

Linking the National Plans for Acceleration and Expansion of Economic Development to Programming in the Education Sector

Volume 1

Main Report



The Education Sector Analytical And Capacity Development Partnership
(ACDP)

Linking the National Plans for Acceleration and Expansion of Economic Development to Programming in the Education Sector

Volume 1 Main Report

Published by:

Education Sector Analytical and Capacity Development Partnership (ACDP)

Agency for Research and Development (BALITBANG), Ministry of Education and Culture

Building E, 19th Floor

Jl. Jendral Sudirman, Senayan, Jakarta 10270

Tel.: +62-21 5785 1100, Fax: +62-21 5785 1101

Website: www.acdp-indonesia.org

Secretariat email: secretariat@acdp-indonesia.org

Printed in April 2017

The Government of Indonesia (represented by the Ministry of Education and Culture, the Ministry of Religious Affairs and the Ministry of National Development Planning/ BAPPENAS, the Australian Agency for International Development (AusAID), the European Union (EU) and the Asian Development Bank (ADB) have established the Analytical and Capacity Development Partnership (ACDP) as a facility to promote policy dialogue and institutional and organizational reform of the education sector to underpin policy implementation and help reduce disparities in provincial and district education performance. The facility is an integral part of the Education Sector Support Program (ESSP) which consists of EU sector budget support with agreed arrangements for results-led grant disbursement, and earmarked policy and program-led AusAID sector development grant support consisting of a school infrastructure program, a nationwide district and school management development program and a program to accelerate the GOI's accreditation of private Islamic schools. This report has been prepared with grant support provided by AusAID and the EU through ACDP.



KEMENTERIAN PENDIDIKAN
DAN KEBUDAYAAN



KEMENTERIAN
AGAMA



Kementerian PPN/
Bappenas



EUROPEAN UNION



The institution responsible for implementation of the study was **PT. Trans Intra Asia**.

The Consultants Who Prepared This Report Are:

1. **Satryo Soemantri Brodjonegoro**, Team Leader/ Education Policy Research Specialist
2. **Bahram Bekhradnia**, Senior Education Policy Research Advisor
3. **John Middleton**, Training And Vocational Education Specialist
4. **Ninasapti Triaswati**, Labor Market Economist
5. **Bruce Mathews**, Labor Market Economist
6. **Anang Kurnia**, Statistician/ Survei Specialist
7. **Premono**, Regional Research Coordinators 1
8. **Herman**, Regional Research Coordinators 2

The views expressed in this publication are the sole responsibility of the authors and do not necessarily represent the views of the Government of Indonesia, the Government of Australia, The European Union or the Asian Development Bank.

Linking the National Plans for Acceleration and Expansion of Economic Development to Programming in the Education Sector

Volume 1

Main Report

Table of Contents

Table of Contents	i
List of Tables	iv
List of Figures	vi
Abbreviations and Acronyms	viii
Executive Summary and Summary of Recommendations	ix
1. Introduction and background to the study	1
1.1. Skills change in the economy	3
2. Methodology and approach	6
2.1. Secondary data.....	11
2.2. Major survey	11
2.3. Focus group discussions	12
2.4. Literature reviews and assessment of international practice.....	12
2.5. Structure of this report	12
3. Demand for skills	14
3.1. Projections based on SAKERNAS data	14
3.2. Analysis of demand: survey of employers	24
3.2.1. Company Distribution and Characteristics	25
3.2.2. Company employment	33
3.3. Principal findings	34
3.3.1. Almost 70 per cent of employers expect to hire more workers in the next 3-5 year period.....	34
3.3.2. The highest percentage of employers expect to hire five workers or less	34
3.3.3. Employers use a variety of methods to recruit new workers.....	34
3.3.4. There is a mismatch between worker availability and required skills	35
3.3.5. Occupations requiring higher technical skills and management expertise are expected to be in highest demand.....	36
3.3.6. Employers see workers with strong skills, both technical and soft, as critical to company success	37
3.3.7. More than 50 per cent of employers felt skill shortages slow down their operations	38
3.3.8. More than 20 per cent of employers did not fill vacancies because of skill shortages	39
3.3.9. More than 65 per cent of employers have hired higher education graduates in the past three years	40
3.3.10. Most companies provide additional training to newly hired graduates.....	40
3.3.11. Almost 60 per cent of companies interviewed do not provide internships for graduates.....	41
3.3.12. Employer assessment of basic graduate skills is largely negative	41
3.3.13. Employers have very weak links with local training institutions.....	42
3.3.14. Most employers make little use of available labour market information	43
3.4. Analysis and Recommendations.....	44
4. Capacity of the SMK and BLK	49
4.1. Formal and non-formal arrangements	50
4.1.1. The formal TVET system	50
4.1.2. Secondary Vocational Schools (SMK)	50
4.2. Non-formal Vocational Training (BLK)	53
4.3. Performance in the labor market.....	55

4.3.1. SMK – performance in the labor market	55
4.3.2. BLK – performance in the labor market.....	60
4.4. International experience.....	61
4.5. Findings from surveys of SMK and BLK.....	62
4.6. Process of Curriculum Development to Match Industrial Needs Applied by SMK, BLK....	65
4.7. Industrial-Educational Cooperation in Developing Graduate Competence	67
4.8. Education-Industrial Links based on RPJMN 2015 (Medium Term Plan).....	69
4.8.1. Access to and Use of Labor Market Information	69
4.8.2. Collaboration with Employers	71
4.8.3. Effectiveness of Fields of Study in Helping Students Find Employment	72
4.9. Conclusions and recommendations.....	80
5. CAPACITY OF HIGHER EDUCATION INSTITUTIONS TO MEET DEMAND FOR SKILLS	85
5.1. Student demand and supply.....	85
5.1.1. Demand.....	85
5.1.2. Supply.....	86
5.2. Ability of universities to respond to future growth	90
5.3. Quality	91
5.3.1. Accreditation.....	92
5.3.2. Curriculum review	93
5.3.3. Real world Experience for students	96
5.3.4. International exposure	97
5.3.5. Faculty Quality.....	97
5.3.6. Institutional disposition	100
5.4. Student Outcomes	101
5.5. Use of Labour market Information	103
5.6. Conclusions and recommendations.....	105
6. RESEARCH AND INNOVATION CAPACITY.....	110
6.1. Introduction.....	110
6.2. The Current Situation in Indonesia	110
6.3. International efforts to improve R&D capacity	116
6.3.1. Innovation	121
6.3.2. Lessons	122
6.3.3. Entrepreneurship.....	122
6.3.4. Lessons	125
6.4. Conclusions and Recommendations – Actions for Indonesia.....	126
7. Strengthening the Labour Market Information System in Indonesia	129
7.1. Review of International Best Practice in LMIS Development.....	129
7.1.1. Background to the review	129
7.1.2. Elements of successful LMIS in different countries	130
7.1.3. Canada.....	130
7.1.4. Lessons learned from the Canadian LMIS.....	133
7.1.5. Singapore	134
7.1.6. Information Dissemination Practices	136
7.1.7. Lessons learned from the Singapore LMIS	136
7.1.8. Hong Kong	136
7.1.9. Organizations involved in the LMI process	138
7.1.10. How LMI is used to inform and influence policy	139
7.1.11. Lessons learned from the Hong Kong LMIS.....	140

7.1.12. Australia	140
7.1.13. Public sector LMI providers.....	141
7.1.14. LMI delivered through the educational system	141
7.1.15. Private LMI providers.....	142
7.1.16. Lessons learned.....	142
7.1.17. Features of an optimal LMIS	143
7.1.18. Conclusion	144
7.2. Current Assessment of Labour Market Information Systems in Indonesia	144
7.2.1. Present Arrangements.....	144
7.2.3. The impact on Labour market Information System Performance	145
7.2.4. Local labour offices	146
7.2.5. Collection of LMI.....	146
7.2.6. LMI reporting	147
7.2.7. Services provided to job seekers	147
7.2.8. Regional government offices (BAPPEDA)	148
7.2.9. Conclusion	149
7.3. Recommendations	149
7.3.1. Development of a Labour Market Information System.....	150
7.3.2. Establishment of Labour Market Information Coordinating Committees.....	150
7.3.3. Conduct of Regular Establishment Surveys.....	151
7.3.4. Need for Counseling and Placement Services at Labour Offices	152
7.3.5. Need for Capacity Building at Government Offices Responsible for LMIS	152
8. BIBLIOGRAPHY	153

Appendix 1 - Annex 1 International Best Practice in the Development of Labour market Information Systems

Appendix 1 - Annex 2 Improving Technical and Vocational Education and Training in Indonesia

Appendix 1 - Annex 3. International Experience with Support for Innovation and Entrepreneurship

Appendix 2 - Projections of Labor Market in Indonesia

Appendix 3 - Brief Review on Policy Direction Relevant To The Study

List of Tables

Table 2.1	Theme of Regional Development under National Medium Term Strategy	9
Table 3.1	Companies Planning to Hire	34
Table 3.2	Planned Company Recruitment by Region	34
Table 3.3	Internships provided by companies.....	41
Table 3.4	Areas where graduate skills are lacking	42
Table 3.5	Use by employers of government labour market information	44
Table 4.1	SMK Sample, By Ownership.....	50
Table 4.2	Senior Secondary Enrolment in 2011/2102.....	51
Table 4.3	Average Number of SMK Teachers 2015, Sample Schools.....	53
Table 4.4	Average Number of SMK Staff 2015 by Civil Service Status, Sample School.....	53
Table 4.5	Employer opinion of SMA and SMK graduates 2015	57
Table 4.6	Share of staff by schooling level identified by firms as in need of training	59
Table 4.7	Per cent of Responding Institutions Reporting Access to Employment Information.....	62
Table 4.8	Institutions maintain labor market and employment information by per cent of institutions responding yes	62
Table 4.9	SMK and BLK: Source of labor market information by per cent responding	62
Table 4.10	Counsellor or teacher assigned to help student find jobs. Per cent of institutions responding yes, by ownership.....	63
Table 4.11	Labor Market Information Provided to Students/Participants, Per cent of Institutions Responding Yes, by Ownership.....	63
Table 4.12	Labor market information provided to teachers, per cent of institutions responding yes, by ownership	64
Table 4.13	Labor market information provided to parents by ownership, percentage of institutions responding yes	64
Table 4.14	SMK BLK: Do Employers Provide Additional Instructors or Trainers.....	66
Table 4.15	SMK BLK: Companies Pay for instructors/Trainers Provided	66
Table 4.16	SMK BLK: Institution Has Internship Arrangements With Employers.....	66
Table 4.17	Reasons why BLK do not organize internship arrangements with employers	66
Table 4.18	Per cent of SMK and BLK With MOUs with Employers by Institution Ownership.....	67
Table 4.19	SMK and BLK: Participate in Meetings on Employment Opportunities, By Ownership.....	68
Table 4.20	SMK BLK Graduate survey conducted annually by percentage of institutions responding yes by ownership.....	68
Table 4.21	Three top ways in which institutions and employers collaborate in curriculum development.....	68
Table 4.22	Per cent of SMK Reporting Access to Employment Information	70
Table 4.23	Per cent of SMK that Maintain Labor Market Information by Region	70
Table 4.24	SMK: Source of Labor Market Information by Region	70

Table 4.25	SMK: Per cent of Responding Institutions Providing, Labor Market Information to Students, Teachers and Parents, by Region	71
Table 4.26	Counsellor or teacher assigned to help students find jobs, by Region	71
Table 4.27	SMK Have MOUs with Employers by Region.....	71
Table 4.28	SMK: Participate in Meetings with Employers on Employment Opportunities	72
Table 4.29	SMK Graduate survey conducted annually, by region	72
Table 4.30	Most effective and least effective fields of study in enabling students to find employment, Java and Bali and other regions combined.	72
Table 4.31	SMK BLK: Budget Issues That Constraint Institution, by Ownership	75
Table 4.32	SMK BLK: Institution Can Raise Funds by Charging Employers.....	75
Table 4.33	SMK BLK Other Operational Costs. Per cent of Yes Response by Institution Type and Ownership	75
Table 4.34	SMK BLK Do Institutions Have Authority to Change Curricula Yes Response by Institution Type and Ownership.....	76
Table 4.35	SMK BLK: Do Institutions Have the Authority to Develop Facilities?	76
Table 4.36	SMK: Constraints to overcome to Improve The Quality of Graduates	78
Table 4.37	BLK: Constraints to overcome to improve the quality of graduates	79
Table 4.38	SMK BLK: Incentives Needed to Make Changes Top Three Responses	80
Table 5.1	Places available vs places occupied for S1, 2014	89
Table 5.2	Places available vs places occupied for D1, 2014	89
Table 5.3	Constraints on developing programs of study – Student Demand.....	90
Table 5.4	Constraints on developing programs of study - Quality of High School Graduates.....	90
Table 5.5	Shortage of Equipment.....	91
Table 5.6	Shortage of physical infrastructure	91
Table 5.7	Shortage of appropriately qualified Staff	91
Table 5.8	Accreditation grades achieved by public and private universities by region (% of programs achieving each grade)	93
Table 5.9	Number of institutions whose students get work experience from local firms.....	96
Table 5.10	Average number of lectures by international lecturers	97
Table 5.11	Percentage of faculty recruited from industry	98
Table 5.12	Number of lecturers with different levels of education qualification	100
Table 5.13	Percentage of institutions undertaking tracer studies	102
Table 5.14	Results of tracer study: graduates in unemployment	102
Table 5.15	Percentage of institutions offering training in generic skills.....	105
Table 6.1	Country Rank of Scientific Publications, 1996–2010	111
Table 6.2	World Intellectual Property Organization patent filings by origin and office, 2007	112
Table 6.3	Percentage of lecturers with different levels of education qualification.....	115
Table 6.4	Average Number of Researcher in Each Institution by Education Level.....	116
Table 6.5	New businesses created	124

List of Figures

Figure 1.1 Trends in Routine and non-routine task input 1960-1998.....	4
Figure 2.1 Potential Economic & Industry by Corridor	6
Figure 3.1 Labour Projection by Education Level, 2014-2018: Agriculture - National	15
Figure 3.2 Labour Projection by Education Level, 2014-2018: Mining - National.....	16
Figure 3.3 Labour Projection by Education Level, 2014-2018: Manufacturing Industry – National	17
Figure 3.4 Labour Projection by Education Level, 2014-2018: Electricity, Gas and Drinking Water - National.....	18
Figure 3.5 Labour Projection by Education Level, 2014-2018: Construction and Real Estate - National.....	19
Figure 3.6 Labour Projection by Education Level, 2014-2018: Trade, Hotel and Restaurant - National	20
Figure 3.7 Labour Projection by Education Level, 2014-2018: Transportation and Communication - National	21
Figure 3.8 Labour Projection by Education Level, 2014-2018: Finance - National	22
Figure 3.9 Labour Projection by Education Level, 2014-2018: Other Services - National.....	23
Figure 3.10 Company Type	25
Figure 3.11 Company Status.....	26
Figure 3.12 Sample Distribution of Food Crop Companies by Operational Office.....	27
Figure 3.13 Sample Distribution of Livestock Companies by Operational Office.....	27
Figure 3.14 Sample Distribution of Plantation Companies by Operational Office	28
Figure 3.15 Sample Distribution of Forestry Companies by Operational Office	28
Figure 3.16 Sample Distribution of Tourism Companies by Operational Office	29
Figure 3.17 Sample Distribution of Land Transport Companies by Operational Office	29
Figure 3.18 Sample Distribution of Air Transport Companies by Operational Office.....	30
Figure 3.19 Sample Distribution of Marine Transport Companies by Operation Office	30
Figure 3.20 Sample Distribution of Fishery Companies by Operational Office	31
Figure 3.21 Sample Distribution of Mining/Energy Companies by Operational Office.....	31
Figure 3.22 Sample Distribution of 'Other' Companies by Operational Office	32
Figure 3.23 Company Ownership	32
Figure 3.24 Company Economic Activity	33
Figure 3.25 Distribution of Employment by Occupation.....	33
Figure 3.26 Employer Recruitment Methods.....	35
Figure 3.27 Company Difficulty in finding new workers	35
Figure 3.28 Company Assessment of Worker Skill Availability	36
Figure 3.29 Occupation areas in demand.....	37
Figure 3.30 Importance of soft skills to companies by region	38
Figure 3.31 Importance of technical skills to companies by region.....	38
Figure 3.32 Implications of skill shortages to companies	39
Figure 3.33 Employer response to finding adequately skilled workers.....	40
Figure 3.34 Company recruitment of higher education graduates in past three years	40
Figure 3.35 Amount of training provided by employers	41
Figure 3.36 Company links with local higher education institutions	43

Figure 3.37 Company participation in institution job fairs.....	43
Figure 3.38 Example of employer responses about graduate skills and abilities	46
Figure 4.1 Gross enrolment rate of senior secondary learners 2006/2006 to 2011/2012	51
Figure 4.2 Gender parity indices in senior secondary schooling	52
Figure 4.3 Employer's 2010 Opinion of Quality of Employees with Senior Secondary Education (%).....	56
Figure 4.4 Relative Wages SMK to SA Graduates, Age 20-24 (2002-2007)	58
Figure 4.5 Unemployment Rate for SMK and SMA Graduates.....	58
Figure 4.6 Number of Months to Find a Job, New Graduates, 2006.....	58
Figure 4.7 Mean score in mathematics and reading, PISA, 2012	60
Figure 4.8 Main Strengths of Informal Education as Perceived by Employers	61
Figure 5.1 % growth in the named disciplines between 2009-2014 (D1 & S1).....	85
Figure 5.2 Match between places available and places occupied	86
Figure 5.3 Constraints on expansion.....	88
Figure 5.4 Accreditation grades achieved by public and private universities	92
Figure 5.5 Percentage reporting a process to revise curriculum	93
Figure 5.6 Percentage of institutions that last revised curriculum within the stated time	94
Figure 5.7 Institutions with curriculum advisory committees with representatives from industry	95
Figure 5.8 Institutions with curriculum advisory committees with representatives from industry – regional and subject breakdown.....	95
Figure 5.9 Percentage of institutions providing internships a part of the program.....	97
Figure 5.10 Faculty qualification levels.....	98
Figure 5.11 Sources of information about the labour market.....	104
Figure 6.1 Effect of different levels of decision making about research topics	120
Figure 6.2 Universities providing start-up support for spin-out enterprises.....	123
Figure 6.3 Universities offering courses in entrepreneurship.....	124
Figure 7.1 Career one stop coach website.....	133
Figure 7.2 Local labour offices reporting by region	146
Figure 7.3 How local labour offices obtain vacancy information from employers	147
Figure 7.4 Services provided by local labour offices to job seekers	148
Figure 7.5 BAPPEDA: Involvement of local agencies in preparation of regional development plan.....	149

Abbreviations and Acronyms

ACDP	Kerjasama untuk Pengembangan Analisis dan Kapasitas	Analytical and Capacity Development Partnership
AEC	Komunitas Ekonomi ASEAN	ASEAN Economic Community
ADB	Asian Development Bank	Asian Development Bank
BALITBANG	Badan Penelitian dan Pengembangan	Research and Development Board
BAPPENAS	Badan Perencanaan dan Pengembangan Nasional	Ministry of National Development Planning
BLK	Balai Latihan Kerja	Center of Work Training
FGD	Kelompok Diskusi Terfokus	Focus Group Discussions
ILO	Organisasi Ketenagakerjaan Internasional	International Labour Organization
KADIN	Kamar Dagang Indonesia	Indonesian Chamber of Trade and Industries
MoEC	Kementerian Pendidikan dan Kebudayaan	Ministry of Education and Culture
MoF	Kementerian Keuangan	Ministry of Finance
MoRA	Kementerian Agama	Ministry of Religious Affairs
MSS	Standar Pelayanan Minimal	Minimum Service Standards
SISLATKERNAS	Sistem Latihan Kerja Nasional	National Training System
SD	Sekolah Dasar	Primary School
SMP	Sekolah Menengah Pertama	Junior Secondary School
SMK	Sekolah Menengah Kejuruan	Vocational School
JUKNIS	Petunjuk Teknis	Technical Guidelines
TIA	Trans Intra Asia	Trans Intra Asia
ToR	Kerangka Acuan Kerja	Terms of Reference
TVET	Pendidikan dan Latihan Teknik dan Kejuruan	Technical and Vocational Education and Training

EXECUTIVE SUMMARY AND SUMMARY OF RECOMMENDATIONS

1.1 INTRODUCTION AND METHODOLOGY

At present a substantial part of Indonesia's wealth is based on agriculture, and the extraction of raw materials. The economic and industrial strategy pursued by the present government, like the previous, recognizes that this is not a sufficient basis for achieving the country's full potential, and is focused on developing intellectual, manufacturing and service-based industries that can add value to the abundant raw materials and agricultural goods that are produced. And it recognizes also that it will not achieve this unless its workforce is educated to a far higher level than at present, unless its education institutions and economic needs of far better aligned, and its research and innovation base strengthened.

The present project is concerned with the education implications of the economic and industrial strategy and what will be required in order to bring it to fruition, together with identifying the labour market information that will be required and a system for providing this.

1.2 DEMAND FOR SKILLS

In the absence of good labour market information, we adopted a two pronged approach to examining the question of skills needs and the issues that arise in the present circumstances. First we interrogated the Sakernas data in order to develop projections at a high level – this provided a macro-level analysis. And second, we conducted a detailed survey of employers, which asked about their hiring patterns and intentions, skills needs and the impact of skill shortages and where they arose.

Using SAKERNAS data we made projections of trends in skill levels to 2014–18, from which it is apparent that there will be acceleration in skills levels required in most sectors, with the strongest growth in high-level skills demand arising in finance, in transport and communication and in "other services". The only sectors not showing significant increases in high-level skills are agriculture, manufacturing and construction. Demand will vary in different regions, and information about this should be part of the labour market information systems that we recommend should be developed at both local and national levels.

Our main conclusions from the employer surveys are that the majority of companies plan to hire more workers during the next 3-5 years, most using local private employment agencies to find workers, particularly at the skilled and more senior levels, and only slightly more than 7 per cent using on-line advertising.

The following conclusions also arise from our survey:

- There is a mismatch between worker availability and required skills; while finding workers was not indicated as a problem for most companies, the issue of workers with the required skills was a different story. Less than 50 per cent of employers felt the workers available would have the required skills. It should be emphasized that this finding refers to all workers – not just those emerging from the education system.
- More than 20 per cent of employers did not fill vacancies because of skills shortages. The highest number 30 per cent stated they increased their recruiting efforts to find

more workers. The second highest method (21 per cent) was to increase overtime hours for existing skilled staff, while 11 per cent were forced to hire less qualified applicants. Only 3 per cent of employers were prepared to venture outside of the country to seek qualified workers.

- Almost one-half of the employers interviewed were concerned that skill shortages slow down their existing operations and over 30 per cent felt this would slow the expansion of future operations. Further over 20 per cent feel that skill shortages directly reduce knowledge transfer.
- Occupations requiring higher technical skills and management expertise are expected to be in highest demand. There will be demand for technicians, engineers and supervisory and senior management personnel and to a lesser degree there will be a requirement for research assistants, personnel managers, machinists and metal fabricators.

As far as the employment, training and skills of graduates is concerned

- 65 per cent of employers sampled had hired higher education graduates during the last three years, while 35 per cent had not.
- Across all regions employers on average provide up to three months of training to newly hired graduates.
- Almost 60 per cent of employers interviewed do not provide internships for graduates.
- Employer assessment of basic graduate skills is largely negative with employers assessing reading and writing skills as very poor. This was followed by work habits, communication, and team work which were assessed by employers as poor. Technical skills were also assessed as relatively poor.
- Employers have weak links with local training institutions. Across all regions only 7 per cent of employers have input into curriculum development, 12 per cent use institutions for staff training, 7 per cent enter into joint research projects and 7 per cent have staff arrangements for instructors. Only in the provision of interns is the involvement higher with 32 per cent of firms accepting interns.
- Less than half of the employers interviewed made use of labour market information. More than 93 per cent of employers did not make use of local government offices in the recruitment of new workers and only 13 per cent of employers participated in job vacancy surveys conducted by government labour offices. On average only 40 per cent of employers make any use of labour market information available on the internet.

Many of the recommendations presented in this report address measures to strengthen linkages between employers and the higher education institutions. The survey reflects employer demand for more highly skilled workers in the technical and science fields. Their main concern is not that they are unable to recruit workers (although there are some concerns about this) – but rather that the workers they recruit generally lack the required skills and knowledge. In particular employers are highly dissatisfied with the basic cognitive skills possessed by graduates from the education system at all levels. This is an important issue and needs to be addressed by the education system as poor basic skills make graduates far less employable and impacts on the development of the Indonesian economy.

It should be noted that in the third National Medium Term Development Plan (RPJMN) for 2015-2019, the Indonesian Government proposes a number of strategies in this regard, including curriculum development that is aligned with employment needs based on input

from business and industry; alignment of curriculum development programs and vocational skills according to the main economic activity in the district/city and labor market needs

However, it should be noted also that we have not attempted precisely to quantify the need for specific skills in specific industries over the coming period. The data do not exist to enable us to do so, and that would in any case be wrong. One lesson that comes through clearly from international experience is that detailed manpower planning that was once fashionable – identifying in precise detail industries that would grow and the occupations and skills that they would require, quantified and precisely identified - is not a successful approach. What is successful is to ensure that labour market signals are provided in a form that education institutions are able to respond to rapidly and flexibly, and to enable them to do that. And in order to enable that what is needed is local information and local structures, and that is what we recommend here.

Policy options arising from the analysis of demand

Addressed to MoEC and MoM

- Government should take the lead in developing measures to strengthen the linkages between employers and the higher education institutions

Addressed to the Ministry of Education and Culture

- In response to negative employer opinion about basic graduate skills the Ministry of Education and Culture should conduct employer satisfaction surveys as a starting point in addressing this problem
- MoEC should consider the international experience we report on in our enterprise study to institute regular employer consumer surveys for the SMK and SMA. Made publicly available, the findings of these surveys could increase the accountability public and private SMK, providing an incentive to improve their performance. These surveys could also generate useful independent monitoring support to local and Provincial governments

Addressed to MoM

- Better information sources should be developed to provide information about skills gaps
- Measures should be taken to address the identified need from the survey sample for higher skilled occupations

Addressed to Higher Education Institutions

- All higher education institutions should have in place job placement/ career centres and involve employers actively in their services

Addressed to Provincial Governments

Training advisory committees should be established at each education institution to involve employers in the development of curricula and program planning to meet local labour market needs

Addressed to Ministry of Research Technology and Higher Education

- Provision of grants to higher education institution to align their programs with the world of work and with global trend.

1.3 REVITALIZATION OF SMK AND BLK

In our survey, three-quarters of employers responding reported that SMK graduates are ready to develop their technical capacity to work in their company, that the schools have supplied their graduates with technical skills that match the needs of the economy and that the schools have provided graduates with an adequate balance of technical concepts, theoretical knowledge and analytical skills. Their satisfaction with the technical skills that students have acquired is in contrast to their dissatisfaction with basic skills (see below). While employers give high ratings to the technical skills of SMK graduates that they hire, they also report that thirty per cent need training after they are hired.

Although the future is always uncertain, as the recent China experience demonstrates, it is most likely that for some time to come the skills structure of the current economy will determine most of the demand for skills. Using SAKERNAS data on the education structure of the current workforce we projected demand for workers across all education levels out to 2018. The projections show that demand for SMA graduates will grow more quickly than for SMK graduates in the Transport and Communications, Finance, Social Services, Trade, Hotel and Restaurant, and construction and Real Estate Sectors. SMK graduates are projected to be in higher demand than SMA graduates only in Mining and Manufacturing. This growing demand for SMA graduates is an early signal of the value employers place on cognitive skills. Sixty per cent of SMA graduates proceed on to post-secondary education while only about ten per cent of SMK graduates follow this path.

And although any increase in demand for secondary school graduates is most likely to be met, the quality of the graduates rather than their numbers is likely to be the main issue, and that in turn depends on junior school outcomes which the poor results in OECD's PISA test of mathematics and reading suggest need improvement. Improving basic and junior secondary education would make a substantial contribution to the quality and effectiveness of both SMA and SMK education and, over time, enable a much larger share of SMK graduates to be prepared for to enter formal employment.

There is currently substantial variation in the practices of SMK in the use of labor market information and building collaboration with employers. Our survey has shown that while virtually all SMK in our sample access labor market information less than 50 per cent of the public SMK share the information with students, teachers and parents.

European experience shows the value to both skill and behavioral learning of structured and supervised apprenticeships as an integral part of secondary vocational education. SMK internships are weak by comparison. 90 or more per cent of public SMK report arranging work internships for their students but these are ad hoc arrangements not well integrated with the curricula. So more formal and better structured internships would be an invaluable learning experience.

Only a quarter of SMK owned by districts and cities report participating in meetings with employers on employment for their students but even fewer - less than 10 per cent - of SMK owned by Central and Provincial Government do so. On the other hand, nearly half of private SMK owned by Foundations follow this practice. Market forces may be in play for the private SMK.

Our data suggest strongly that SMK are not accountable for employment outcomes. Practice varies according to ownership and locality, but only a small minority of SMK conduct an

annual survey of graduates. Clearly, if there are no data on employment outcomes both the public and private SMK are not accountable for the outcomes that justify their costs.

Our survey also found that SMK can identify courses of study that are effective in helping students find jobs, and are also equally able to identify ineffective courses. But despite this, currently SMK cannot change their courses of study. SMK follow a national curriculum that was put in place eight years ago and has not been updated since. And as part of a national reform, most public SMK teachers are now civil servants. So although new courses of study designed to support the projected new economy would require teachers with different skills, civil service teachers are not easily laid off and so teachers with redundant skills cannot be replaced.

There are other constraints on linking public SMK to changing skill needs. From secondary sources we know that all levels of government are unlikely to take SMK performance into account when allocating budgets. This lack of accountability for outcomes is a major constraint on SMK quality and labor market responsiveness.

The central challenge to the SMK is to improve the quality of instruction generally and, more significantly, take strong steps to better serve the half of the student body that does not now enter formal employment. If successful, a quality improvement program could increase the share of graduates prepared for work in formal sector from about 600,000 annually now to close to 2 million when universal secondary education is achieved.

The MoEC will clearly have the main responsibility in leading change.

It will not be easy to or cheap to move the SMK toward the performance levels required for a high-income economy. These schools are currently rigid in curricula and staffing, and until these constraints can be eased to better enable them to respond to changing skills needs, some groundwork could be laid.

It will be important that SMK move toward increased flexibility of curriculum and staffing to support the emerging regional economic strategy. Over the medium term, pilot projects could be developed to test new practices across the regions

Policy options arising from the study of SMK

Addressed to MoEC

- MoEC should take steps to better monitor the use of labor market information by the SMK. This task could be assigned to District Education Offices with the annual SMK report as a vehicle. This would be a first step in improving accountability.
- MoEC should take further steps to initiate a process aimed at improving accountability and quality in the SMK system. It could be helpful to convene consultations at Province and District/City levels involving employers, SMK Principals, Government officials, and citizens to develop strategies and proposals for consideration. This process could well be linked with the proposed National Vocational Education Council that is now being considered.
- MoEC should consider strengthening the staffing, expertise and funding of the district and city education offices that fund and manage more than 80 per cent of the public SMK to enable them to actively monitor and report annually and publicly on the employment outcomes of each SMK in their jurisdiction. Continuing support of local governments for this should be contingent on their performance. Consideration could be given to establishing a local Skills Committee comprised of employers,

educators and citizens to guide and oversee this process.

- MoEC should establish and support a high-level Working Group to assess and evaluate the present condition of SMK internships and recommend strategies and action plans to bring these internships closer to international good practice. This working group would need to have access to resources, and also expertise, which we believe should be drawn from among Indonesian institutions.
- We recommend that, pending the finding of this Working Group, the MOEC consider Norway's internship model of subsidizing the employer costs of a six-month apprenticeship at the level of half the annual of a year of SMK education with half of the subsidy going to the student in wages as an incentive to employers and students alike.
- Above all, MoEC should determine ways in which the courses of study of the SMK could be regularly updated and periodically replaced as the skill needs and employment opportunities change with the economy. This will be essential to aligning SMK courses with the changing regional economies under the RPJMN 2015. For example, a district or city government could be empowered and financed to work with employers, schools and citizens to identify courses of study that are not effective in the local economy and seek the support of the MOEC in replacing them with other SMK courses of study in the near term.
- Over the longer term, and depending on progress made in monitoring and accountability, MoEC should consider providing financial incentives to local governments and to the SMK to reward improvements in the employment outcomes of public and private SMK
- There should be a reform in the definition and role/mission of SMK. SMK could not be conducted as it is any longer otherwise SMK will be marginalized totally. SMK should be a special school due to its uniqueness and strength, not just another secondary school. Therefore number of SMKs should be limited (e.g. in Japan only 5).

The BLK system is small, aging and expensive. BLKs have little autonomy or accountability: there are no rewards or sanctions in the governance of the system. Appropriately, the MoM and MOEC are considering reforms that could revitalize the BLK through integration with the SMK, and indeed A number of BLK have MOUs with SMK and the World Bank has reported that a substantial number of SMK students and graduates take short training courses at the BLK.

Some reforms are already in progress. In addition to the urban BLK the MoM operates a successful program of Mobile Training Units (MTU) that provide training in skills appropriate to rural areas and in the informal sector. More than 50,000 persons graduate from MTU programs each year.

New self-paced competency-based training packages have been introduced but they are being implemented in only a small number of centres. Most BLK conduct training on a classroom schedule. Trainees are assessed internally with little reference to national standards.

The instructor force is aging and over 400 have left employment and only 40 per cent of the vacancies have been filled. The loss of staff is considered a significant threat to training effectiveness. Most BLK have not received new equipment since 2000.

BLK are expensive: the average cost for a three month BLK course is reported to be Rp. 17 million, similar to the cost of one year of education in some public tertiary education institutions. Consequently – because of the small number of BLK, their cost and the lack of national standards, there is a large private training market for the kinds of skills that the BLK offer, with even more concern about the standards attained.

Finally, our survey found that the BLK lag behind the SMK in the use of labour market information and collaboration with employers, such as through internships.

Policy options arising from the study of BLK

Addressed to MoM

- We recommend that ways should be found to better leverage the resources of the BLK, possibly through stronger linkages with the SMK.
- With an aging and shrinking teaching force, an uncertain curriculum reform, deteriorating equipment and facilities, and very high costs, the formal urban BLK should be reformed to better adapt their resources to the future economy.
- In developing these reforms, the MoM could consider models for linking skills training with formal vocational education that have been well developed in the USA, especially the Area Vocational Centres that provide accredited courses to secondary school students as well as non-formal training for out of school youth and unemployed adults.
- The Mobile Training Units (MTU) program should be continued and should remain under public management with district governments playing a stronger role.

1.4 CAPACITY – UNIVERSITY EDUCATION

As stated above, it is unwise to attempt to project in any detail or precision the likely future demand of the labour market for specific skills and translate that into precise requirements from the education system. We were nevertheless able to take a view about broadly whether the university system was likely to be able to meet the demands made of it for skilled manpower as a result of the RPJMN policy. Our conclusion is that in terms of pure numbers it will be able to do so.

Demand for highly skilled manpower is likely to increase substantially (although it is not possible to say in detail what the nature of that demand will be); and there is sufficient potential student demand, and the capacity of the university system - in terms of both of physical capacity and the availability of academic staff – will be sufficient, to meet needs as they are foreseen at present.

But there are two caveats. First, presently foreseen needs are not sufficient to move up to a more knowledge-based economy with more downstream industries. Second this analysis is purely in terms of numbers and physical capacity. The quality of the output of the education system is even more important than quantity, and therein lie serious doubts. And although we caution against detailed and precise manpower planning, universities of course have to be in a position to respond flexibly and rapidly to labour market needs as they evolve. So we recommend the creation of local labour market information networks, precisely to provide education institutions at all levels with this sort of information on the basis of which they can both advise students and modify their program offerings.

In pursuing the above questions we consider the matter of physical supply and demand – on the one hand whether students are demanding higher education in sufficient numbers to

meet need, and will do so in future; and on the other whether institutions are able to meet the demand now and potentially in the future as well. Based on our survey results we have concluded that the situation is broadly positive. However, there are some regionally specific concerns, and to major general cautions:

- physical resources
- the availability of adequately qualified faculty.

We do not think that these need be long-term constraints on expansion:

- if they recruit additional students, universities will obtain sufficient additional income to repay the costs of additional plant and equipment
- we believe that a Masters qualification is the appropriate level for most undergraduate teaching (it is a different matter for research) and we have noted with approval the Government's commitment to increase the number of Masters graduates sevenfold within 10 years.

These conclusions hold for both for S1 and D1 places, though there appears to be a serious imbalance between the two with a large preponderance of S1 places compared to D1.

The quality of provision is more important than quantity. There is now good research evidence that simply increasing the number of graduates will have a limited impact upon economic progress – what matters is the quality of those graduates. Here there is rather more concern. Examination of accreditation scores reveals wide variations – not only between public and private institutions, which is well known, but between large institutions and small institutions and also between regions.

We found an almost linear relationship between accreditation grades and size of institution, with small institutions having a far worse accreditation record than large institutions, and there were marked differences between regions as well, with the Papua, Nusa Tengarra and Kalimantan regions in our sample having no Category A accreditations in either public or private institutions. This has significance in view of the Government's medium term strategy intention to reduce disparities and build up capacity in all regions, related to their industrial strengths.

Other indicators of quality – and in particular the existence of processes for reviewing the curriculum and the engagement of industry in such processes - appear satisfactory across the country and in all disciplines, and the availability of work experience and internships are also high. However, there are some regional differences which will need to be addressed if the Government's strategy is to be achieved.

Related to the variation in quality is the comment made to us by employers that they find that graduates with similar qualifications often differ considerably in the skills and knowledge that they have acquired while at university. There are large variations in standards. That is a serious shortcoming, but is one which is addressed by the project parallel to this one looking at the implementation of the Qualification Framework (ACDP 20).

The other thing that will impact upon standards, even more directly, will be the establishment in Indonesian higher education of a properly functioning quality assurance process. In our view both the remit and the resources of BAN--PT are inadequate, and we believe that if these are increased and broadened, as we recommend, that will impact positively and substantially on the quality of provision.

The ultimate measure of quality is the outcomes for the graduates produced by the education system. The great majority of institutions said that they conducted tracer studies to follow up the outcomes for their graduates, and moreover that the outcomes were broadly positive – though again with some worrying regional and discipline variations.

Finally, we think that the Government should be actively involved in seeking to improve the provision of information of all kinds – and we have recommended that tracer studies should be conducted and their results published, together with information about the professional accreditation of program and other critical facts.

The replies to questions about labour market information systems give particular cause for concern. It is apparent that very little use is made of official sources of labour market information, because, according to replies in the focus group discussions these are not trusted, are out of date and are not relevant. It is essential that these are reformed to make them valuable resource, and we make recommendations about this.

Policy options arising from the analysis of the capacity of universities

Addressed to the Ministry of Research, Technology and Higher Education

- The Government should conduct the review proposed by the OECD, aimed at rationalizing provision on a provincial level, as one instrument in the improvement of quality, and this review should specifically consider how smaller institutions might be rationalized and their quality increased, as well as the balance of provision between D1 and S1 levels..
- BAN-PT should be provided significantly increased resources and its remit should widen from accreditation to one of quality assurance more generally, and it should consider issues of outcomes as well as inputs and process that bear on the quality of provision
- The Government should take steps to publish a relatively small number of performance indicators covering all universities in the country, to provide information about student outcomes, and these should include annual tracer studies, and possibly a student satisfaction survey
- A separate and serious study should be undertaken – or better still studies that have previously taken place should be reviewed – with a view to an unequivocal commitment to increase the autonomy of public institutions – both managerial, governance, financial and academic autonomy - beginning with those judged to be of the highest standard and which are most prepared for autonomy
- Higher education institutions should be provided with autonomy for their accountability. With autonomy the institution will be able to achieve its mission effectively.

Addressed to Provincial Governments & Universities

- As proposed in Chapter 3 below Local networks of employers, government and education institutions should be created to ensure that education institutions at all levels are geared into the local employment environment, and universities should be part of these networks and play an active part.

Addressed to Universities

- All universities should ensure that all relevant programmes – that is to say programs that aim to prepare students for specific occupations – are informed by curriculum advisory committees at faculty, departmental and even program level with representatives from industry and are reviewed at least once every five years

1.5 RESEARCH AND INNOVATION CAPACITY

Economically successful countries have well developed research and innovation systems, and there are numerous examples of countries that have sought to develop their economies by developing these – and their higher education generally – as one of the elements on the way to achieving that. Indonesia needs to develop its research and innovation capacity if it is to achieve its economic ambitions.

At present Indonesia performs worse than the majority of its neighbors, on most generally accepted measures of research performance – and in particular publications and patents on the output side and faculty qualifications and finance on the input side. This is beginning to be addressed with the welcome creation of the Indonesian Science Fund. However, how the Fund operates, its priorities, parameters and programs will be of the utmost importance to ensure that its benefits are maximized. Among the lessons to be drawn from international experience are the following:

- There is a balance to be struck between supporting excellent research and building capacity. Although building capacity is an important consideration, limited research funds mean that in a competitive environment there is an opportunity cost associated with overlooking excellence as the key consideration.
- Nevertheless, the ISF can legitimately – and should – identify research priorities and topics judged to be in the national interest
- Availability of staff is a constraint. In only three Regions in our survey – Java, Sumatra and Sulawesi – do more than 20 per cent of faculty have PhDs, and in all the others the proportion is nearer just 10 per cent. This is no basis for developing a strong research base – and it is essential that there is some research strength throughout the country.

There are a large number of initiatives, most found in Asia, Europe and the Middle East, intended to drive/maintain national competitiveness and attractiveness to mobile investment and talent, as some governments have become concerned that they are/have been under-investing vis-à-vis their competitors. These realizations are leading many countries to restructure their higher education and research systems with the primary objective of ensuring that some of their universities become outstanding in research, and are able to match the best in other countries.

This Report provides an account of a number of international approaches to improving research and innovation capacity, from which a number of strands are apparent:

- Increased public investment in basic research
- Highly selective distribution of that investment
- Mergers, in order to achieve universities with critical mass – on the assumption that critical mass is necessary for high-quality.
- Importing talent is a feature that appears in some of the strategies.

- An emphasis on the development of basic and applied research, which provide the cornerstone – the sine qua non - of innovation and applied research.

In considering the balance between supporting excellent research and building capacity, the best approach would be to invest selectively but substantially in a relatively small number of institutions in order to boost their research capacity and output, but do so in a way that might have spin-offs for other institutions.

The aim should be to encourage cooperation and clusters so that every region has at least one research university that aims to be of national significance and a beacon for research into the topics of research significance for that region; and that each province has at least one university where significant research activity takes place – though at a lower level of intensity than in the regional research universities. And the aim should be that ultimately 3 or 4 universities in the country develop their research capability to be world class.

Innovation and entrepreneurship do not exist independent of basic research, fundamental discoveries, and the availability and development of the staff needed in order to innovate and exploit these discoveries. So given Indonesia's poor performance in basic research it is not surprising that innovation and entrepreneurship are underdeveloped – manifested for example in its poor performance in creating new businesses. This is something recognized by the Government, and statements have been made signaling Government policy to encourage entrepreneurship

Both Government and universities need to do more to support innovation and entrepreneurship. The aim of innovation support – whether from universities or from Government – is to unlock the capacity of universities and their staff for innovation, bringing to bear their theoretical knowledge into exploitable goods and services.

Policy options arising from the analysis of research capacity

Addressed to the Ministry of Research, Technology and Higher Education & the Indonesian Science Fund

- There should be increased and targeted funding for basic science – targeted both in the sense of identifying strategic topics, and also identifying those institutions where research is to be concentrated, and where funding is to be principally directed.

Addressed to the Indonesian Science Fund

- The Indonesian Science Fund should conduct a review of research strengths - strategic topics, the most promising people and the institutions with the greatest potential - around the country, with the aim that every region has at least one research university, that each province has at least one university where significant research activity takes place, and that ultimately 3 or 4 universities in the country develop their research capability to be world class.

Addressed to the Ministry of Research, Technology and Higher Education

- In order to meet the need for an increased number of gifted researchers the Government should implement two programmes: one explicitly concentrated on drawing Indonesians undertaking research in overseas institutions to return to a relatively small number of Indonesian universities, and the second to send faculty abroad to undertake PhDs with the requirement that they return to their parent university.
- The Government should consider a program to provide dollar for dollar funds for any money generated by universities from entrepreneurial activity.
- The Government should encourage those universities in receipt of Government funds – whether through the ISF or otherwise – to establish centrally located infrastructure support such as technology transfer offices, incubator facilities and science parks, and should consider providing seed funding support for this purpose
- The Government should provide incentives (e.g. competitive grants) to all universities to develop entrepreneurship programs – which can be done collaboratively between institutions, not necessarily discretely by individual institution

1.6 DEVELOPMENT OF LABOUR MARKET INFORMATION SYSTEMS

The following actions were taken to assess the LMIS:

1.1. Review of International Best Practice in LMIS Development

We reviewed international best practice in the development of labour market information systems (LMIS) in selected countries and the methods used to identify skills gaps and shortages linked to projections of labour demand and economic development.

Based on our review seven fundamental features of an optimal LMIS were identified. These are:

- Good governance and cost-effectiveness;
- Timely, accurate and relevant data
- Effective analysis and interpretation of data;
- Competent labour market analysts;
- Information that is easily accessible to users through a variety of outlets;
- Knowledgeable intermediaries; and
- Development of education and guides for effectively using LMI.

1.2. Results from the survey of government agencies in Indonesia on use of LMI

A survey was completed of a sample of local labour offices and a number of regional government offices (BAPPEDA) to gain a better understanding of how LMI is developed and disseminated in the country.

The majority of LMI collected by the labour offices relate to job seekers and employers who use the services of the office, including vacancy information, number and type of job seekers, number of placements, results from job fairs, training data and the outcomes from job fairs.

The main responsibility of the BAPPEDA office is the development of a regional development plan. As far as the LMI area is concerned the offices develop a skills development plan which helps to fund the programs of the local agencies such as the labour offices. Survey results show that in terms of the development and distribution of LMI the BAPPEDA offices have little direct involvement.

The results from the government surveys show that the use of LMI is very limited. The Indonesian labour market information system is particularly weak at the district/local level. In general the collection, analysis and dissemination of labour market information is very fragmented in the country. There is a pressing need to better coordinate these functions to ensure that the primary users of LMI including policy makers and planners, employment services, training institutions, employers; students and job seekers receive timely and accurate data and information. The collection of information from employers on the demand for workers and their skill requirements is particularly weak as opposed to supply information on job seekers and graduates from training institutions which is fairly readily available.

Under the third National Medium Terms Development Plan (RPJMN) of 2015-2019, the Strategic Plan of the Ministry of Manpower addresses the need for a more effective LMIS. In particular, the Ministry Plan proposes to facilitate labour mobility and functioning of the labour market by: (a) Improving the effectiveness and efficiency of the labour market as well as maintaining the balance between supply and labor requirements; (b) Integrating the labour market information system (LMIS) to respond to the information needs of companies, training providers and job seekers as well as policy makers to work together with the private sector job market; (c) increasing industry involvement in the design and implementation of employment services, as well as the development of a standard system that uses a feedback mechanism from stakeholders; (d) ensuring that job placement and counselling are implemented correctly; (e) improving outreach/cooperation between educational institutions, and employers to develop an ongoing collaboration. This is a positive step and is supported by our recommendations.

Policy options arising from the analysis of Labour market Information Systems

Addressed to the Ministry of Manpower

- As a strategic priority the Government should ensure the development of a labour market information system and provide incentives and structures to implement this.
- The Ministry of Manpower and the regional labour offices should conduct regular establishment surveys to obtain demand data and statistics.
- Each local labour office should be mandated to provide placement and counselling services to its clients
- The Ministry of Manpower as part of the operational policy to implement an effective Labour Market Information System, should plan and implement a wide-ranging program of capacity building covering all levels of government and others with responsibility for implementation

Addressed to provincial government

- A Labour Market Information Coordinating Committee should be established in each region of the country to coordinate and advise on all matters related to the labour market. As a first step one region should be selected and a committee

should be established that would serve as a model for the other regions.

1. Introduction and background to the study

This project was born out of the previous Government's MP3EI strategy and its recognition that as the world's fourth largest country by population, Indonesia underperforms as an economy. Its precise location in the ranking of economies varies according to date and authority, but at best it lies in the lower teens – between 16th and 20th – and there is recognition that in order to achieve the desired economic boost the balance of economic activity will need to change.

Although the MP3EI project has been superseded with the arrival of the new government and the issue of Presidential decree 2/2015, promulgated on 8 January 2015 which launched the National Medium-Term Plan, the issues that underpinned many aspects of the vision that drove that project have been carried forward into the new government's medium-term economic strategy, and have been repeated in one way or another by other commentators and global authorities.

And although the fundamental approach – the identification of geographically-based Development Areas and strategic industries for development in those areas – remained similar, there are seven Regional Development Areas in the Medium-Term plan, compared to six 'Corridors' in MP3EI, and the details of the industries in each area are differently described. Where necessary we have modified our approach to fit the new Medium Term Plan.

The other significant difference between the MP3EI and the medium-term strategy is that the latter has a five-year horizon compared to the 25 year horizon of the MP3EI. That is a helpful change which will, for example, mean that employer perceptions of skills needs are likely to be much more meaningful – while it is reasonable to ask employers to say what they anticipate their needs will be five years hence, that is not so 25 years hence. In this report, unless otherwise specified, we have taken the Medium-Term Plan's five-year horizon while setting it in the context of the longer term.

At present a substantial part of Indonesia's wealth is based on the tertiary sector – agriculture, but also the extraction of raw materials. Because of Indonesia's good fortune to have an abundance of raw materials and a fertile and productive land, it has exploited these and benefited. However, if it is to move up a step in terms of economic performance there is recognition that that will not be achieved by continuing along this path. Simply to allow foreign companies – or even Indonesian companies – to extract its raw materials, but then to take these overseas to add value – simply to rely on income from upstream activity, but allow others to reap the far greater benefits available from downstream activity – is seriously to miss a trick. The economic and industrial strategy pursued by the present government, like the previous, recognises this, and is focused on developing downstream industries that can add value to the abundant raw materials and agricultural produce that are produced.

That is the vision. The achievement of that vision is complicated by the changing macroeconomic climate within which the country operates. While there appears to be some differences between different authorities' views of the immediate prospects for the country, the consensus appears to be rather more downbeat than was current only two or three years ago, with economic growth slowing and inflation and unemployment increasing. That complicates the prospects for achieving the industrial vision, but it does not negate the validity of that vision.

The other major consideration, and the one that has given rise to the present project, is the recognition that for the country to achieve its ambitions it has to develop into what is now commonly described as a "knowledge economy", and that it will not achieve this unless its workforce is educated to a far higher level than at present and unless its education institutions and economic needs are far better aligned. It will need to produce graduates at all levels with the skills

and knowledge able to provide industry with the new and enhanced skills and knowledge needed to produce these high-level products and services; and it will also need to develop its research and innovation base to enable it to make discoveries and to exploit these discoveries – as well as discoveries made elsewhere – in order to develop new advanced products and services.

Indonesia has benefited from a large number of reviews carried out by global authorities in the last few years, and our own surveys and analyses carried out in the context of the present project confirm the unanimous conclusion that in this respect there remains much to be done.

An illustration of the gap that needs to be filled is provided by the World Bank's "Knowledge Economy Index¹" which in 2012 placed Indonesia at number 108 in the world, below all Southeast Asian countries other than Lao and Cambodia. That is a measure of the challenge facing the country, and in particular its education system. The purpose of this present study is to identify what can be done to improve the education system generally, but specifically also to identify how the education system can better respond to the developing needs of the labour market and how labour market needs and education system outputs can be better aligned. It covers both skills output and manpower requirements, but also innovation, research and entrepreneurship – all indicators of, and prerequisites for, a vibrant and modern economy.

Indonesia's potential is unquestionable. It has led some to conclude that it is on the cusp of becoming one of the world's great economic powerhouses. The McKinsey global Institute report in 2012, for example, said

"Indonesia could be on the cusp of a new era of sustained growth and rising prosperity with the advantage of a following wind from major international and domestic trends ... By 2030 Indonesia could become the seventh-largest economy in the world – overtaking Germany and Great Britain'

That was written at a time when the macroeconomic outlook was outstanding and had been stable and improving for many years. It is unlikely that such a hyperbolic statement would now be made, but the general point is undoubtedly true. If Indonesia can address some of the issues that have been recognised, and if it can take the further steps needed to develop its skills, knowledge and other infrastructure to the extent that is necessary, then it will undoubtedly make great strides towards becoming one of the world's great economies. But meanwhile there are important issues to resolve.

The present project is concerned with the education implications of the economic and industrial strategy and what will be required in order to bring it to fruition, together with identifying the labour market information that will be required and a system for providing this. Essentially, as described in our earlier Progress Reports, this study concerns the objective of strengthening human resource capacity and national science and technology – the outputs of the education system and the higher education system in particular – to support the development of the main industries being developed in each Regional Development Area.

Our terms of reference require us to assess the current situation and trends in the availability of human resources and science/technology to accelerate economic development and to review current systems for gathering labour market data, projecting manpower needs and using labour market information to create a demand driven education system. (This assessment will also entail an analysis of the roles and responsibilities of the institutions comprising Indonesia's labour market information system). To this end a multinational team of consultants has been assembled – half from Indonesia and half from overseas – under the auspices of PT Trans Intra Asia. The skills

¹ World Bank Knowledge Economy Index (KEI) 2012 Rankings1
<http://siteresources.worldbank.org/INTUNIKAM/Resources/2012.pdf>, accessed 20 August 2015

sets of the consultants cover labour markets and labour market information systems, education and skills provision - both at school and higher education levels - statistical analysis and survey development.

The team began work in September 2014 (the kick-off meeting was on 22 September 2014), and produced an inception report which was delivered to ACDP in November 2014, a First Phase report delivered in March 2015, and a Progress Report delivered in July 2015. Our Terms of Reference require us to produce our final report by the end of September 2015.

1.1. Skills change in the economy

As economies change education and training must change as well.² Education systems take considerable time to change and there can be an intellectually and politically challenging decision about what to change, when and how.

Forty years ago the (too) simple idea was to project the number and type of skilled workers that would be needed in different sectors by calculating the shares of different occupations – managers, engineers, technicians, production workers, craft persons, unskilled workers – in the current economy and multiplying these by the expected rate of growth in the economy³

With hindsight, we now know that the structure of economies, employment, production and skills demand can change quickly and in unexpected ways making longer-term projections unreliable. But it is still important to link education and training policy and strategy to medium-term economic strategies and plans. It is also important that students in secondary schools and universities learn about the world of work through counselling and also through some experience in the work place in order to make better plans for their post-education futures.

Over the last decade there has been an animated debate, fortunately supported by good economic research, regarding the impact of globalization and technological change on the skills required for competitiveness in the very rapidly evolving global economy. The research has been greatly aided by much better measurement of learning achievement through international testing. And instead of equating skills demand with occupational categories, education certificates and projected employment growth we are now measuring changes at the level of skills.

The research is concentrated in high income, high technology economies but the findings are instructive for economies, such as Indonesia, that aspire to high-income status. And while it is common to talk about rapid economic and skills change, the research suggests that this happens over decades, not years.

For strategic thinking about skills education in changing economies like Indonesia it is useful to take different kinds of analysis into account. Perhaps most fundamental is research that shows that investments in education quality that lead to higher cognitive skills contribute substantially to higher earnings and economic growth. But also important is research that analyzes the stages of development across Asian countries to identify the most appropriate models of education and training at each stage.

Using the results of international achievement tests that measure cognitive learning in secondary

² For analyses of linking education to economic change see Rita Almieda, Jere Behrman and David Robalino (eds) (2012). *The Right Skills for the Right Jobs*. World Bank; Atchaorena, David (ed) (2000). *The Transition of Youth from School to Work: Issues and Policies*. UNESCO/International Institute for Education Planning. Paris.; Gill, Indermit S., Fred Fluitman and Amit Dar (Eds) (2000). *Vocational Education and Training Reform: Matching Skills to Training and Budgets*. Washington, D.C. and Geneva: World Bank and International Labour Organization

³ This explanation of fixed coefficient manpower planning is much too simple but reasonably accurate for the purposes of this discussion

schools, it has been estimated that a one-half standard deviation improvement in the test scores of US students would increase America's GDP by two per cent twenty years later through higher earnings in work. This would be worth an estimated US\$ 250 billion, more than enough for substantial investments in school quality. The research also shows that similar impact occurred in part high growth in East Asian economies that rapidly expanded and improved secondary and tertiary education.⁴

Investments in the quality of basic and secondary education have a significant economic payoff in high growth economies and in those countries aspiring to high growth status as well.

We also know more about the impact of technological changes on workforce skills and the implications for education and training strategies.

Economists now have measures of actual skills used in employment in the US and other high-income OECD economies, replacing the long-standing use of occupational categories and levels of education in the economic analysis of education investments. Rather than compare the earnings of factory workers and electrical engineers, we can now also look at the differences in kinds of skills that are used in work.

Tasks are classified on two dimensions. One discriminates between jobs with analytic and interactive tasks that require thinking, information processing and interactions with others, and tasks that are manual. The other dimension compares routine tasks and non-routine tasks – the latter requiring flexibility, creativity, problem solving and complex communication, and the former tasks that a computer can easily be programmed to do.⁵

Figure 1.1 Trends in Routine and non-routine task input 1960-1998

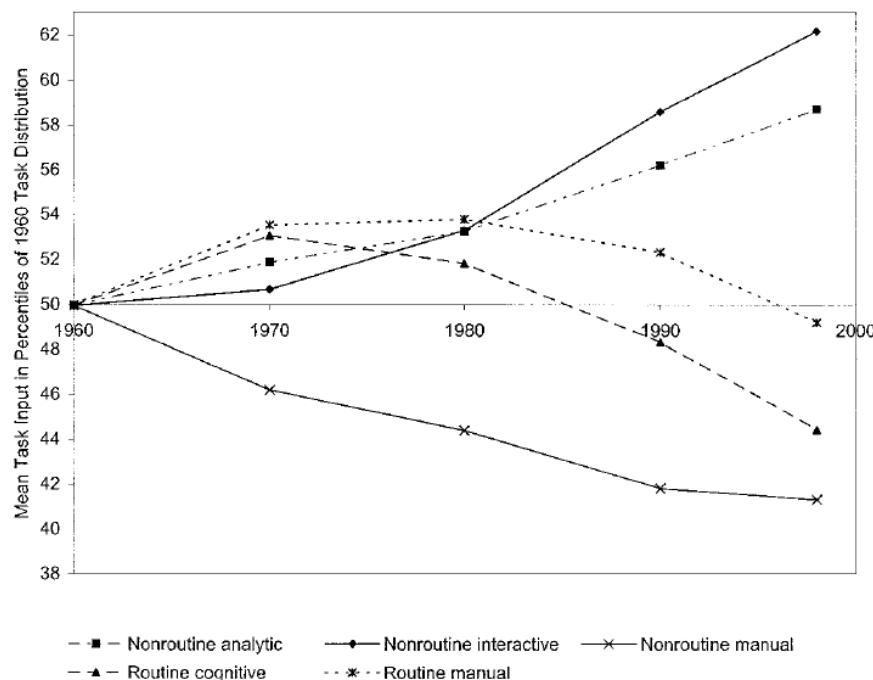


Figure 1.1 above shows changes over forty years in shares of the labour force employed in occupations with intensive use of skills of each kind. The shares of the labour force in jobs using

⁴ Hanushek, Eric A. Alternative school policies and the benefits of general cognitive skills. *Economics of Education Review* 25 (2006) 447-462

⁵ Author, Levy and Murnane (2003)

non-routine thinking and non-routine interactive skills increased substantially, while the share of jobs using routine skills fell sharply. In sum, more jobs required more and higher cognitive analytical and interpersonal skills while the share of jobs using of routine manual skills declined.

This research gives us insight into how technological change impacts skill demand and helps explain why the US and other advanced economies are seeing middle skilled jobs and salaries decline while jobs and wages for the top 10 percent increase quite sharply.⁶ There are clear implications for education and training policies and investment. Importantly, demand and salaries have increased for workers with the better cognitive skills (language, math, science) that are learned in good secondary schools and colleges.

Recent research on the pace of technological change and changes in employment by occupation over the past two decades suggests that, across the OECD, this has been a general and steady process.⁷ Data that examine changes in skills confirm that the demand for cognitive and interpersonal skills is rising while the demand for craft skill and manual labour has declined. The study recommended that students have access to guidance manuals that provide a “full understanding” of jobs and wages available in the labour market, their entry requirements, working conditions and wages,

A TVET policy study published by the Asian Development Bank in 2004 developed a broadly useful model that suggests the type of education and training that best serves economies at different stages of development.

While all such models are approximate they are helpful in thinking about directions for change and development in education and training both to manage well the economy as it is and, at the same time, take steps to adapt the current system for the future economy.

By the ADB scale Indonesia would appear to be well into the stage of investment-driven growth while aspiring to the level of Innovation Driven Growth. Reaching this goal will require more work to develop its education and training systems at all levels.⁸ And indeed, unless it does so it will be unable to develop its industrial and economic base into a knowledge economy and consequently will fail in its ambition to achieve the economic status to which it aspires. Improvements are required on many fronts beside education and training – financial, legal, and infrastructural – but improvements in education and training are necessary albeit insufficient conditions to fulfil its ambitions. That is the core fact underpinning this study.

⁶ McKinsey Global Institute (2009) op. cit.

⁷ Michael J. Handel (2012). Trends in Job Skills in OECD Countries. OECD Social, Employment and Migration Working Papers No. 143. Paris

⁸ Recent evaluations of education and training in Indonesia all point to the priority of improving the quality of outcomes of primary and all forms of secondary education, academic and vocational. See DiGropello (2010) op. cit. OECD

2. Methodology and approach

The MP3EI strategy, which we have taken as our starting point, identified 22 industries (broadly economic and industrial sectors) which would be developed in six "economic corridors". Some economic corridors would be concerned with several of these industrial sectors and some with fewer, but none with all. The economic/industrial sectors and their allocation to economic corridors is shown in Figure 2.1 below.

Figure 2.1 Potential Economic & Industry by Corridor

Main Economic Activity	Cor-1	Cor-2	Cor-3	Cor-4	Cor-5	Cor-6
Steel	❖		❖			
Food and Beverage		❖				
Textile		❖				
Transportation Equipment		❖				
Shipping	❖	❖				
Nickel				❖	❖	
Cooper					❖	
Bauxite			❖			
Palm Oil	❖		❖			
Rubber	❖					
Food Agriculture				❖	❖	
Tourism					❖	
ICT		❖				
Coal	❖		❖			
Oil and Gas				❖	❖	❖
Jabodetabek Area		❖				
Sunda Strait Nat'l Strategic Area	❖					
Defense Equipment		❖				
Animal Husbandry					❖	
Timber			❖			
Cocoa				❖		
Fishery				❖	❖	❖

Note: Cor-1 = Sumatera, Cor-2=Java, Cor-3=Kalimantan, Cor-4 = Sulawesi, Cor-5=Bali-Nusa Tenggara, Cor-6=Papua-Maluku

Source: MP3EI Report, Coordination Ministry of Economic Development, 2011

Moving on from the original terms of reference, this study has been aligned and implemented in accordance with the policy directions of the present government, particularly as articulated in the TRISAKSI and Nawacita

A brief review of these as they relate to the study is provided in Appendix 6, which describes the policies and strategies set out in

- The third National Medium Terms Development Plan (RPJMN) of 2015-2019,
- The Strategic Plan (Renstra) of the Ministry of Research, Technology and Higher Education (MoRTEH) of 2015-2019,
- The Strategic Plan (Renstra) of Ministry of Education and Culture (MoEC) of 2015-2019,
- The Strategic Plan (Renstra) of the Ministry of Religion Affair (MoRA) of 2015-2019, and
- The Strategic Plan (Renstra) of the Ministry of Man Power (MoMP) of 2015-2019.

Briefly, these have identified the following policy directions relevant to the study

In economic and regional development the policy is intended to identify specific fields and to strengthen these by increasing competitiveness which itself is based on the advantages of natural and human resources, as well as quality and capacity in science and technology, which it is intended should be continuously improved.

Economic corridors have been established with the specific themes of development according to regional potential as follows:

- Maluku
- Nusa Tenggara
- Sulawesi
- Kalimantan
- Java-Bali
- Sumatra.

These economic corridors have broadly been the basis for analysis in this study. The substantive regional development policies include:

- Encouraging the accelerated development of centres of economic growth as the main drivers (engines of growth), in each island, aligned with the particular potential and advantages of each region, especially for the development of food, energy, maritime, tourism and industry. Industrialisation should be encouraged to develop downstream industries and the processing of raw materials.
- Accelerating economic development of region-based maritime and marine industries, including fish production, marine energy and minerals, nautical tourism and shipping
- Selecting growth centres with strong prospects for high-value commodities.
- Increasing human resource capacity in science and technology to support the development of industrial clusters

In education development the new policy is to:

- Implement 12 years of compulsory education by expanding and improving the quality of secondary education and the equity of provision so accelerating the availability of trained human resources to meet the needs of the labour market
- Strengthen the curriculum and its implementation
- Improve the relevance and competitiveness of higher education
- Improve access, quality and relevance of education and skills training for jobs

In detail, strategic actions are articulated to:

- Develop the curriculum in a way aligns it with employment needs based on input from business and industry
- Align curriculum development programmes and vocational skills according to the main economic activities in each district/city and the corresponding needs of the labour market
- Strengthen the curriculum in order to provide 21st-century skills
- Diversify the curriculum to enable students to develop optimally in accordance with their potential, interests and abilities.

In higher education the strategic approach includes:

- Development of innovative study programs/departments according to industrial

- development needs
- Increasing graduate competence in science according to labour market needs, especially in agriculture, maritime, tourism, manufacturing industry and the creative economy
- Increasing graduate expertise and skills so as to reduce periods of unemployment
- Strengthening cooperation between higher education institutions and the world of work for research and development
- Developing entrepreneurship education and training and creating partnerships between higher education institutions and businesses

The policy of increasing science and technology capacity gives rise to the following intended activities:

- Increasing support for science and technology, including improvement of graduate output, infrastructure, institutions and networks
- Establishment of 100 techno parks, and science parks in every province

In science, technology and innovation the aim is to harness science and research in order to improve the competitiveness of the production sector, by:

- Supporting research and development that is relevant to the creation of technologies and new products
- Strengthening University-Industry-Government partnerships, again through the development of science and technology parks, incubators and venture capital. The development of Technopreneur is envisaged for this end.

The final relevant strand of the new mid-term strategy concerns labour and manpower initiatives, intended to strengthen labour competitiveness. The strategy seeks to:

- Harmonise the certification of competence
- Develop partnerships between government and industry on the one hand and between central and local governments on the other in order to improve labour quality
- Develop training funding patterns to support the improvement of labour skills
- Improve governance in the implementation of training programs to accelerate the certification of workers
- Strengthen and revitalise BLK
- Expand sectors and subsectors with high productivity in order to provide greater employment prospects
- Enable the labour market to function better.

This last aim is to be pursued through improving the effectiveness and efficiency of the labour market, maintaining a better balance between supply and demand and improving labour market information systems, as well as increasing industrial involvement in the design and implementation of employment services, with greater cooperation between education institutions and employers and enhancing the role of local governments.

In what follows, these developments in national strategy have, explicitly as well as implicitly, informed the analyses that we have conducted and our recommendations and conclusions.

So the present Government's Medium Term Strategy refines aspects of the MP3EI, and in particular focuses on seven Regional Development Areas as distinct from the six corridors previously. But the fundamental aim remains unchanged, and the industries for development are those in which there are existing strengths in each Regional Development Area. Table 2.1 below shows the geographical areas and the industries in each identified by the National Medium Term Strategy. It

will be seen that there is a broad match between the MP3EI strategy and the present National Medium Term Strategy

Table 2.1 Theme of Regional Development under National Medium Term Strategy

REGION	THEME OF DEVELOPMENT
PAPUA	<ul style="list-style-type: none"> Centre area of food production through industrial development base on paddy, maize, ground nut, sago, cassava, vegetables and fruits, as well as development of livestock and non-food crops such as sugarcane, rubber and oil palm. Accelerating economic development base on maritime through development of marine tourism; Energy barn of eastern part of Indonesia through developing oil, natural gas and copper.
MALUKU	<ul style="list-style-type: none"> Producer centre of marine-based food and national fishery centre with acceleration of maritime-based economic development through fishery-based industrial development Processing industries base on copper and nickel
NUSA TENGGARA	<ul style="list-style-type: none"> Gate for eco-tourism by directing MICE industry development Cantilever for national food with economic acceleration base on marine fishery, salt and sea grass Industrial development base on livestock – particularly cattle – and maize Development of manganese ore and copper industries
SULAWESI	<ul style="list-style-type: none"> Indonesia gate for international trading and gate of eastern Indonesia with development of logistic-based industries Centre of national food with industrial development base on cacao, paddy, maize Industrial development base on rattan, asphalt, nickel and iron core Development acceleration base on maritime through fishery-based industrial development and marine tourism
KALIMANTAN	<ul style="list-style-type: none"> As one of lungs of the world through maintaining Kalimantan forest area Centre of national energy with development of downstream coal industries Industrial development base on oil palm, rubber, bauxite, liquid natural gas, zircon & quartz sand Development of food estate.
JAVA-BALI	<ul style="list-style-type: none"> Centre area of food production and cantilever of national industry and service sectors with development of food and beverage industries, textile, automotive, main weapons system equipment, telematics, chemicals, alumina, and steel One of the gate of world class tourism destination by developing creative industries and acceleration of maritime-based industries through developing industry of shipping and marine tourism
SUMATERA	<ul style="list-style-type: none"> One of the Indonesia gate for international trade and national energy Directed to developing downstream coal-industries and industries base on oil palm, rubber, tin, bauxite and kaolin

In order to make our study more manageable, and with the agreement of ACDP, we grouped the industrial sectors into four "super sectors" as follows:

- Mining
- Agriculture & agroindustry
- Maritime
- Transportation & tourism

and we combined the Papua and Maluku regions.

In the event, these considerations proved to be less significant than had been anticipated, because the evidence that we were able to gather was insufficiently fine-grained to enable very much analysis at the level of individual subjects/industries and regions. Some such analysis has been possible, but in any case, as is explained below, detailed manpower planning of the sort that might be implied by such detailed analysis is not now considered good practice.

Our remit required us to examine broadly the questions of

- Likely future demand
- The capacity of the education service to respond to need, and for this purpose we look separately at
 - BLK/SMK
 - The higher education sector broadly
 - Research capacity within the higher education sector
- The availability and use of labour market information

and to make recommendations about the development of capacity in these respects.

In March 2015 the study team was also commissioned by ADB-ACDP to conduct the additional task of studying the "Revitalization of BLK and SMK" as requested by BAPPENAS. The general objective of the study is to revitalize both BLK and SMK through forming a complementary program/approach between the two types of institution in order to efficiently and effectively produce more qualified and competent graduates who meet the requirements of industry. Specifically, that study

- Assesses the capacity and utilization of BLK resources particularly their training equipment and facilities for use in practical training and education;
- Assesses the needs of SMK for educational resources to conduct vocational education and training,
- Formulates models of resource sharing and joint programs between BLK and SMK to deliver vocational training and educational services responsive to labour market information and signals, taking into account fields of study and geographical areas; and
- Formulates policies to promote TVET-industry linkages and partnerships to develop labour market information systems and to improve links and matches between TVET system and industries.

This sub-project ran in parallel as a related but discrete activity.

In conducting our study, we relied on an evidence base that comprised of

- Secondary evidence from national and international surveys and reports as well as our own experience

- A wide scale survey that we commissioned of firms, education institutions and government
- Focus group discussions designed to provide qualitative interpretation of the quantitative data obtained from primary and secondary sources
- Literature reviews and surveys of international practice.

2.1. Secondary data

The first thing to say about data is that we were surprised and disappointed at the lack of reliable administrative data available from the government. The data that exist appear to be ad hoc and not collected systematically – for example data about different years in different universities are presented together, instead of consistent data produced to the same standards and definitions covering the same periods of time - and very little reliable data on the basis of which policy can be formed appears to be available. That is something that will need to be resolved, but it is a more general issue than falls beyond the terms of reference of the study.

That said, we were able to obtain some useful information from the previous studies and reviews referred to above, of which the World Bank studies of skills in Indonesia⁹ are outstanding examples, and on which we were able to draw substantially in our first progress report, as is the more recent OECD review of the Indonesian education system¹⁰.

And finally, the Government's SAKERNAS survey provides a certain amount of useful information about skill levels and future supply, though that is a relatively limited sample household survey and is at a very high level, and so its use its value is somewhat limited.

2.2. Major survey

At the end of February 2015 we obtained the go-ahead from the ACDP to commission a wide-ranging survey, intended to give a comprehensive coverage of all types of relevant institutions and organizations, covering all the relevant disciplines across the different regions of Indonesia, to provide the primary evidence on the basis of which to develop our conclusions and recommendations. This survey was in six parts, and covered:

- SMK schools
- BLK institutions
- Universities (S1 and D1 providers)
- Research institutions
- Employers
- Government

LPEM was appointed to undertake the survey, and the project team provided the survey company with the analyses that they wished to have provided from the raw survey data in the form of a series of tables, and those have been largely produced by the survey company.

This was a large survey – 489 firms, 282 SMK, 54 BLK, 896 Universities and research institutions and 83 Government bodies – but the size and diversity of Indonesia, and the number of industrial sectors involved, mean that there was nevertheless insufficient coverage at a sufficiently detailed level to enable us to draw fine-grained conclusions about specific needs in regions and industries.

⁹ World Bank (2011). Skills for the Labour Market in Indonesia: Trends in Demand, Gaps and Supply. Washington D.C and World Bank (2010). Education, Training and Labour Market Outcomes for Youth in Indonesia. Washington, D.C.

¹⁰ 'Education in Indonesia: Rising to the Challenge' OECD 2015

While the survey sample as carefully drawn to be reasonably representative and enable broad conclusions to be drawn, it was nevertheless strictly not a representative sample.

Nevertheless, a number of such detailed conclusions have been drawn where possible and appropriate. But it needs to be borne in mind also that the sort of detailed manpower planning implied by such an approach is no longer considered appropriate. That is something that is developed further in the report.

Overall the response rate of the survey was 93%. It varied somewhat between types of institution (with the firms' survey requiring some iterations in order to make up the numbers – which were nevertheless achieved). Considering the short survey time (i.e. 2 months), this is a remarkably high rate of response, enabling the survey to meet its purpose and conclusions to be drawn.

2.3. Focus group discussions

In order to help us interpret the results of the information we gathered, and in particular the quantitative data obtained from the surveys, we arranged six focus group discussions. These were held in Palanbang, Denpassar and Makassar. We divided the consulting team into three, so at least two consultants were present at each (other than at Palanbang where the project director alone was present), and we held two focus group discussions at each location (six in total). We had a list of prepared questions, common to the three venues, to ensure that there was as much consistency as possible in the different sessions. One session consisted of representatives of government and BLK/SMK and the other of firms and universities. Those discussions were important, to ensure that our interpretation of the data were not wrong, but by and large they were of limited value otherwise, essentially confirming what we already knew or believed.

2.4. Literature reviews and assessment of international practice

One thing that we noted in our earlier interim report was the wealth of surveys that have been conducted and reports prepared about the labour market, skills and education in Indonesia and the wider region, both by global institutions like the World Bank and OECD, and by national institutions here in Indonesia. The most significant of these are listed in the bibliography.

In addition, we prepared three substantial reviews of international practice on the subjects of

- Approaches to skills training
- Approaches to labour market information provision
- Research and innovation policy and practice.

Those are quoted extensively in this report.

2.5. Structure of this report

Following these introductory sections this report is structured as follows

- Chapter 3 assesses likely future demand for skills, and related issues, including the views of industry about its needs and the constraints arising from issues related to skills.
- Chapter 4 assesses the capacity of SMK/BLK to play their part in meeting skills requirements in future
- Chapter 5 does the same for higher education institutions
- Chapter 6 discusses research and innovation, and draws on international practice to assess the current capacity and future prospects for Indonesia

- Chapter 7 describes the current state of labour market information provision in Indonesia, and drawing on this and international practice makes recommendations for the future.

3. Demand for skills

In order to form a view of skills demand, we conducted analyses at the macro and also at the micro level. At the macro level we interrogated the SAKERNAS database based on the regular household survey. This provides information at a high level and is not detailed, but enables some conclusions to be drawn about the development of demand in the future by broad economic sector and based on past trends.

At the micro level we conducted a survey of firms which asked about their hiring patterns and intentions, skills needs and the impact of skill shortages and where they arose.

3.1. Projections based on SAKERNAS data

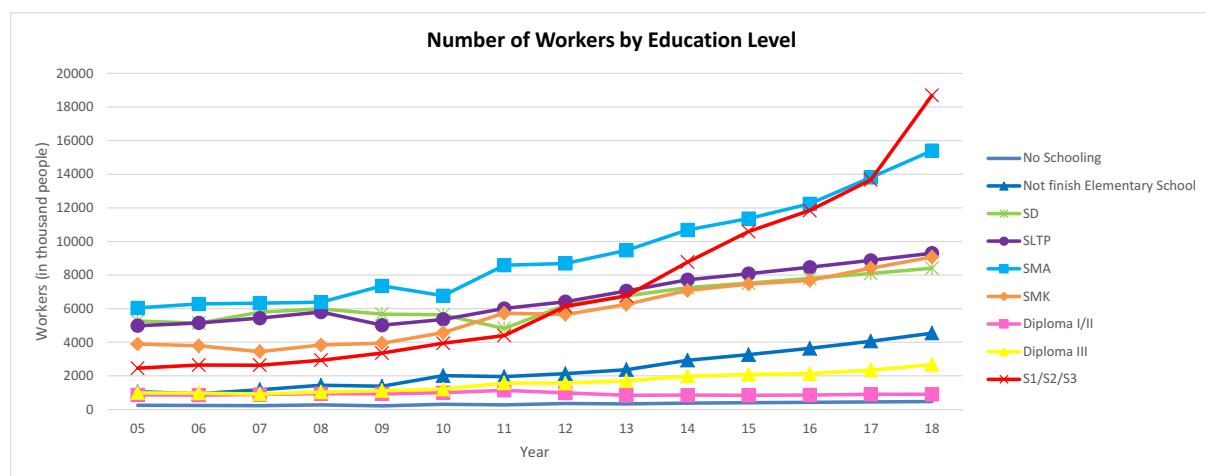
The estimation of future labour market equilibrium for all sectors and all education levels can at a high level be projected using secondary data from the National Labour Force Surveys (SAKERNAS) conducted by Central Agency of Statistics (Badan Pusat Statistik) Indonesia. The SAKERNAS data available for this study are from 2005 to 2013. The projection data were prepared based on the current time trend of number of formal workers at a national level.

Based on availability of data in SAKERNAS, we apply econometric method to estimate the projection of labor in formal sector which is defined in SAKERNAS as permanent workers with regular payment (in Indonesian language as *buruhkaryawan/pegawai*) from 2014 and 2018 using two different economic models, time trend and wage trend. The income data for entrepreneur and informal workers are not available in SAKERNAS.

In this study, we have prepared five year projections of labour, from 2014 to 2018, for nine economic sectors.

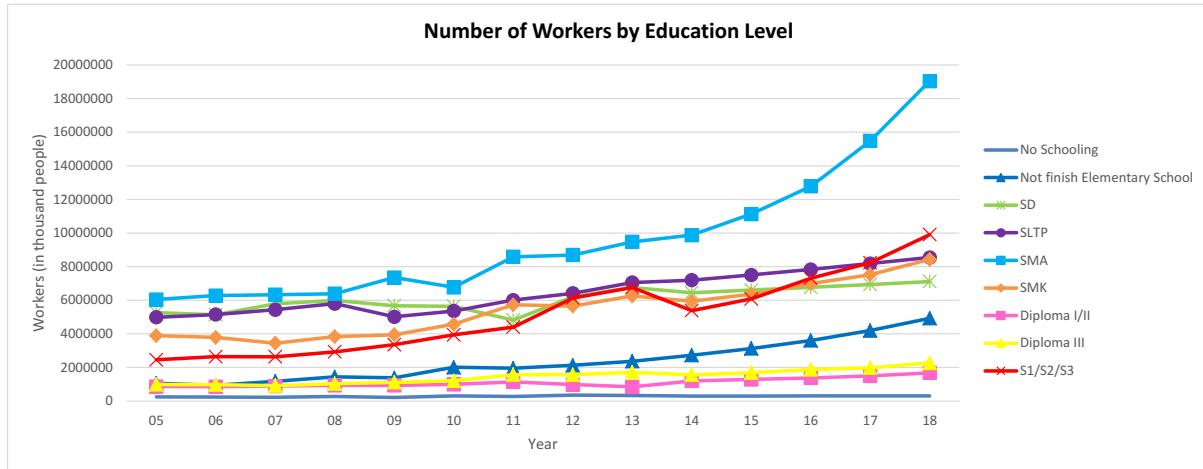
Figure A5.2.1. Labor Projection by Education Level, 2014-2018: National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

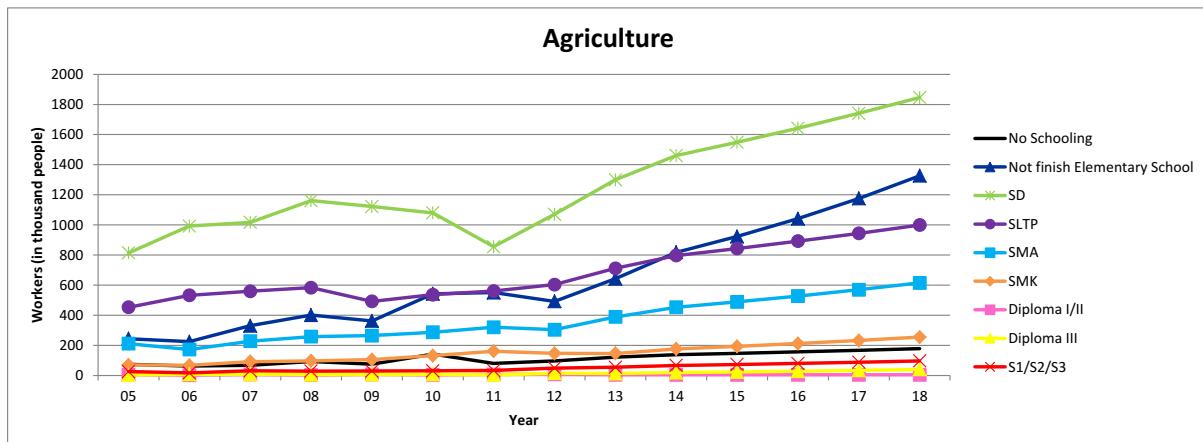


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Agriculture. The time-trend projection of labour in the agriculture sector 2014-2018 shows that this sector relies on low-skilled labour (junior high school/SLTP or lower) as a result of slow technical progress. Methods are still mostly very simple and traditional.

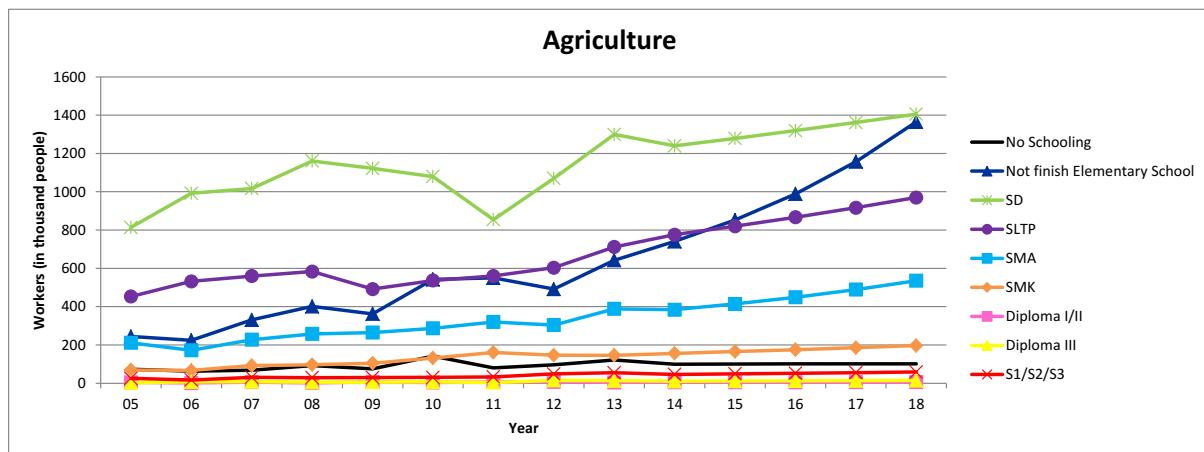
Figure 3.1 Labour Projection by Education Level, 2014-2018: Agriculture - National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

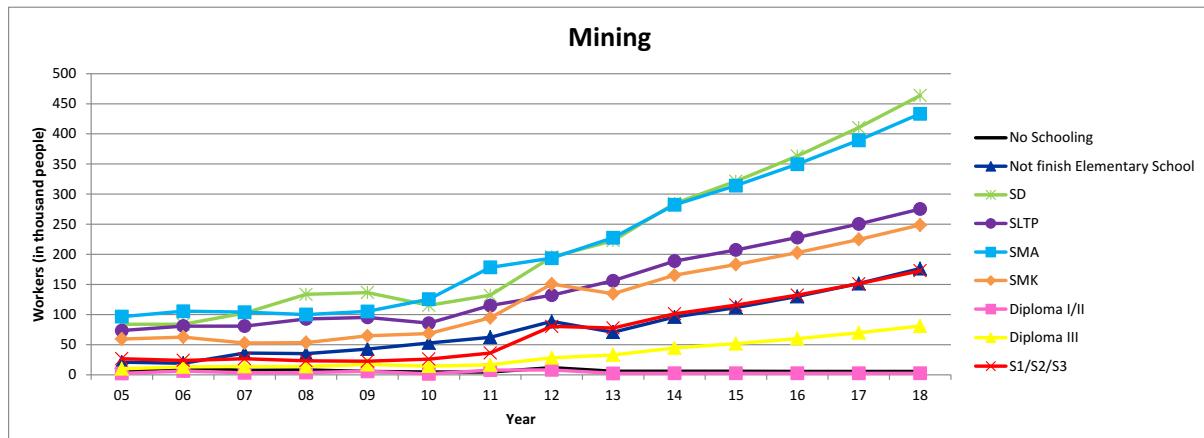


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Mining. Since mining is a relatively capital intensive sector, the labour projections for 2014-2018 suggest a higher level skills are required - senior high school level and university levels.

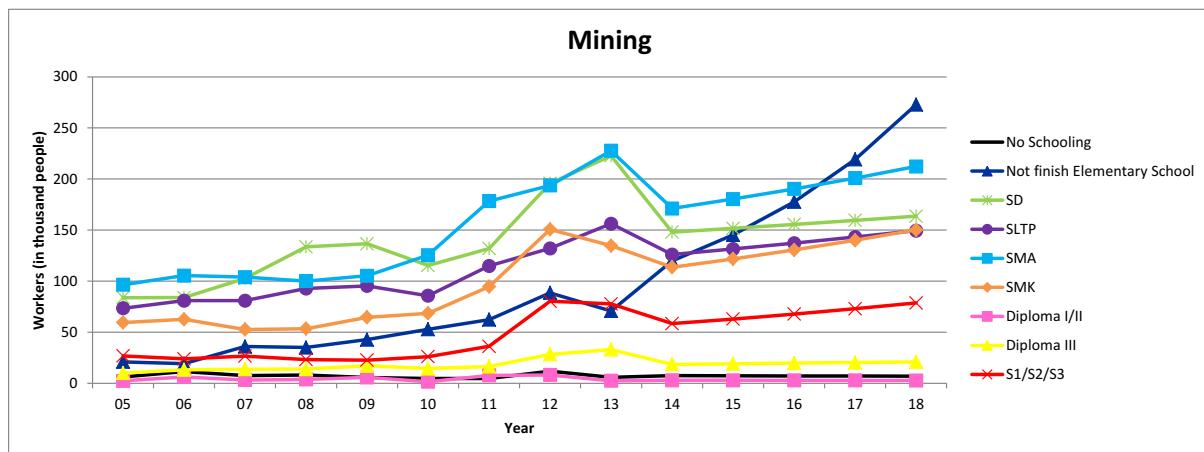
Figure 3.2 Labour Projection by Education Level, 2014-2018: Mining - National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 StudyTeam

Model 2 – Wage Trend

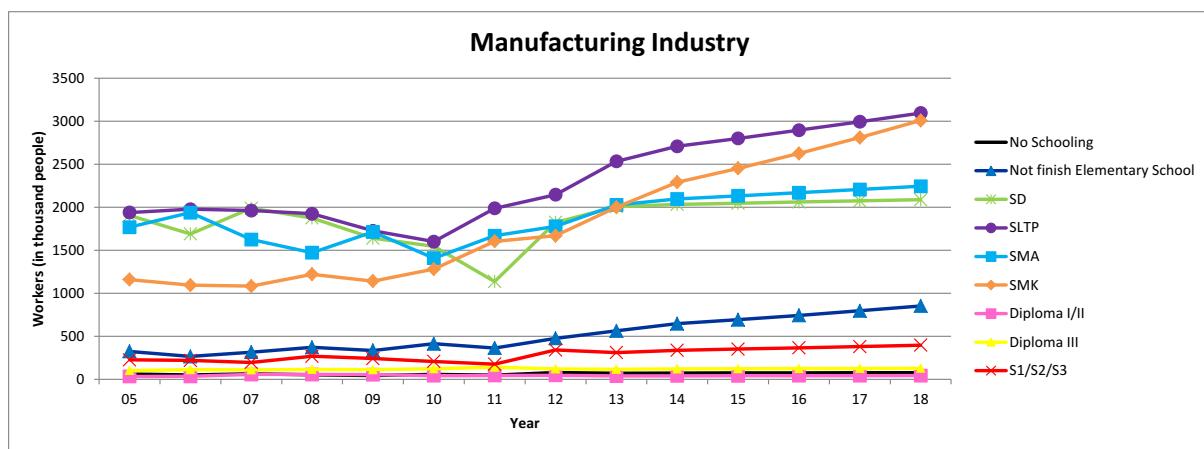


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Manufacturing industry. This sector benefits from a variety of technological developments, and therefore the labour projection for 2014-2018 is dominated by medium skills- high school – levels (those graduating from SLTP, SMA and SMK).

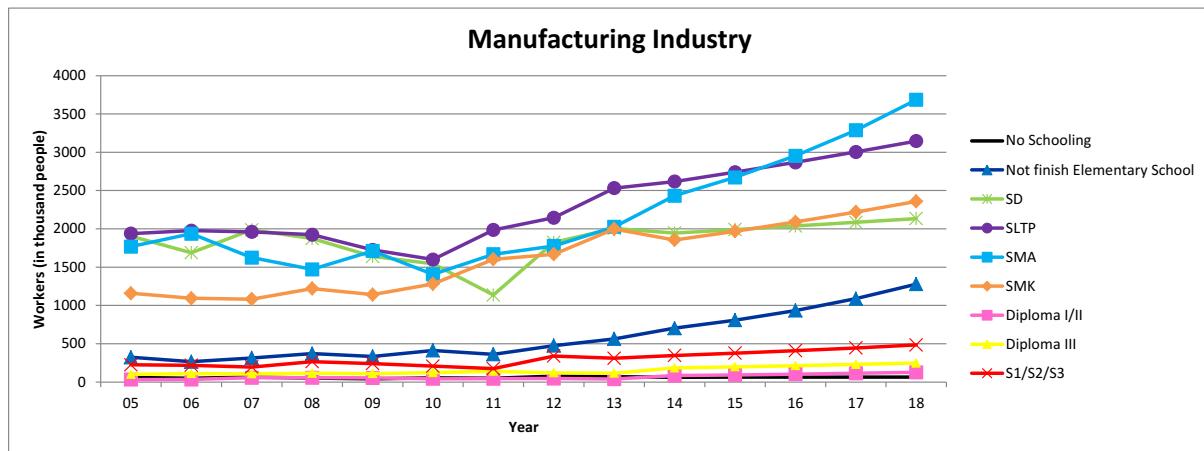
Figure 3.3 Labour Projection by Education Level, 2014-2018: Manufacturing Industry – National
Manufacturing Industry – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

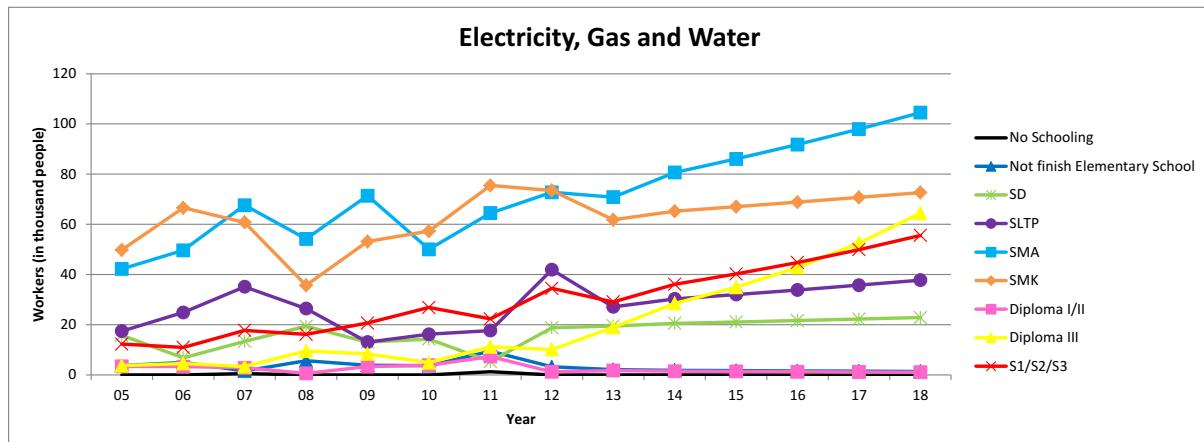


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Electricity, gas and drinking water. This sector has a relatively high technological development, and the labour projections for 2014-2018 show future skills needs at the levels of senior high schools or SMA and SMK, diploma III and university.

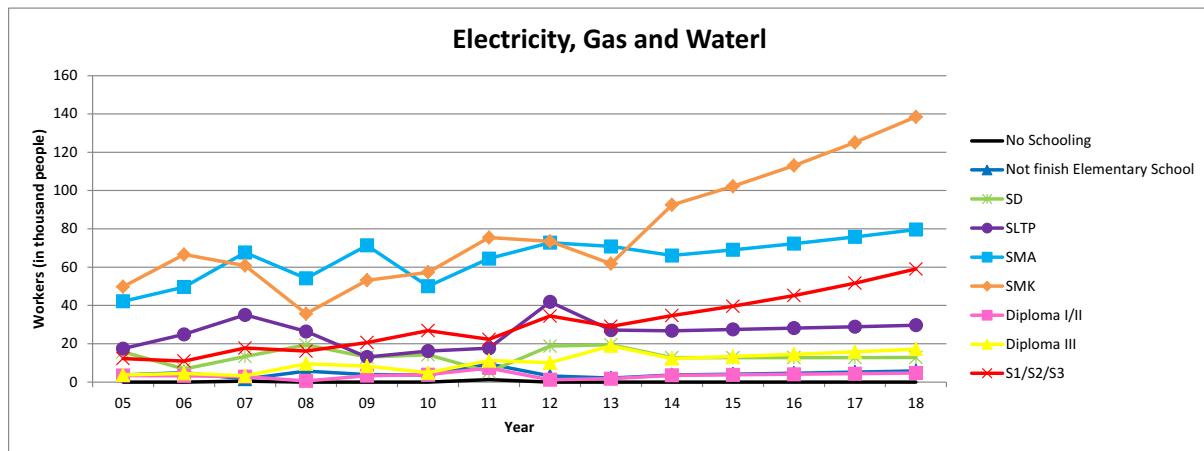
Figure 3.4 Labour Projection by Education Level, 2014-2018: Electricity, Gas and Drinking Water - National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

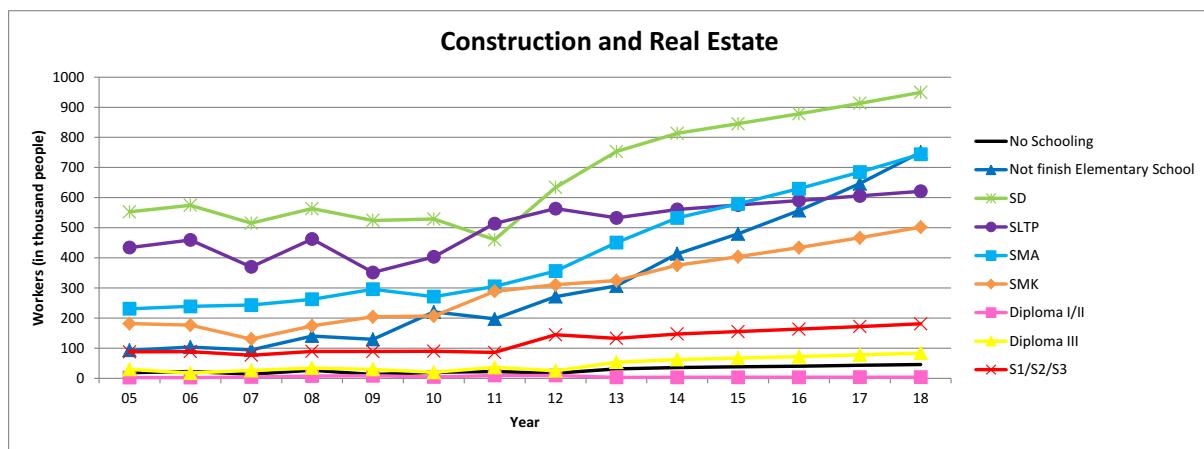


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Construction and real estate. Since the construction sector in Indonesia is relatively labour intensive and utilises low technological developments, the major skills needed in the labour projection for 2014-2018 are at junior high schools level or lower. However, there is an increasing trend of SMA and SMK graduates entering the sector, which indicates that this sector faces a transition to a higher skill level.

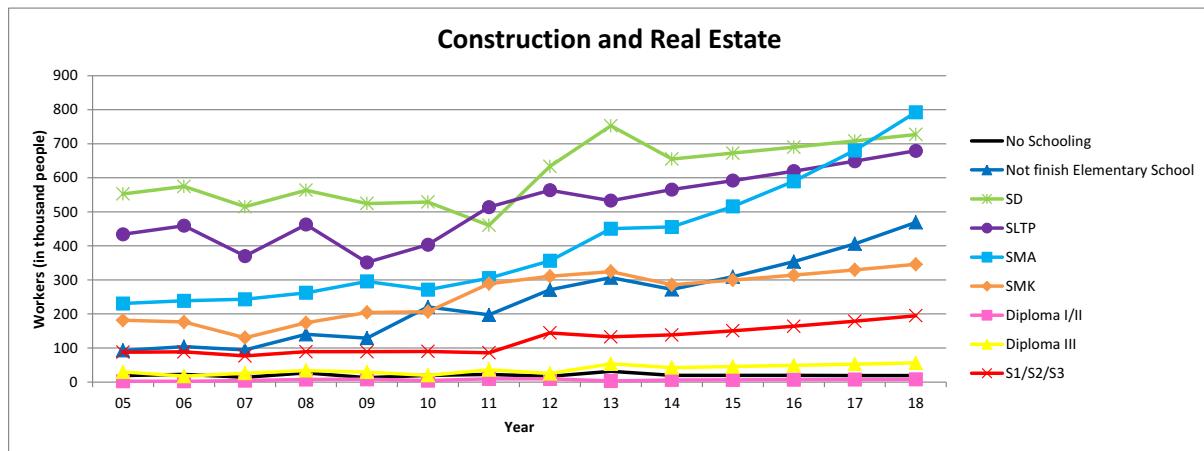
Figure 3.5 Labour Projection by Education Level, 2014-2018: Construction and Real Estate – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

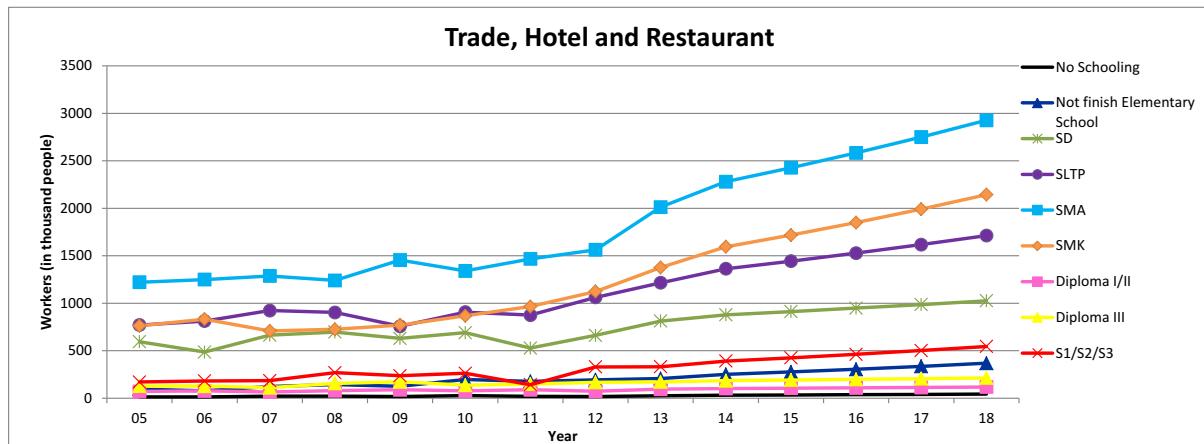


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Trade, hotel and restaurant. This sector has transitioned to medium-high technological development. Thus, the labour projection 2014-2018 trends show it requires higher labour skills such as are possessed by SMA, SMK and SLTP graduates.

Figure 3.6 Labour Projection by Education Level, 2014-2018: Trade, Hotel and Restaurant – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

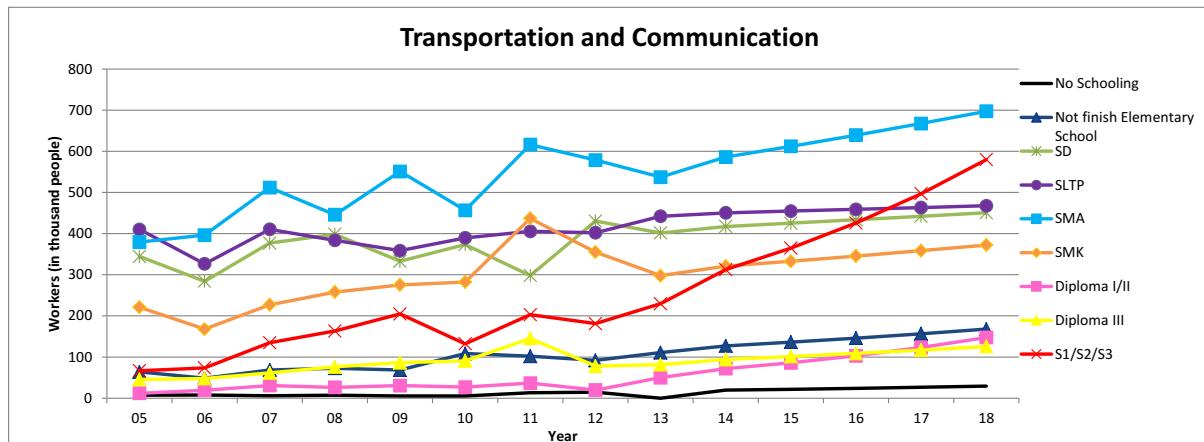


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Transportation and communication. This sector has experienced fast technological development in the past decade. Therefore the labour projection for 2014-2018 presents high and fast growth demand for SMA, higher education and diploma III graduates.

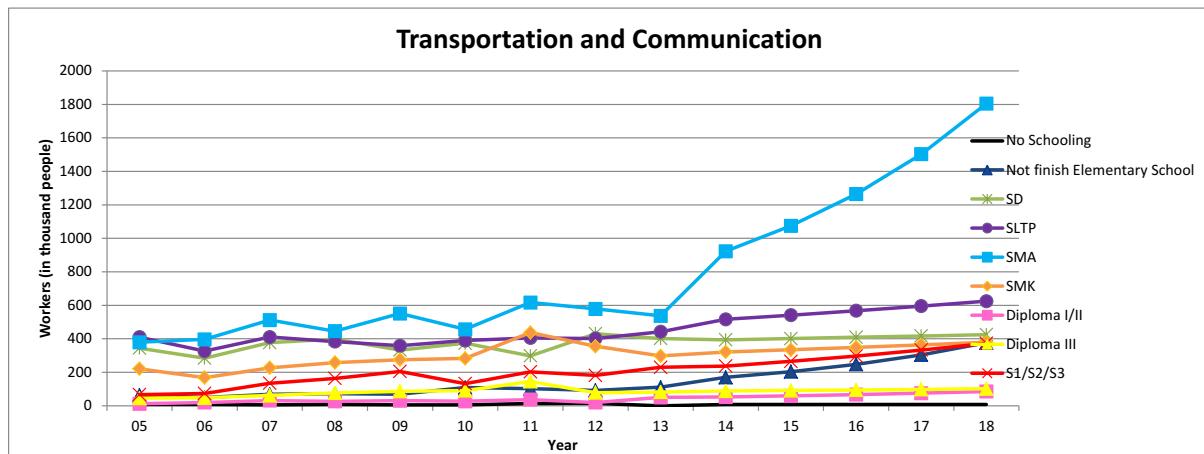
Figure 3.7 Labour Projection by Education Level, 2014-2018: Transportation and Communication – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

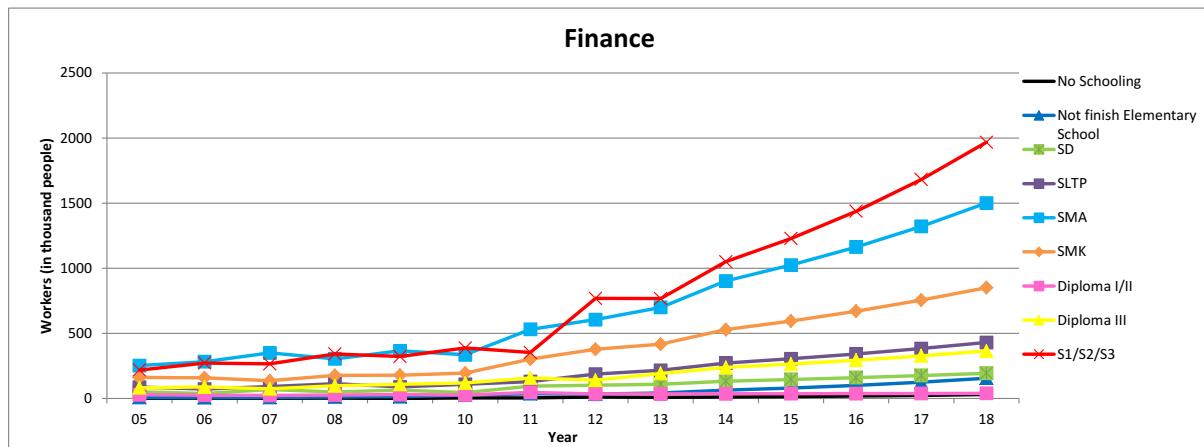


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Finance. This sector has experienced the highest technological development compared to others. Therefore high skilled labour dominates the labour projection for 2014-2018. University, SMA and SMK graduates are three highest skills levels demanded in this sector.

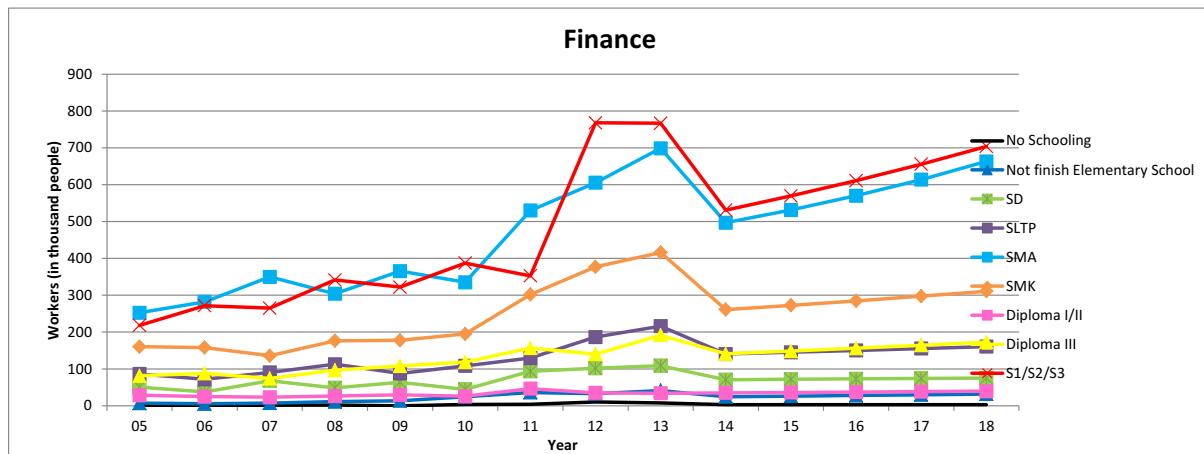
Figure 3.8 Labour Projection by Education Level, 2014-2018: Finance – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

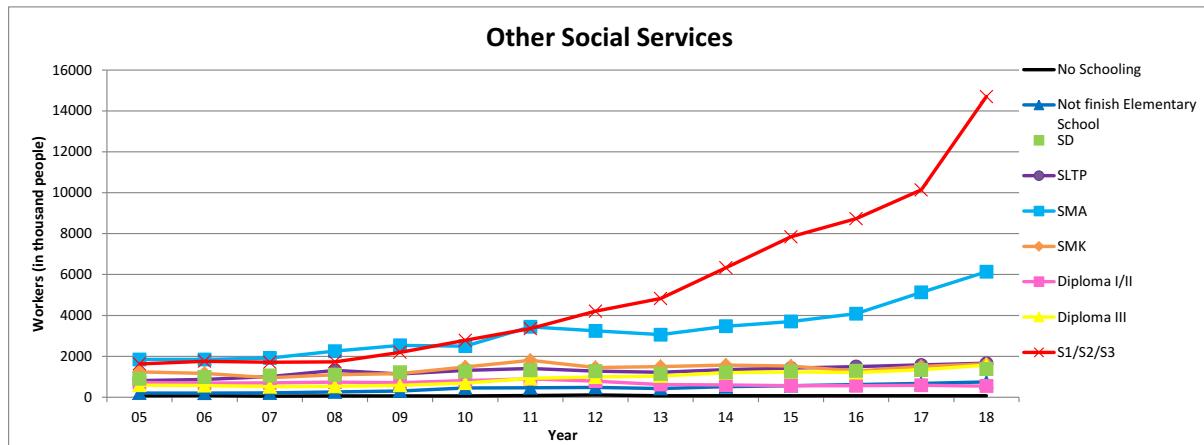


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Other social services. The labour projection for 2014-2018 shows that skills possessed by university and SMA graduates will be most in demand.

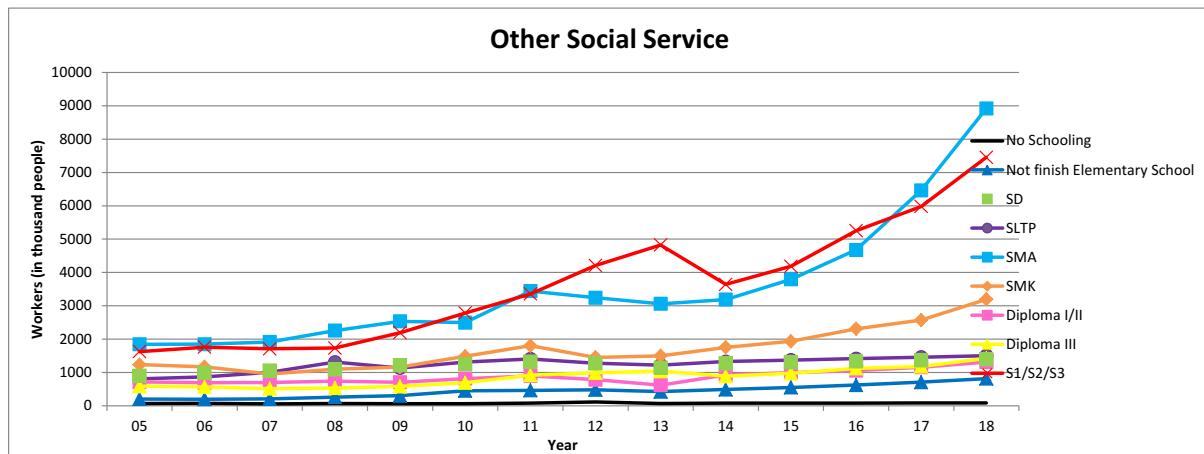
Figure 3.9 Labour Projection by Education Level, 2014-2018: Other Services – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend



Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

It is apparent from this analysis of projections of trends in skill levels to 2014–18, conducted at the macro level using SAKERNAS data, that there will be acceleration in skills levels required in most sectors, with the strongest growth in high-level skills demand arising in finance, in transport and communication and in "other services". The only sectors is not showing significant increases in high-level skills are agriculture, manufacturing and construction. Demand will vary in different regions, and information about this should be part of the labour market information systems that we recommend should be developed both local and national levels.

3.2. Analysis of demand: survey of employers

In the remainder of this chapter we report on and draw conclusions from our survey of employers, which provides detailed pointers to demand for skills and discusses issues concerned with skills availability. This sample, is felt to be representative of the total number of companies operating in the country and reflects the type of companies, their ownership, economic activity taking place and employment.

Employers interviewed were asked a broad range of questions covering a number of areas including:

- Employee characteristics, numbers, gender, category, skilled, semi-skilled and unskilled etc.
- Company hiring expectations over the next 3-5 years, number of required employees by occupation, education and skill level.
- Difficulties facing employers in finding new workers and the availability of suitable workers in their region.
- Importance of skills to employers, soft versus technical skills and the implications for the company.
- Methods that employers are using to address occupation and skill shortages.
- Recruitment practices, local and foreign methods, use of placement agencies, newspapers, internet etc.
- Employer assessment of higher education graduates, the skills they are lacking both soft and technical skills.
- The amount of training employers provide to graduates and their sponsorship of interns.
- Employer involvement with local education institutions, input to curricula, participation in job fairs and assessment of quality of training provided by the institutions.

- Employer use of labour market information, participation in job vacancy surveys, involvement in local training/ education committees.

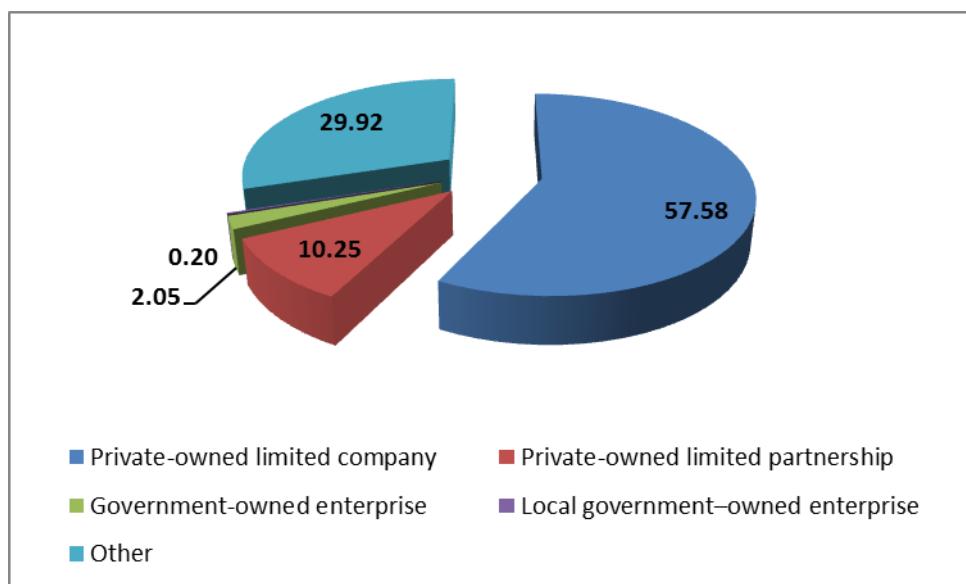
In addition to the interviews conducted with employers we also conducted Focus Group Discussions (FGD) in a number of regions of the country. The FGD served as an opportunity to further confirm the findings from the employer interviews and the resulting recommendations. Employer comments from the FGD are attached in Appendix 3.

3.2.1. Company Distribution and Characteristics

A. Distribution of Company Headquarters by Sector

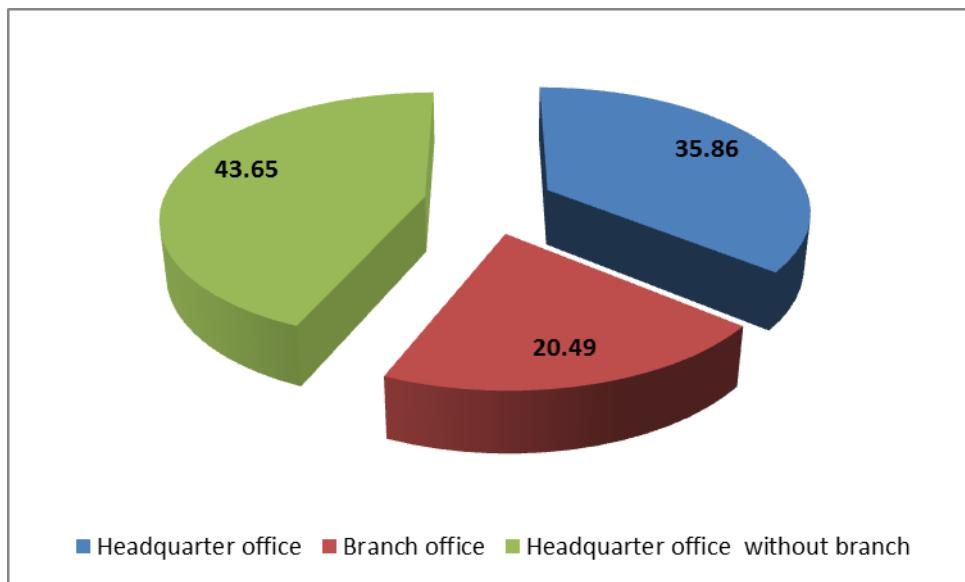
Based on the distribution of company headquarters by sector, the employer survey was conducted in four main regions of the country: Java/Bali, Sumatera, Kalimantan and Sulawesi. The survey sample consisted of 460 companies with the highest number of employers 269 or 58 per cent being privately-owned limited companies. This was followed by companies classified as other, 137 (30 per cent) and privately owned limited partnerships 44 (10 per cent). The sample selected for the Java/ Bali region was the largest with 340 companies, followed by Sumatera with 70 responds, Sulawesi 28 respondents and Kalimantan with 22.

Figure 3.10 Company Type



Of the companies surveyed 200 (43 per cent) were independent without any branch office operations. The majority were in the Java/ Bali region (77 per cent). Next were headquarter offices with branch office operations, 167(36 per cent), the majority also in the Java/ Bali region (72 per cent). The last category was branch office operations representing 93 companies or 20 per cent.

Figure 3.11 Company Status



B. Distribution of company's regional operations by sector

Based on the distribution of company operations by region and by economic sector, the employer survey was conducted in all provinces in the country (see figures 3.12 to 3.22). The survey sample was selected based on 11 economic sectors in the provinces that represent the highest population for those sectors. For the food crop sector and livestock sector, companies were selected primarily in North Sumatra and Java. For the plantation sectors, companies were selected in North Sumatra, Riau, Central and East Java and DKI Jakarta. In the forestry sector, companies were selected in North Sumatra, West and Central Java, and DKI Jakarta. For the tourism sector companies were selected in Bali. For the land and river transportation sector the highest number of companies were in West Java, followed by DKI Jakarta. For the air transportation sector companies were selected in East Kalimantan, DKI Jakarta and East Java. For marine transportation companies were selected in East Java following by East Kalimantan and DKI Jakarta. In the fisheries sector selected companies were in North Sulawesi, West Java and DKI Jakarta. For the mining/energy sector, companies selected were in West Java, East Kalimantan and DKI Jakarta. In the remaining other sector, companies selected were in South Sulawesi, South Kalimantan and DKI Jakarta.

Figure 3.12 Sample Distribution of Food Crop Companies by Operational Office

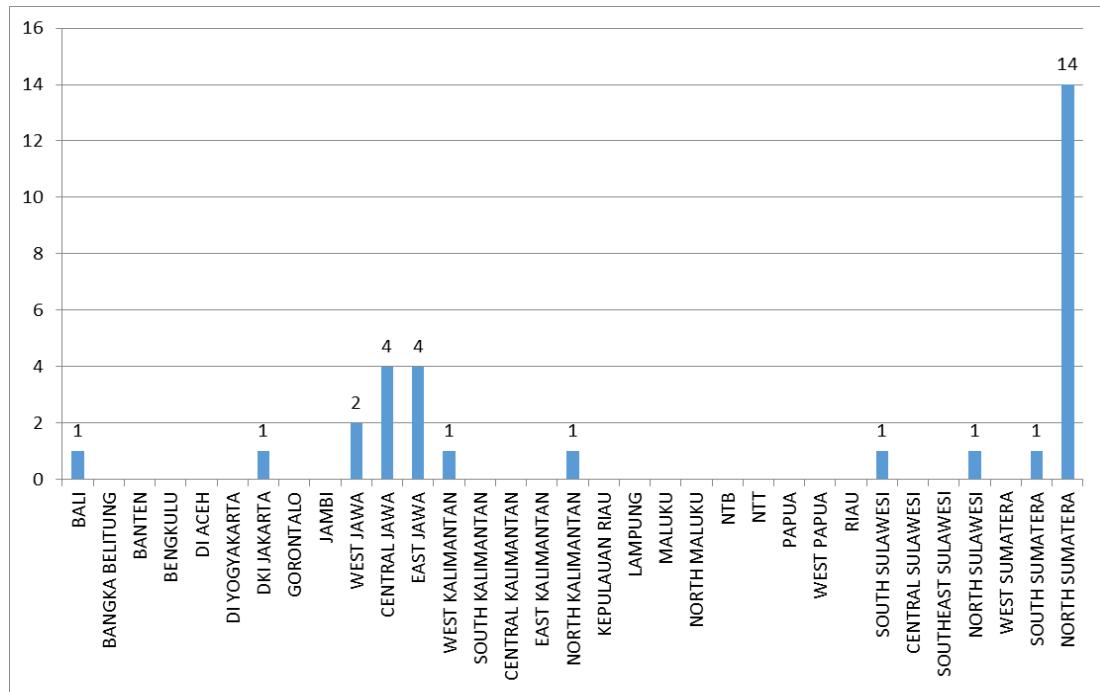


Figure 3.13 Sample Distribution of Livestock Companies by Operational Office

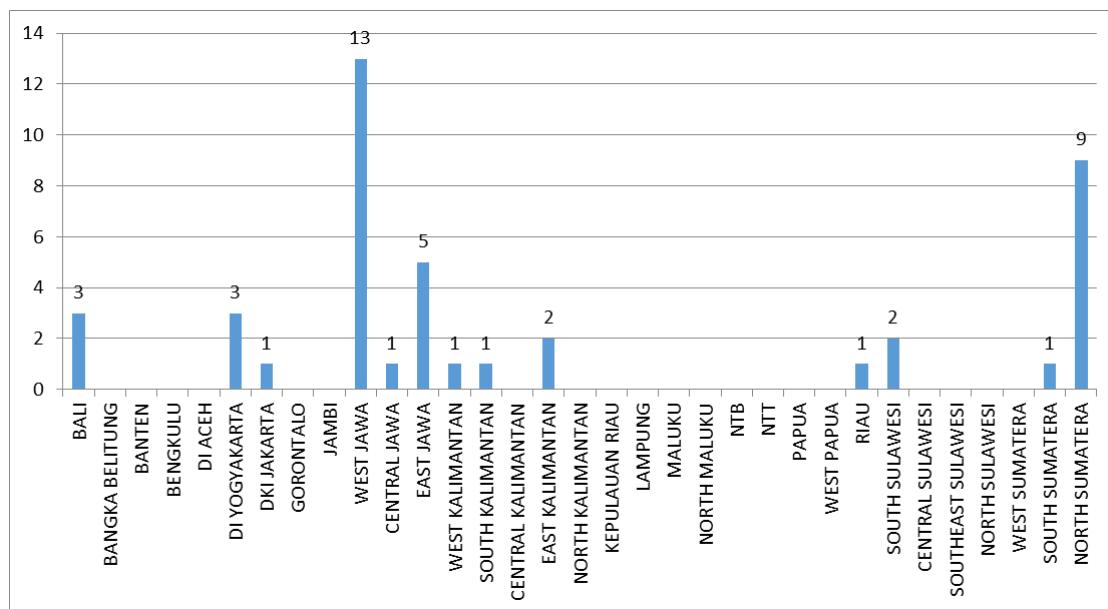


Figure 3.14 Sample Distribution of Plantation Companies by Operational Office

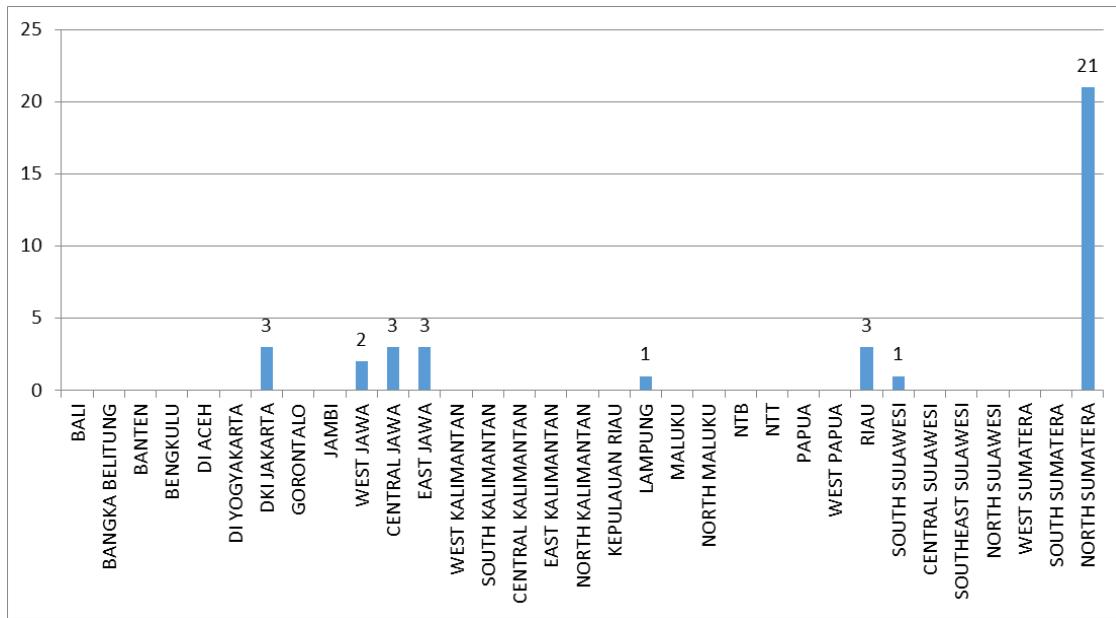


Figure 3.15 Sample Distribution of Forestry Companies by Operational Office

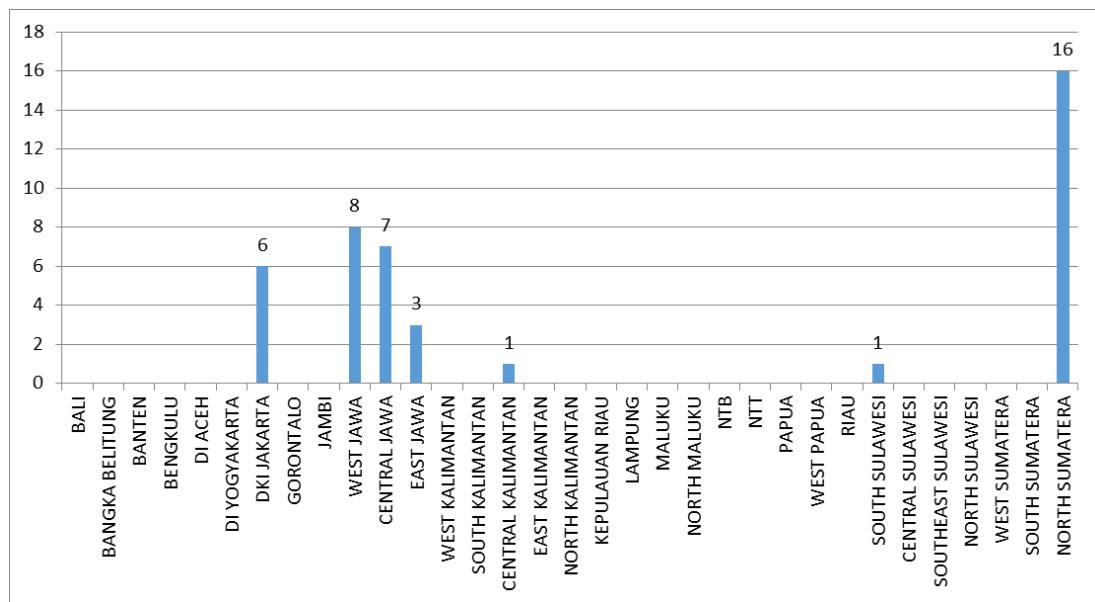


Figure 3.16 Sample Distribution of Tourism Companies by Operational Office

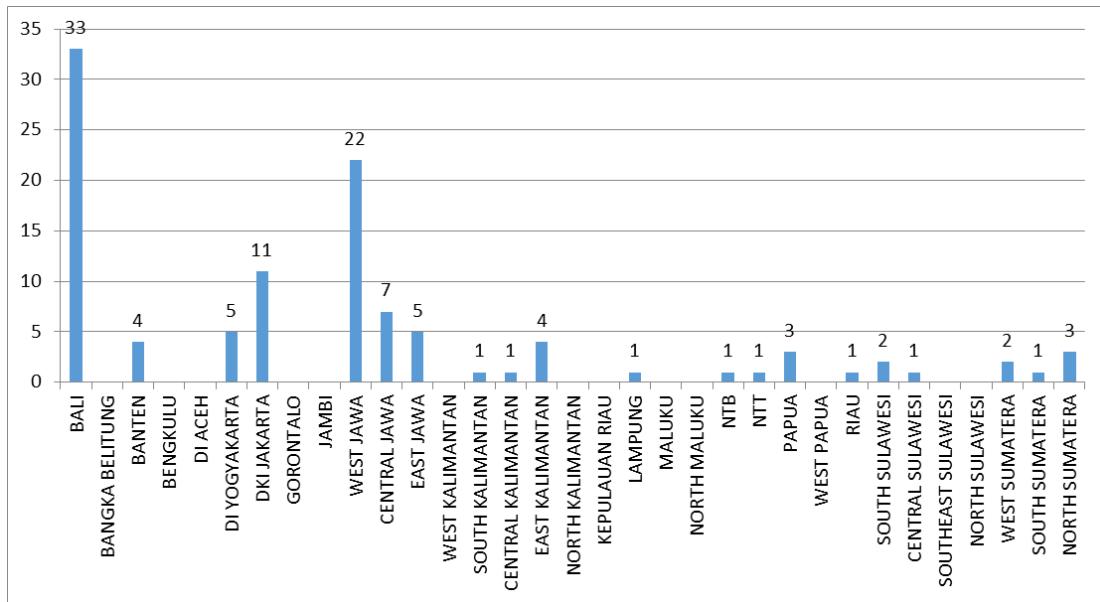


Figure 3.17 Sample Distribution of Land Transport Companies by Operational Office

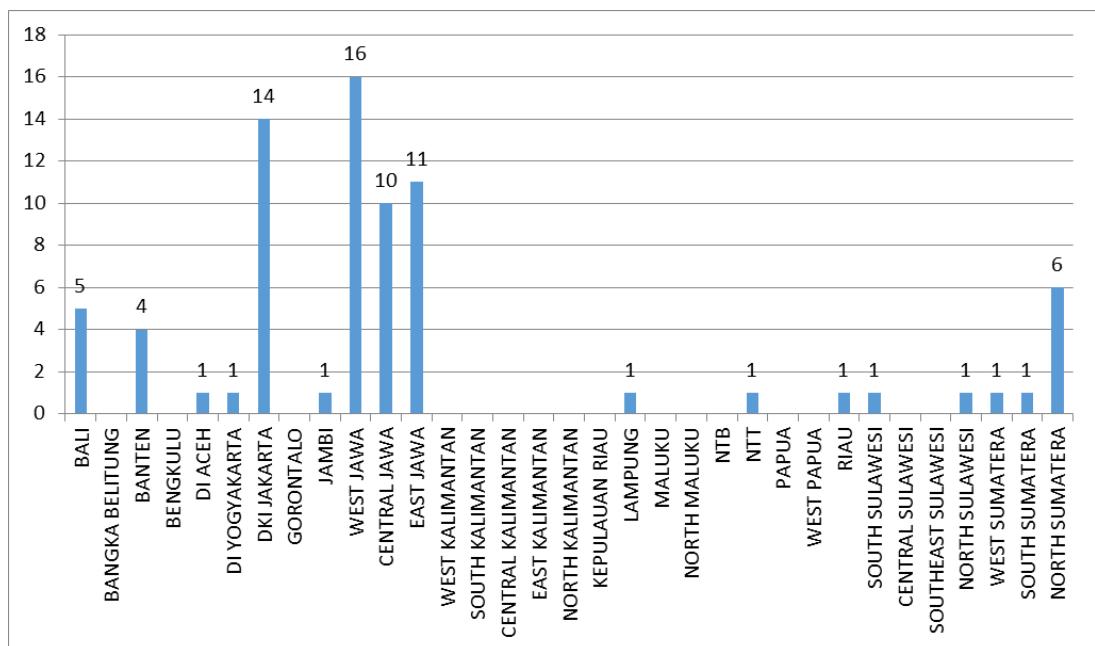


Figure 3.18 Sample Distribution of Air Transport Companies by Operational Office

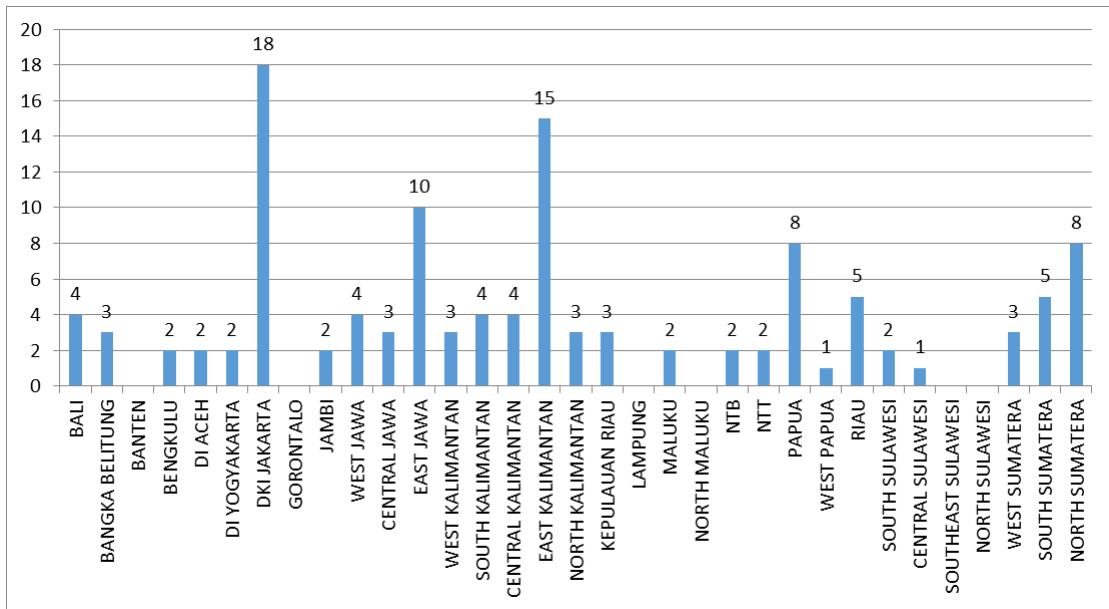


Figure 3.19 Sample Distribution of Marine Transport Companies by Operation Office

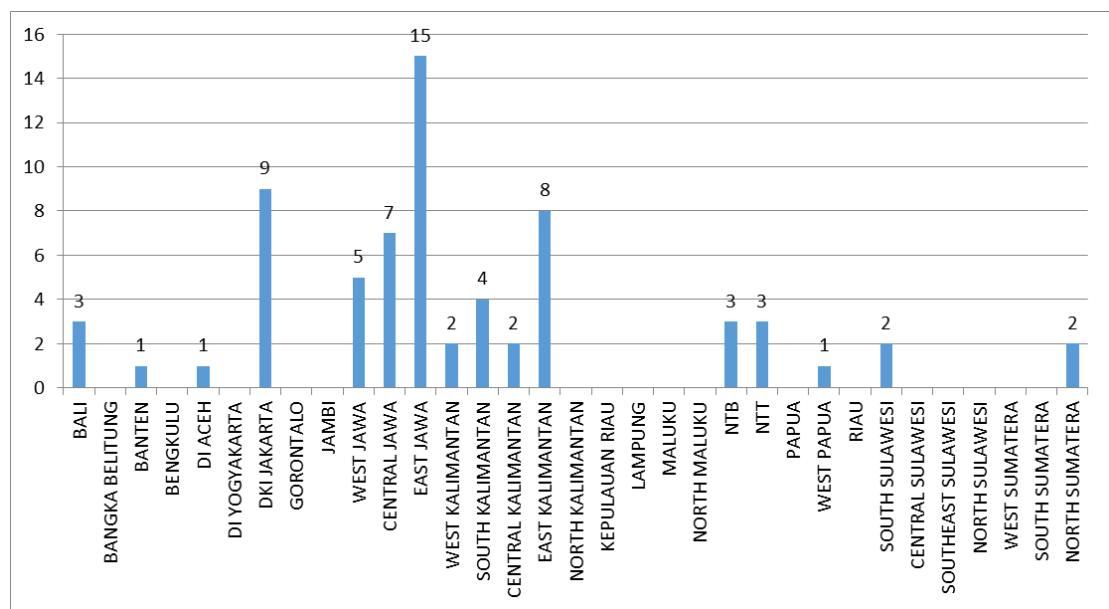


Figure 3.20 Sample Distribution of Fishery Companies by Operational Office

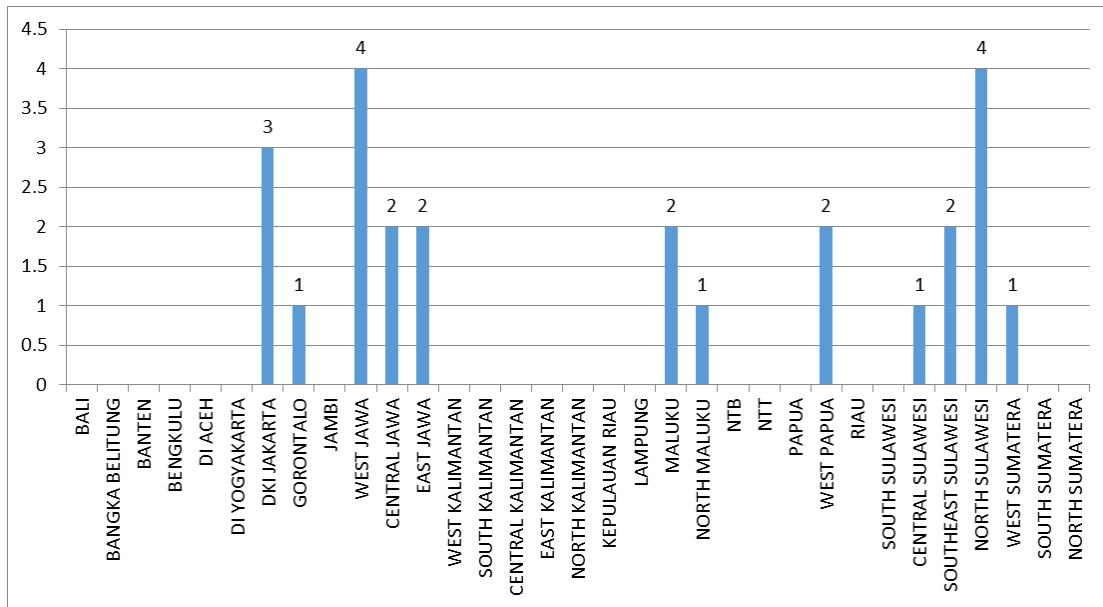


Figure 3.21 Sample Distribution of Mining/Energy Companies by Operational Office

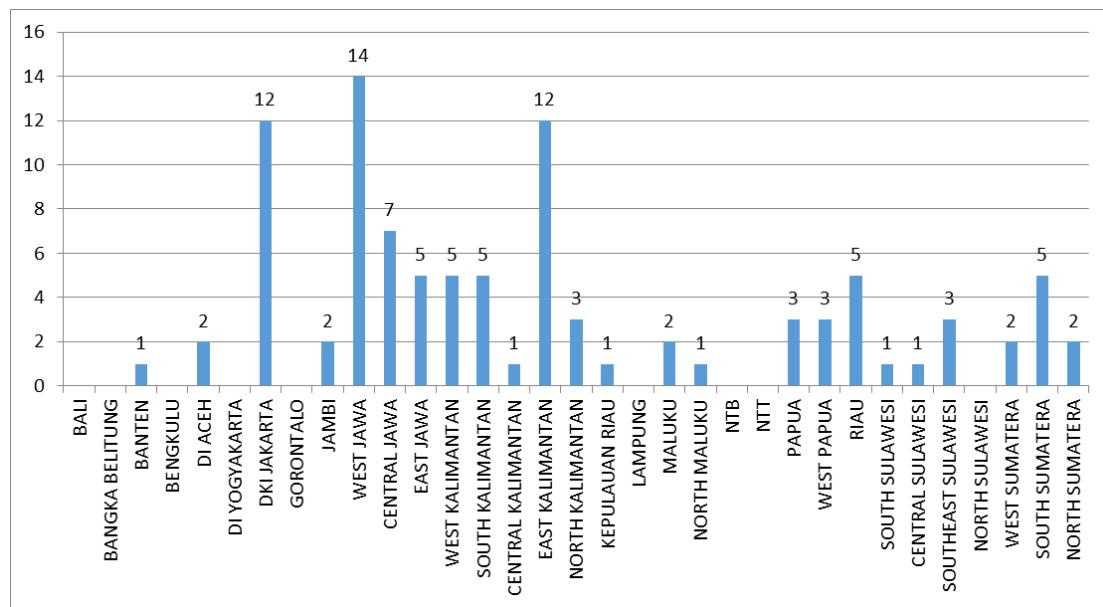
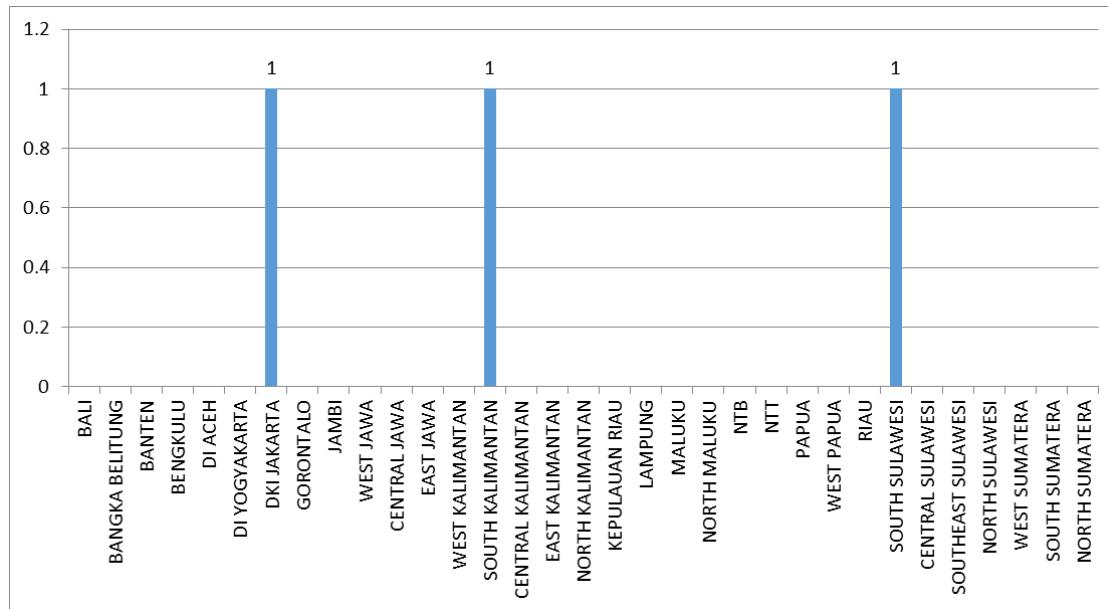


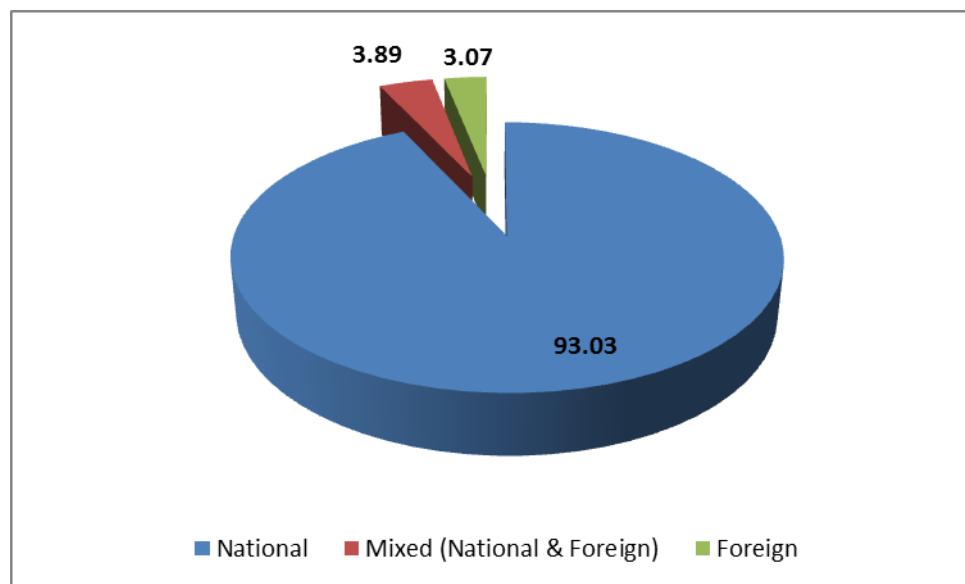
Figure 3.22 Sample Distribution of 'Other' Companies by Operational Office



C. Distribution of company by ownership

Companies in the survey sample were primarily nationally owned with 426 out of the total 460, or 93 per cent. The second category was mixed ownership (national and foreign), 19 companies or 4 per cent and last foreign companies, 15 companies or 3 per cent.

Figure 3.23 Company Ownership

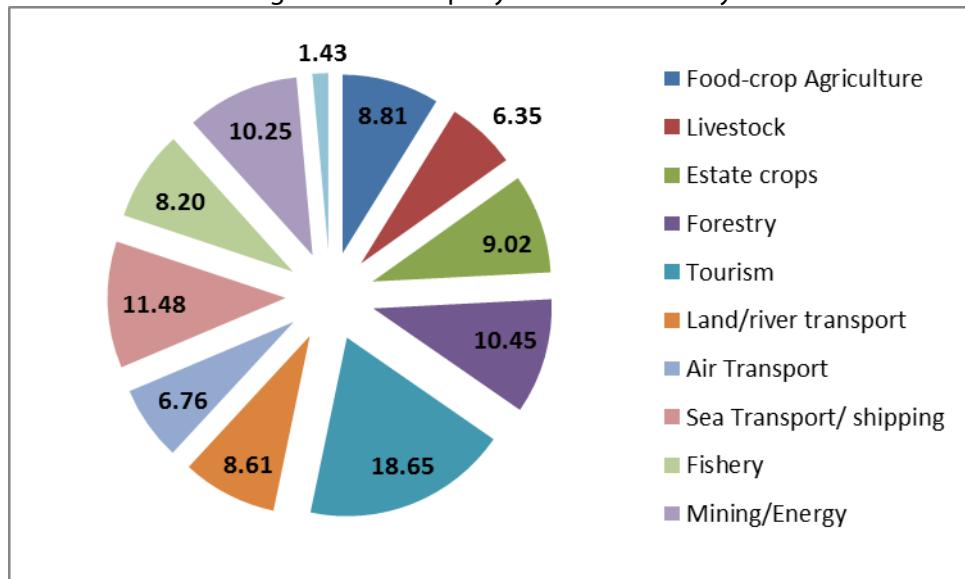


D. Company economic activity by region

The highest numbers of employers interviewed during the survey were in the tourism sector, 85 companies or 18 per cent. This was followed by sea transport and shipping with 56 companies (12 per cent), forestry 51 companies (11 per cent); and mining and energy 50 companies (11 per cent). By region the largest number of employers in Java/ Bali were in the sea transport and shipping industries, followed by tourism and mining and energy. In the Sumatera region the largest number

of companies were in the estate sector, followed by forestry and agriculture. In Sulawesi the most respondents were in tourism, followed by fisheries and air transport. Finally in the Kalimantan region the two highest reporting sectors were air transport and tourism.

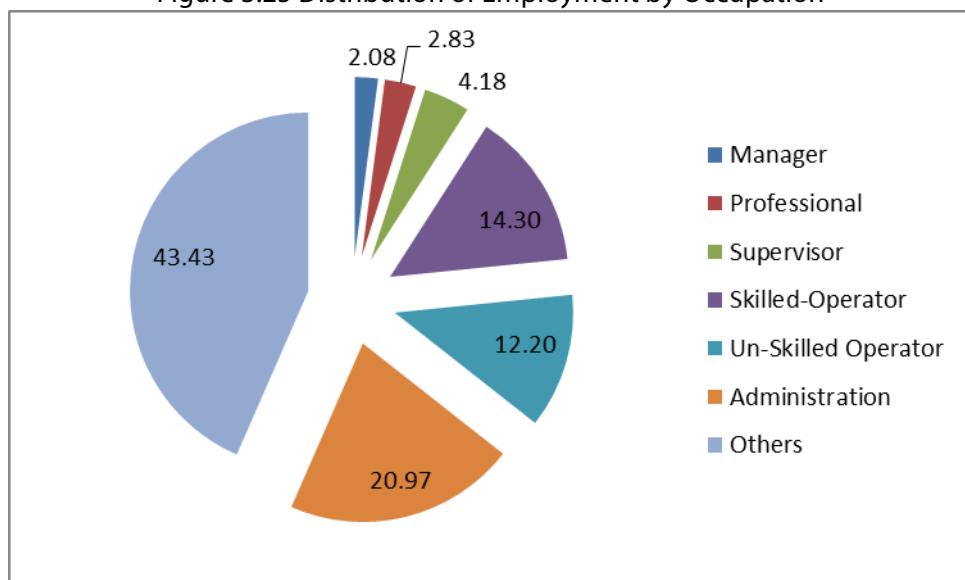
Figure 3.24 Company Economic Activity



3.2.2. Company employment

The total number of employees in the companies sampled was 118,765. The number of males employed by companies in the sample was 73 per cent of the total. Managers and professional occupations made up less than 3 per cent of the employment total, supervisors 3 per cent, technical operators 21 per cent and administration employees 23 per cent. The number of workers in headquarter operations, primarily in Jakarta was 23 per cent of the total as opposed to 77 per cent in branch offices.

Figure 3.25 Distribution of Employment by Occupation



The highest number of workers by region in the company sample was in Sumatera, followed by Java/ Bali, Kalimantan and Sulawesi. Java/ Bali had the highest number of managers and professionals (8 per cent), while Sumatera had the least with just 1 per cent of the sample. In terms

of total employment Sumatera had the highest number of workers in the sample with 72 per cent, followed by Java/ Bali 25 per cent, Kalimantan 2 per cent and Sulawesi 1 per cent.

3.3. Principal findings

3.3.1. Almost 70 per cent of employers expect to hire more workers in the next 3-5 year period

The number of companies planning to hire more workers across the four regions during the next 3-5 years is 335 or 69 per cent, while 153 or 31 per cent do not plan to hire. Java/ Bali has the highest number of companies planning to hire with 232 or 68 per cent, while Kalimantan has the highest percentage of companies planning to hire with 81 per cent.

Table 3.1 Companies Planning to Hire

Companies	Region								Total	
	Sumatera		Java/Bali		Kalimantan		Sulawesi			
	No.	%	No.	%	No.	%	No.	%	No.	%
Hiring	44	63	232	68	18	81	20	71	335	69
Not hiring	26	37	108	32	4	19	8	29	153	31

3.3.2. The highest percentage of employers expect to hire five workers or less

Employers who stated they planned new recruitment were asked the number of employees they expected to hire. 115 or 37 per cent indicated they expected to hire 1-5 new employees over the next 3-5 years. 31 per cent of employers interviewed stated they expected to hire 6-10 new workers, 15 per cent said 11-20, 7 per cent 21-59, six per cent 51-100, and 4 per cent more than 100. The largest number of companies expecting to hire more workers were in the Java/Bali region (74 per cent), followed by Sumatera (14 per cent), Sulawesi (6 per cent), and Kalimantan (5 per cent).

Table 3.2 Planned Company Recruitment by Region

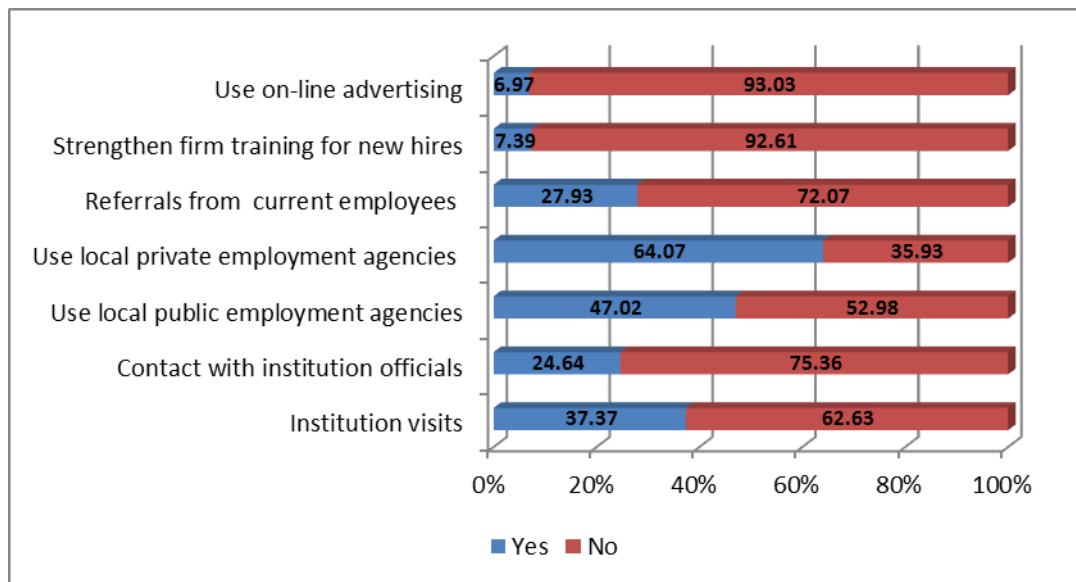
Number of new employees	Region				Total	%
	Sumatera	Java/Bali	Kalimantan	Sulawesi		
1- 5	13	87	3	12	115	37
6 - 10	12	73	8	4	97	31
11 - 20	8	34	3	2	47	15
21 - 50	7	14	1	1	23	7
51 - 100	2	14	1	1	18	6
> 100	2	10	1	0	13	4
Totals	44	232	17	20	313	100

3.3.3. Employers use a variety of methods to recruit new workers

Employers were asked which methods they used to recruit new workers. The highest percentage use local private employment agencies, particularly for workers at the skilled and more senior levels. Only 47 per cent use official government agencies, and a very small proportion upskill their

own staff to meet the need. Surprisingly only slightly more than 7 per cent of employers used on-line advertising.

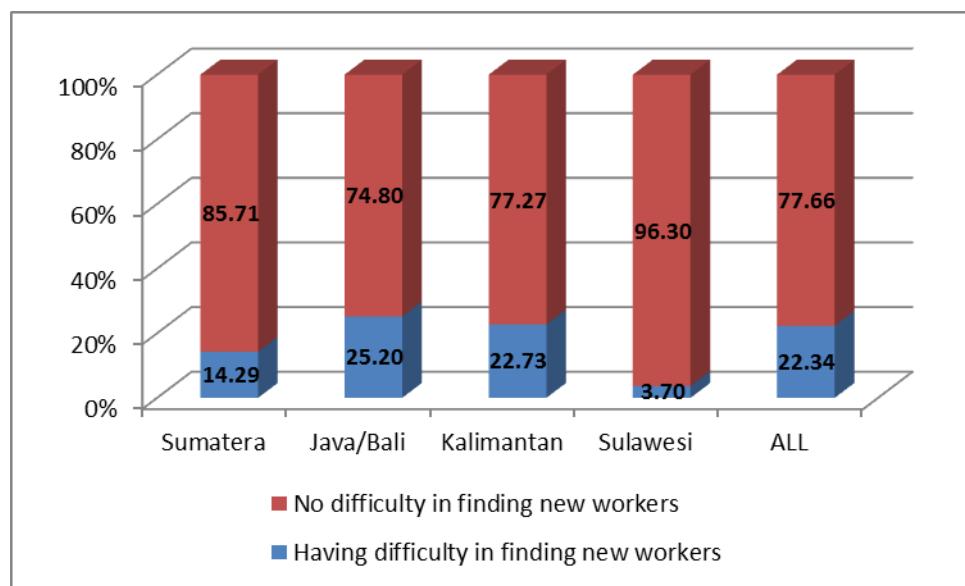
Figure 3.26 Employer Recruitment Methods



3.3.4. There is a mismatch between worker availability and required skills

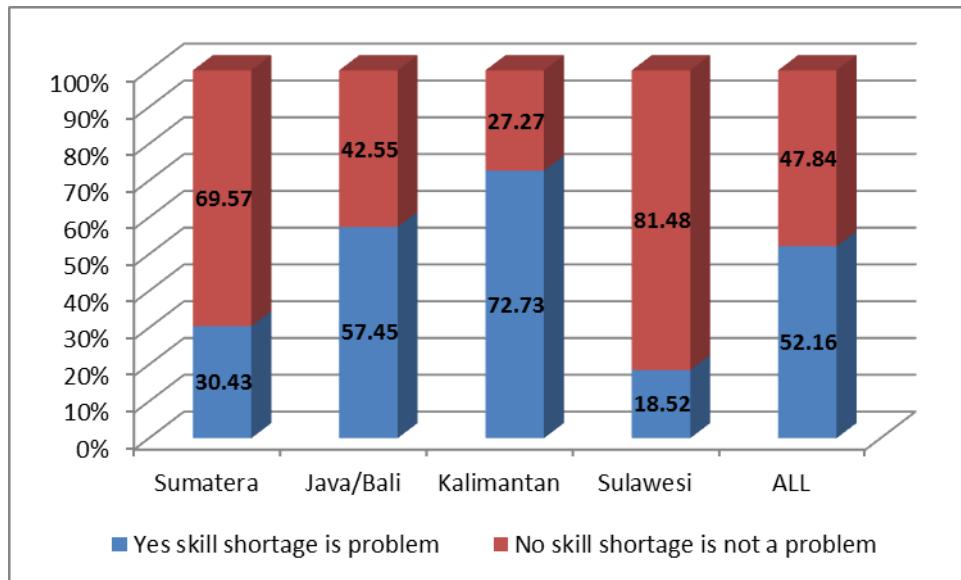
In general almost 80 per cent of employers felt they were having no difficulty in finding new workers. Employers in the Sulawesi region felt they would have the least difficulty, followed by Sumatera, Kalimantan, and Java/Bali.

Figure 3.27 Company Difficulty in finding new workers



There is a mismatch here however as while finding workers was not indicated as a problem for most companies, the issue of workers with the required skills was a different story. Less than 50 per cent of employers felt the workers available would have the required skills. Employers in the Java/Bali and Kalimantan regions felt skills shortage was becoming a greater problem than employers in the Sumatera and Sulawesi regions.

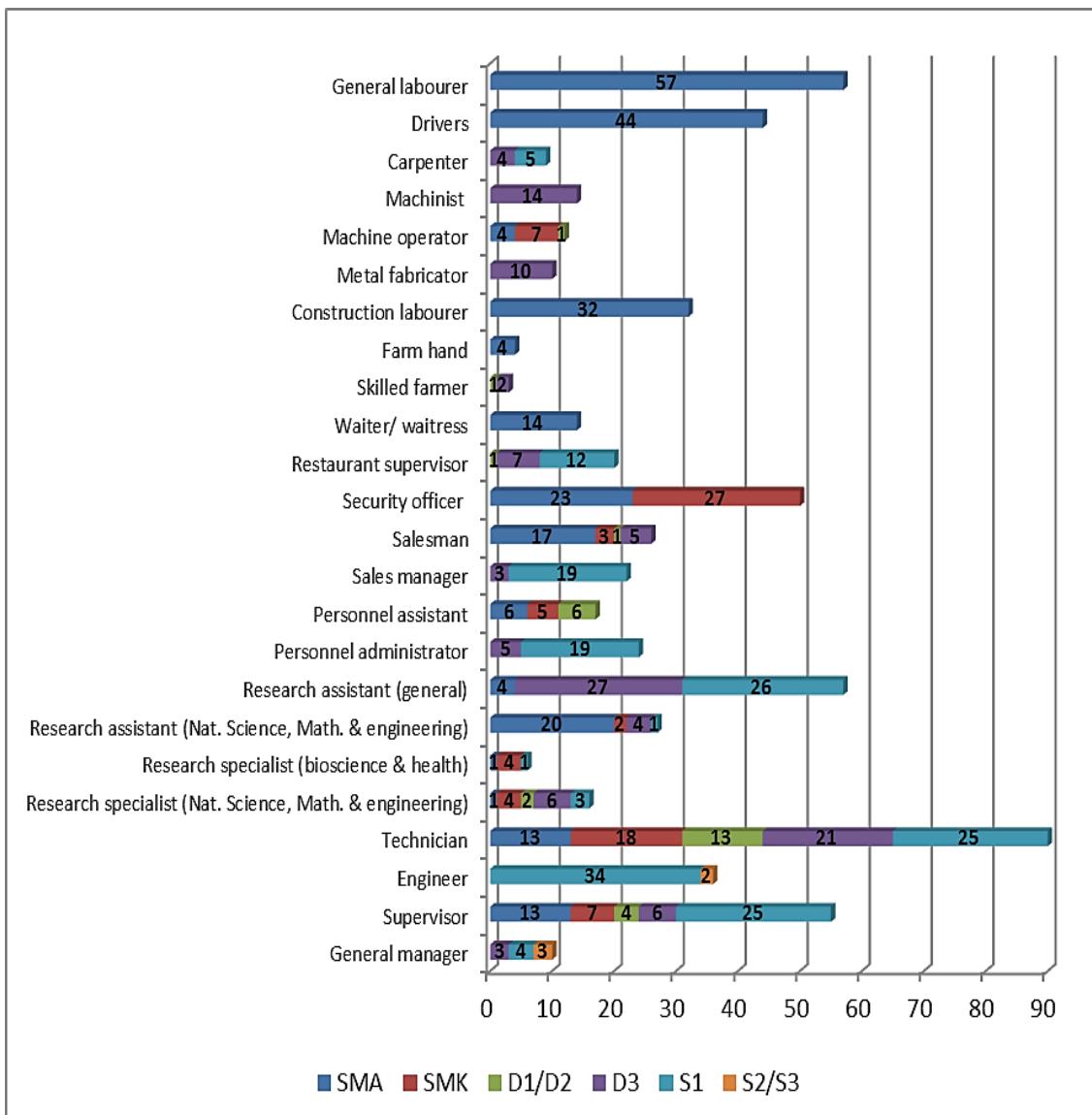
Figure 3.28 Company Assessment of Worker Skill Availability



3.3.5. Occupations requiring higher technical skills and management expertise are expected to be in highest demand

Employers interviewed were asked which specific occupational areas they felt would be most difficult to find over the coming 3-5 year period. Two themes emerged. In the higher skilled area: 1) there will be demand for technicians, engineers and supervisory and senior management personnel and to a lesser degree there will be a requirement for research assistants, personnel managers, machinists and metal fabricators; 2). in the lower skilled categories employers see a growing demand for security personnel, labourers and drivers. Figure 3.29 details the occupations which employers identified, along with their educational requirements.

Figure 3.29 Occupation areas in demand

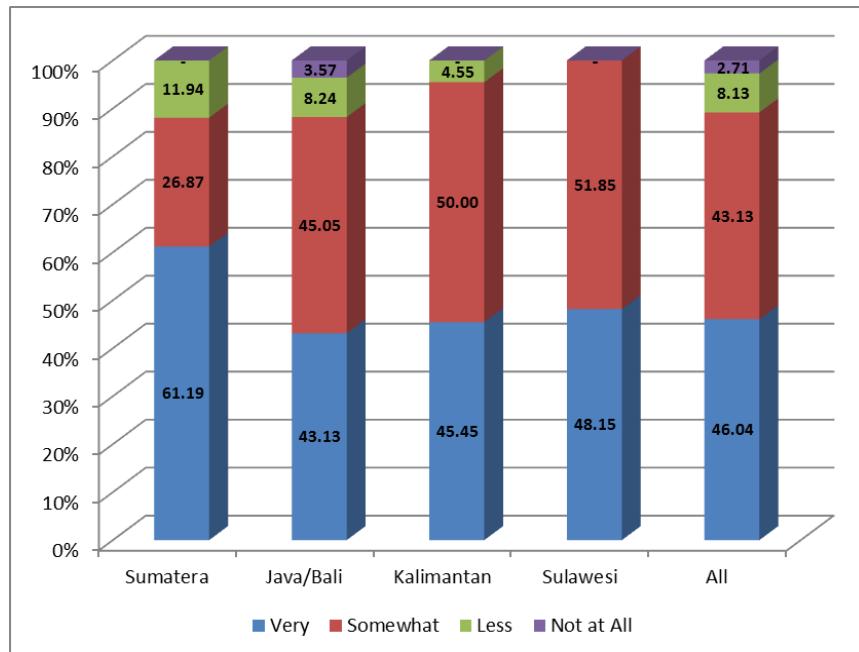


Employers were also asked to specify which skill areas they would have the most difficulty finding in the coming 3-5 year period and the reasons for this difficulty. Their responses corresponded with the findings for occupational demand as they expected higher skill level positions to be the most difficult to fill and in many cases felt there would be no applicants at all with the required skills. Occupations such as engineers, technicians, scientific personnel, senior management and senior supervisors fall into this category.

3.3.6. Employers see workers with strong skills, both technical and soft, as critical to company success

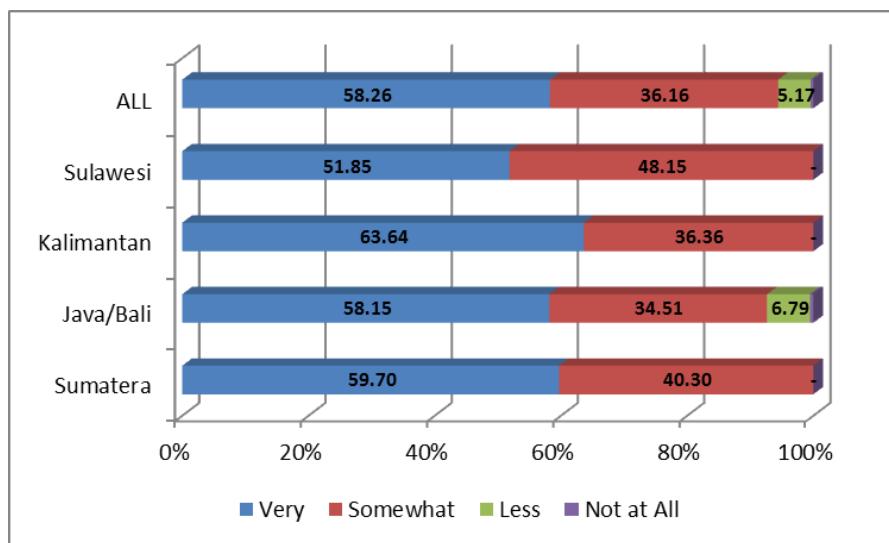
Employers were asked how they rated the importance of soft versus technical skills in their workforce. Across all regions they felt both types of skills were either very important or

Figure 3.30 Importance of soft skills to companies by region



somewhat important. Sumatera region had the highest percentage (61 per cent) of employers who felt soft skills in their workforce were very important. In comparison 46 per cent of the entire sample, across all regions, felt soft skills were very important and 43 per cent felt they were somewhat important. Overall some 10 per cent or less of employers felt both technical and soft skills were of low importance. It should be noted that employers were asked their opinion about all workers in the company, not just new hires.

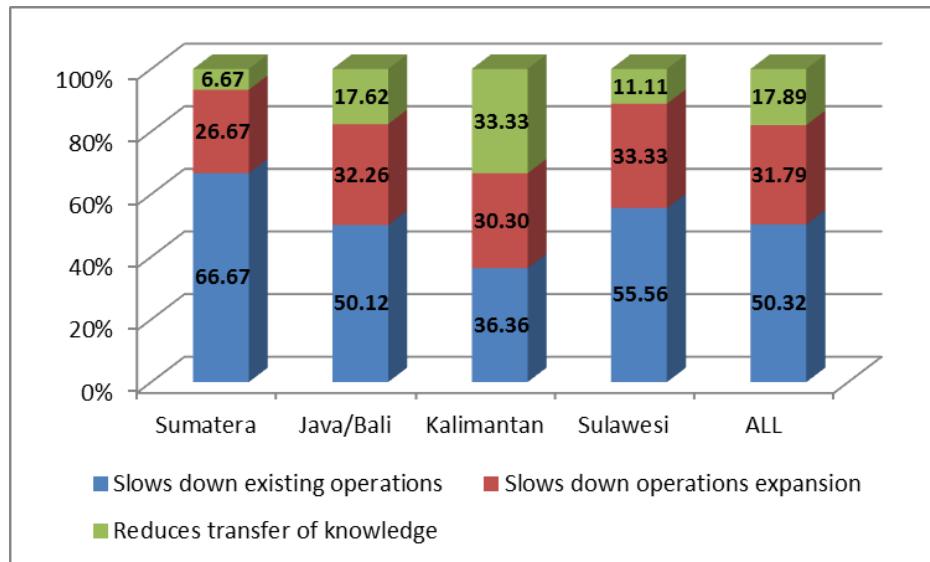
Figure 3.31 Importance of technical skills to companies by region



3.3.7. More than 50 per cent of employers felt skill shortages slow down their operations

Employers were asked what the implications of skill shortages to their operations would be. As figure 3.32 shows skill shortages are a concern to most companies. Almost one-half of the employers were concerned that skill shortages slow down their existing operations and over 30 per cent felt this would slow the expansion of future operations. Further over 20 per cent felt that skill shortages directly reduce knowledge transfer.

Figure 3.32 Implications of skill shortages to companies

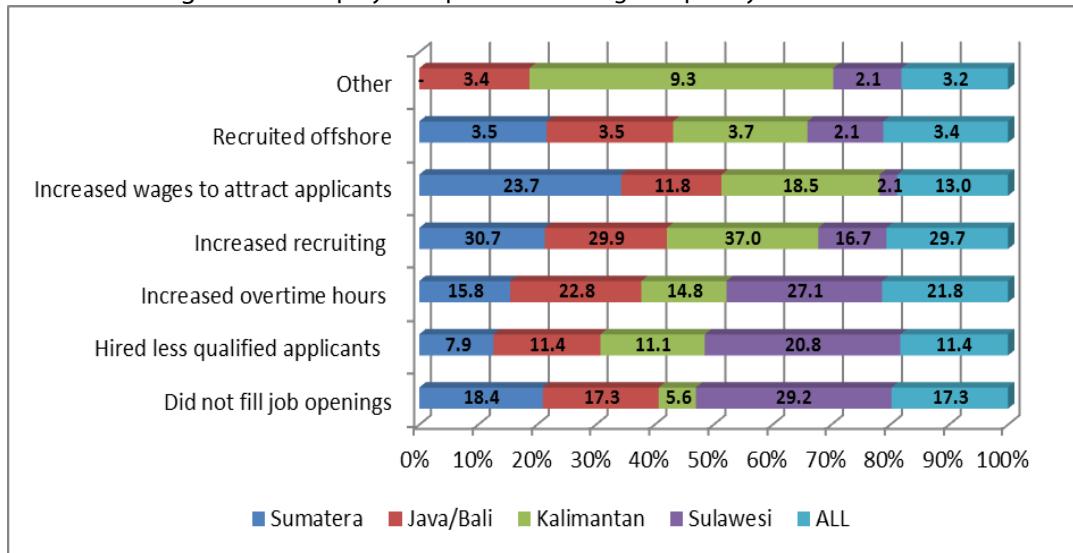


The implications for future economic growth in the country are significant if the growing skill gaps are not reduced. Employers will be forced to look for foreign workers if the local institutions, particularly universities and other higher level institutions, cannot provide enough graduates with the required skills and if, as appears to be the case at present, they do not upskill and retrain their own staff.

3.3.8. More than 20 per cent of employers did not fill vacancies because of skill shortages

Employers were found to use a number of different methods to respond to their need for skilled workers. Across all regions the highest number 30 per cent stated they increased their recruiting efforts. The second highest method 21 per cent was to increase overtime hours for existing skilled staff. Surprisingly though almost 20 per cent of employers across all regions simply left many of their skilled positions vacant, while 11 per cent were forced to hire less qualified applicants. Only 3 per cent of employers were prepared to venture outside of the country to seek qualified workers.

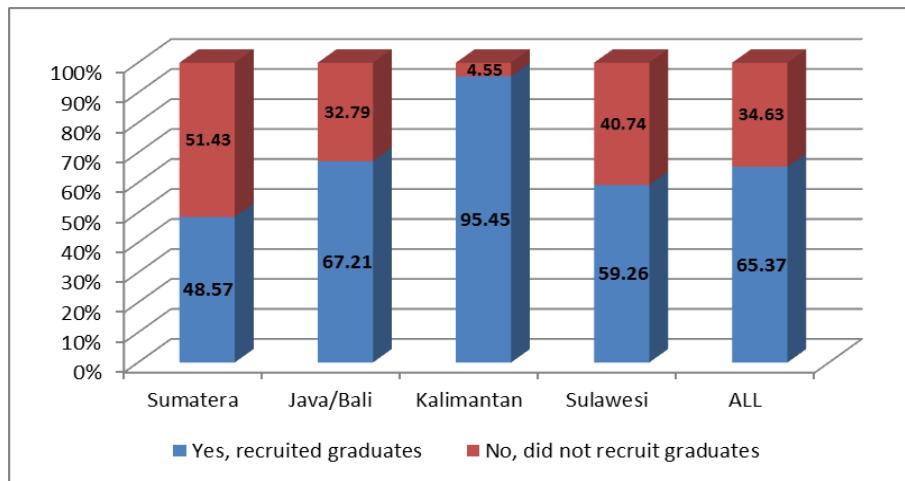
Figure 3.33 Employer response to finding adequately skilled workers.



3.3.9. More than 65 per cent of employers have hired higher education graduates in the past three years

The employer survey revealed that 65 per cent of the 460 employers sampled had hired higher education graduates during the last three years, while 35 per cent had not. The highest level of recruitment was in Java/ Bali with 227 companies hiring graduates followed by Sumatera with 34, Kalimantan with 21 and Sulawesi with 17.

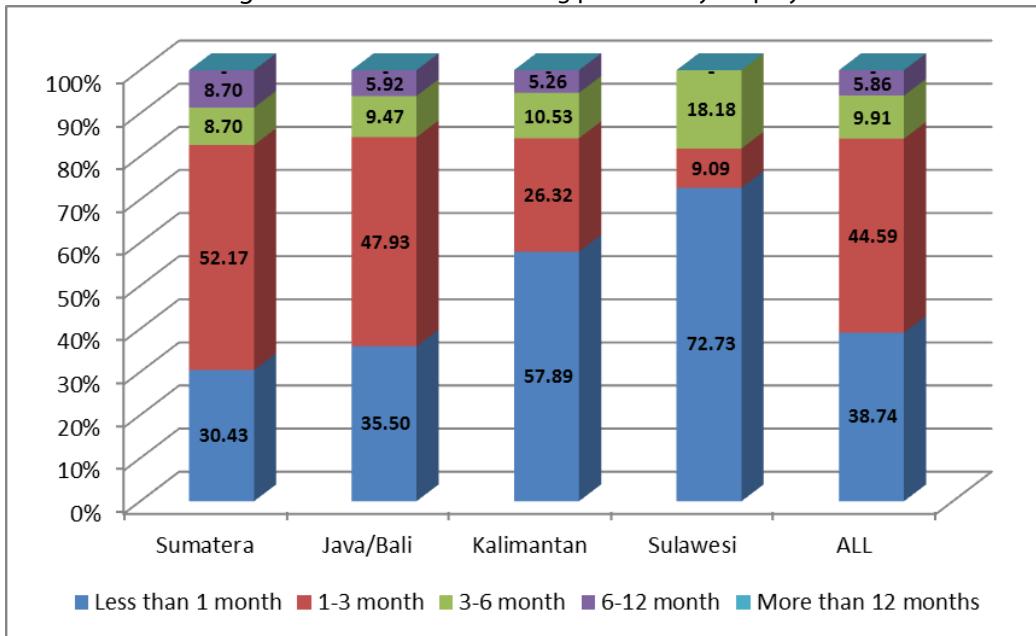
Figure 3.34 Company recruitment of higher education graduates in past three years



3.3.10. Most companies provide additional training to newly hired graduates

Across all regions employers on average provide up to three months of training to newly hired graduates. In the Sulawesi region employers provide the least amount of training on average, one month or less, while in Sumatera more than 50 per cent of employers provide between one and three months training.

Figure 3.35 Amount of training provided by employers



3.3.11. Almost 60 per cent of companies interviewed do not provide internships for graduates

More employers responded (59 per cent) that they did not provide internships to students than those that did (41 per cent). In terms of the total number of students completing internships Java/Bali had the highest number of interns, followed by Sumatera, Kalimantan and Sulawesi.

Table 3.3 Internships provided by companies

Total companies reporting	Region								Total	
	Sumatra		Java/Bali		Kalimantan		Sulawesi			
	N	%	N	%	N	%	N	%	N	%
Yes, provide internships	28	40.0	145	39.4	17	77.3	11	40.7	201	41.3
No, don't provide internships	42	60.0	223	60.6	5	22.7	16	59.3	286	58.7

This finding shows the poor lack of interaction between the institutions and employers. While employers seek more highly skilled and qualified workers they are not prepared to provide practical experience to potential workers.

3.3.12. Employer assessment of basic graduate skills is largely negative

Employers were asked a series of questions about their opinion of basic skills possessed by higher education graduates, as detailed in Table 3.4. Overall the results were largely negative, with employers assessing reading and writing skills as very poor. This was followed by work habits, communication, and team work which were assessed by employers as poor. Technical skills were also assessed as relatively poor.

Table 3.4 Areas where graduate skills are lacking

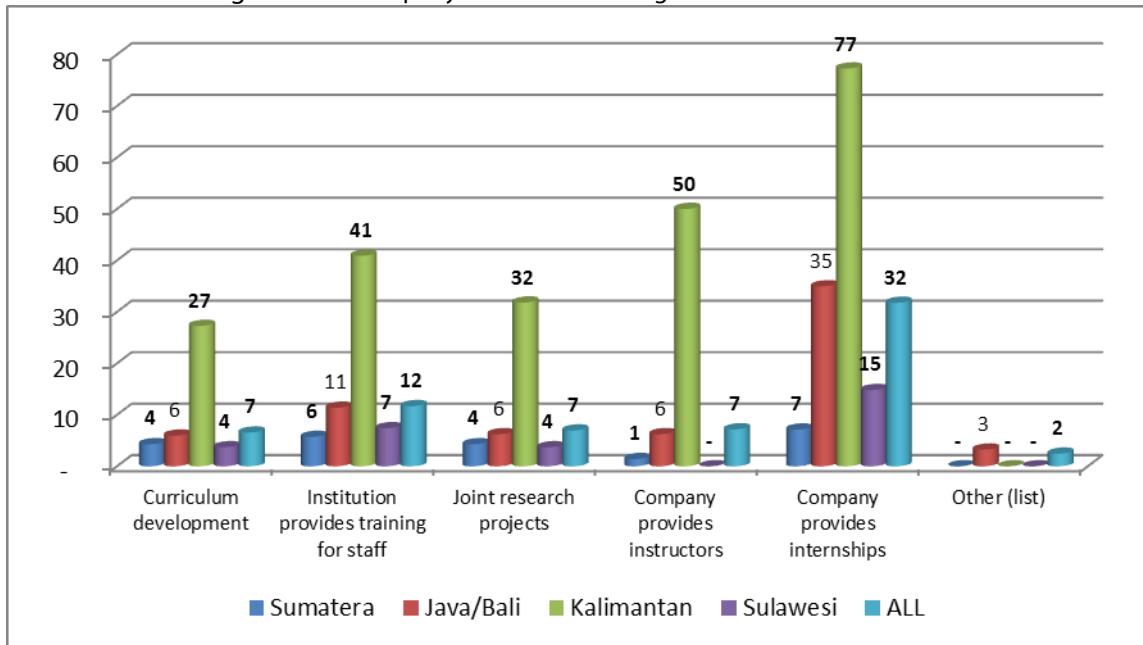
Skill areas in which graduates are deficient	Percent of Responses from Employers			
	25	50	75	
Reading			92	
Writing			90	
English		66		
Computer skills		62		
Teamwork			82	
Problem solving		75		
Communication			83	
Work habits			84	
Technical skills	74			

It is clear from this assessment that employers feel they are not being provided with graduate applicants with the required skills across all areas. This is an issue which needs to be explored further as the implications for the current education system are significant.

3.3.13. Employers have very weak links with local training institutions

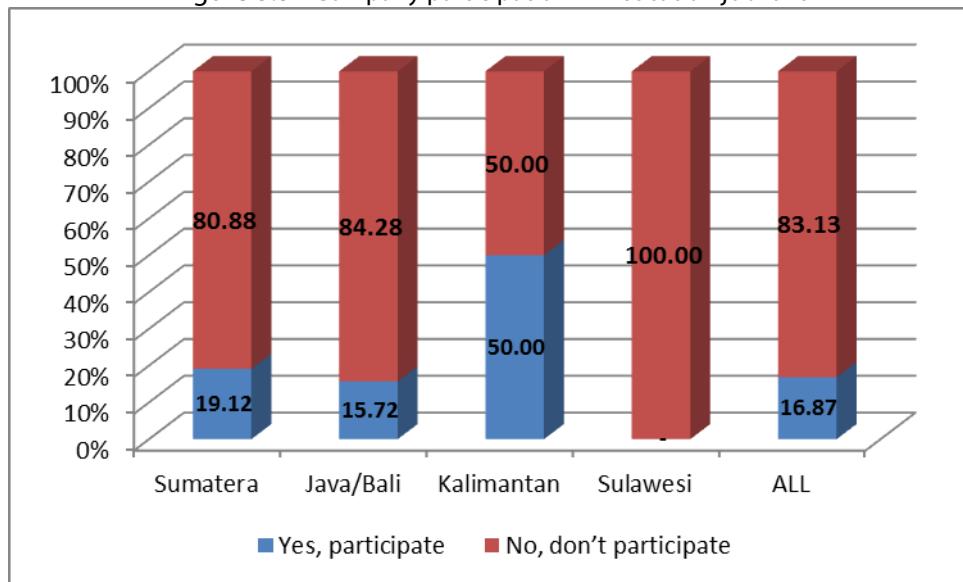
It is somewhat ironic that employers complain about the quality of graduates produced by the higher education institutions yet they make little effort to involve themselves in areas such as curriculum development, internships for students, joint research projects, staff training and so forth. Figure 3.36 shows the percentage of companies involved with local institutions. Other than in the Kalimantan region employers have minimal involvement with the local education institutions. Across all regions only 7 per cent of employers have input into curriculum development, 12 per cent use institutions for staff training, 7 per cent enter into joint research projects and 7 per cent have staff arrangements for instructors. Only in the provision of interns is the involvement higher with 32 per cent of firms accepting interns. These results contrast with the responses from universities, and this is touched upon in Chapter 5 below, where the responses in the FGDs are discussed. These suggest that while it is true that most employers have little involvement with local institutions, education institutions nevertheless have intensive contacts with a small number of employers.

Figure 3.36 Company links with local higher education institutions



Similarly the company participation in job fairs sponsored at the local institutions is very low. Across all regions less than 20 per cent of companies participate in job fairs which provide an opportunity to advertise company employment opportunities.

Figure 3.37 Company participation in institution job fairs



3.3.14. Most employers make little use of available labour market information

Slightly more than 1/3 of employers (36 per cent) interviewed made use of labour market information. Only in the Kalimantan region did more employers make use of available information than those that did not. More than 93 per cent of employers did not make use of local government offices in the recruitment of new workers and only 13 per cent of employers participated in job vacancy surveys conducted by government labour offices. On average only 40 per cent of employers make any use of labour market information available on the internet.

Table 3.5 Use by employers of government labour market information

Total Companies Reporting	Region									
	Sumatera		Java/Bali		Kalimantan		Sulawesi		Total	
	N	%	N	%	N	%	N	%	N	%
Yes, make use of gov't LMI	11	16	141	38	19	86	6	22	177	36
No, don't make use of gov't LMI	59	84	228	62	3	14	21	78	311	64

3.4. Analysis and Recommendations

3.4.1 Employer/ Institution Linkages

Results from the survey sample of employers shows that while almost 70 per cent expect to hire new workers in the next 3-5 year period they are not at all confident that the education system as it currently exists will have the ability to produce graduates with required skills. The issue is not one of numbers as there are many graduates, but of quality and unless the linkages between employers and the institutions are strengthened this situation will not change. This problem is certainly not unique to Indonesia, it is common in most countries and certainly in the more developed economies extensive measures are being taken to involve the institutions with employers and close the 'skills gap'.

Our employer survey results consistently show that employers are not satisfied with the skill levels of their new tertiary hires, whether these are graduates from universities or vocational schools. The main complaints are the lack of technical training, inadequate English, and deficient soft skills, such as the ability to work in teams, critical thinking, and innovative capability. While more than 80 per cent of employers surveyed stated there were plenty of job candidates available they also felt that less than 50 per cent of candidates would have the required skills necessary for work in their firm. So for many employers not only the lack of technical skills is an issue, but general employability of job candidates is also a major concern. A reflection on this matter is that almost 20 per cent of employers stated they would not even attempt to fill vacancies as they knew there would be no suitable candidates available.

At the same time while employers raised concerns about worker skills and the poor quality of graduates, they are really doing little to address the core problem which is to strengthen linkages with the institutions themselves and to provide input into their programming and student outcomes. In other words employers can be their own worst enemy. Survey results show that only 7 per cent of employers had input into curriculum at the institutions, participated in joint research projects or provided instructors; 12 per cent used institutions to provide staff training and less than 1/2 provided opportunities for student internships.

In many countries the government takes an active role to strengthen linkages between higher education institutions across the country and employers. This is a logical development as the employment of graduates is a major concern to countries such as Indonesia which invests large sums of money into the university education system and expects that the economy and society in general will benefit from these investments.

In Canada for instance a number of programs have been developed by government. These programs either directly or indirectly provide opportunities for students to participate with the private sector during their programs or upon graduation. Among these in particular is the Economic Action Plan 2015 which is funded by the Federal government supports paid internships for postsecondary graduates. The funding will help up to 3,000 university and college graduates

access full-time paid internships in high-demand fields such as science, technology, engineering, mathematics and the skilled trades.

The program focuses on providing opportunities for Canada's youth to ensure the next generation has the skills and experience they need for Canada's labour force. These internships give a boost to the careers of highly-skilled students graduating from universities and benefits employers as well.

To address these issues we recommend that Government should take the lead in developing measures to strengthen the linkages between employers and the higher education institutions.

In the third National Medium Term Development Plan(RPJMN) for 2015-2019, the Indonesian Government proposes a number of strategies in this regard, including curriculum development that is aligned with employment needs based on input from business and industry; alignment of curriculum development programs and vocational skills according to the main economic activity in the district/city and labor market needs

3.4.2 Identification of Skill Gaps

From the sample interviews employers were asked which specific occupational areas they felt would be most difficult to find over the coming 3-5 year period. Employers identified expected demand for technicians, engineers and supervisory and senior management personnel and to a lesser degree there will be a requirement for research assistants, personnel managers, machinists and metal fabricators. These are occupations which require university or higher level technical training and will take three or more years of training. Further research needs to be conducted to identify needs on a national basis as these types of positions will be critical if Indonesia is to develop its economy in line with the Medium Term Development Plan.

We recommend that better information sources should be developed to provide information about skills gaps, and further development of the labour market information system in Indonesia addressed in Chapter 7 of this report provides suggestions on measures to better identify the need for these difficult to fill occupations.

3.4.3 Need for Employer Satisfaction Surveys

A large percentage of the employers surveyed indicated that they were highly dissatisfied with the basic skills possessed by new graduates across all education levels. Over 90 per cent of employers rated reading and writing skills of graduates as poor to very poor. Similarly English speaking skills, work habits, communication, and team work were assessed by employers as poor. Technical skills were also assessed as relatively poor. This assessment has serious implications for the existing education system and needs to be addressed by government.

Universities and other institutions in many countries carry out tracer studies of graduates to determine employment outcomes, to assess and improve institutional quality, adapt old and develop new, curriculum and influence institutional performance management systems, and recommendations about this are made in Chapter 5 below. What these studies do not provide however is specific feedback from employers on the quality and relevance of training that graduates have received and recommendations and opinions on how the training received can be improved.

More recently both institutions and government agencies in a number of countries have conducted employer satisfaction surveys to get a better understanding of the impact of training on the employability of graduates and employer reaction to the quality of the graduates and the relevance

of their training. The results from these surveys provide institutions with information on ways to tailor their programming to meet labour market needs and also strengthen linkages with employers to obtain input into curricula, involvement in job fairs and other forms of university recruitment. Additionally survey results can lead to the provision of better training in a number of the 'soft' skill areas which employers have identified as poor quality and result in graduates becoming more employable.

The employer satisfaction survey can also provide the opportunity to ask graduates working in a particular firm the same questions asked of the employer. This data can serve as a good cross-reference to confirm or question survey results and to validate data.

Figure 3.38 Example of employer responses about graduate skills and abilities

Statement	Percent of Employers	
	Agree	Disagree
Graduates have a good technical in their field of study understanding	57	43
Graduates have a good theoretical understanding in their field of study	61	39
Graduates have good practical skills in their field of study	55	45
Graduates can use operating manuals effectively	47	53
Graduates have basic English skills necessary for company operations	30	70
Graduates are well prepared to improve their skills through on-the-job training	80	20
Graduates can qualify for a promotion to higher levels	82	18
Graduates understand about technical specifications and standards	60	40
Graduates perform their jobs in a cost efficient manner	54	46
Graduates are more productive than other workers	58	42
Graduates can apply the skills they have acquired in a practical way	75	25

Note: The above chart uses fictional data, intended only to illustrate how the results of an Employer Satisfaction Survey might look

We therefore recommend that in response to employers' negative opinion about basic graduate skills that the Government should conduct employer satisfaction surveys as a starting point in addressing this problem

3.4.4 Need for Active Job Placement/ Career Centers

Many universities internationally have implemented comprehensive employment and career services centers at the institution. This allows students the opportunity to access information on the job market and future possible careers as well as receive guidance directly from counsellors working at the institution. An Employment and Career Resources Center provides students access to all types of labour market information, the opportunity to receive counseling and career guidance services and apply for employment opportunities on campus, external to the institution locally, nationally and internationally. These centers can strengthen student involvement with employers and lead to the exchange of information on present and future job opportunities.

More specifically:

- Institutions should develop a coherent career guidance profession, independent from psychological counselling and well-informed by labour market information.
- Institutions should provide adequate resources for career guidance and its proactive delivery and ensure an independent base to support objective career guidance.
- Institutions should provide good sources of information about careers and courses.
- Institutions should build a comprehensive framework of guidance through a partnership with employers.

To provide better guidance to students about the job market, job prospects and the education and skills required, **we recommend that all higher education institutions should have in place active job placement/ career centers and involve employers actively in their services**

3.4.5 Need for Education and Training Advisory Committees

Employer survey results clearly show the lack of involvement with local higher education institutions. Only 12 per cent of employers interviewed have any direct involvement with the institutions in their area. As pointed out earlier while employers make little effort to directly involve themselves with the education institutions they are highly critical of the training provided and quality of students they produce.

Education and training advisory committees would serve as a mechanism for employers to involve themselves in the development of required programs, curricula development, internships, job placement, job fairs and so forth. It is important that such committees should be locally based, so reflecting the skills needs in a particular region or province; though within a geographical area this type of committee could be established on a sectoral basis as well and involve a number of employers in the same industry.

Training advisory committees could play a key role in:

- planning, identifying and prioritising industry skill and workforce development training needs to advise government and the education institutions on required funding
- identifying career pathways within the industry, for national qualification purposes
- development of performance benchmarks for training content purposes
- the review of education institution programs and courses to meet industry standards
- developing training and career information resources

- providing advice on different training options and workforce development to industry and enterprises which might complement the education institution programs

We recommend that education and training advisory committees be established at the local level to involve employers in the development of curricula and program planning at the local institutions. These committees should be developed at the level of the Province, and Provincial governments should take the lead in developing these.

It is apparent from this review that employer survey results show a major disconnect between the skills provided by education institutions and what employers require. All of the recommendations presented in this chapter address measures to strengthen linkages between employers and the higher education institutions. The survey sample is sufficient to reflect employer demand for more highly skilled workers in the technical and science fields. Employers are highly dissatisfied with the basic cognitive skills possessed by graduates from the education system at all levels. This is an important issue and needs to be addressed by the education system as poor basic skills make graduates far less employable and impacts on the development of the Indonesian economy. The recommendations provided here will help to address it.

4. Capacity of the SMK and BLK

This chapter considers the capacity of the SMK and BLK to respond to Indonesia's manpower needs as articulated through the RPJNM, and addresses six questions in particular:

- What lessons from international experience are useful in evaluating Indonesia's experience?¹¹
- Can the secondary vocational education system meet the both the quantitative and qualitative requirements of the changing economy?
- How well do Indonesia's vocational secondary schools (SMK) and labor training centers (BLK) access labor market information, what are the sources of that information and how is the information used to improve instruction and employment outcomes?
- How do the SMK and BLK collaborate with employers to improve curricula and learning and help students find jobs
- How are these labor market information and collaboration practices followed across the seven RPJMN 2015 regions? As part of this analysis we examined the view of SMK leaders on the effectiveness of different fields of study in helping students find employment.
- What are the constraints and incentives for institutional change in the SMK?

For the SMK, differences in the answers to the questions are also analyzed by the nature of school ownership: central government, provincial government, district/city government, and private foundations. All of The BLK in the sample are government owned.

We draw on the several broad studies of education and skills in Indonesia to describe the SMK and BLK systems and to assist in judging labor market performance of SMK graduates¹². In doing so we link the findings of our enterprise survey regarding employer assessment of SMA and SMK graduates back to a similar study published by the World Bank in 2012¹³.

The chapter draws on the findings of a survey of 282 public and private SMK and 53 public BLK. The sample was drawn from large cities in order to assess institutions most likely to follow good practices in large employment markets and therefore not representative of the institutions nationally. However, both public and private SMK operate with the same curricula in a common framework of government rules and regulations. This standardization across all of Indonesia increases the reliability of the inferences made in this sample study. The BLK system is small and aging and it is expected that the present arrangements will soon be reformed.

Private schools owned and managed by foundations comprise fifty-seven per cent of the sample, slightly less than their overall share of SMK enrolments, which is sixty-three per cent. Twenty-nine per cent of the sample schools are owned by District and City Governments, Provincial Governments own eight per cent and six per cent are owned by the Central Government (Table4.1) The 53 BLK in the sample are all public institutions located in large cities.

¹¹ See John Middleton (2015) Improving Technical and Vocational Education and Training in Indonesia. Review of International Experience in the Annexes to this Report.

¹² Unfortunately, these studies do not provide data on the labor market performance of the BLK.

¹³ di Groppelo, Emanuela with Aurelien Kruse and Prateek Tandon (2011). Skills for the Labor Market in Indonesia. Trends in Demand, Gaps, and Supply. World Bank. Washington, D.C

Table 4.1 SMK Sample, By Ownership

Ownership	Number	Per cent
Central Government	16	6
Provincial Government	23	8
District/City Government	81	29
Private Foundation	162	57
Total	282	100

Our review of international experience with technical and vocational education has been helpful in assessing the survey findings and will be referred to throughout.¹⁴

There is certainly room for improvement in linking the SMK and BLK with employment and strategic recommendations are made for this.

4.1. Formal and non-formal arrangements

4.1.1. The formal TVET system

Recent studies of education in Indonesia provide some useful information and data on Indonesia's system of vocational education. Our survey data on employer views of the quality of SMA and SMK graduates links our data to these studies.

4.1.2. Secondary Vocational Schools (SMK)

SMK and BLK operate in Indonesia's decentralized governance structure. Institutions of both types are guided by national standards, policies and regulations and public financing is provided by Districts supported by block grants from the Central Government. The SMK are managed by the Ministry of Education and Culture (MOEC) Private SMK follow the public vocational curriculum and standards. The BLK are overseen and financed by the Ministry of Manpower (MOM)

Secondary education has been rapidly expanding in Indonesia, rising from 5.5 million students in 2000/2001 to 9.6 million in 2011/2012 (Figure 4.1). Enrolments in general secondary schools (SMA) and vocational secondary schools are essentially equal (Table 4.2).¹⁶ Government policy and investment has increased enrolment in vocational education by 158% between 2001 and 2010. The ADB reports that the Ministry of Education and Culture (MEC) plans to increase gross enrollments for all secondary education to 97% by 2020 and considers this feasible, depending on resources. Enrolment in the SMK is to reach about fifty per cent of the total.

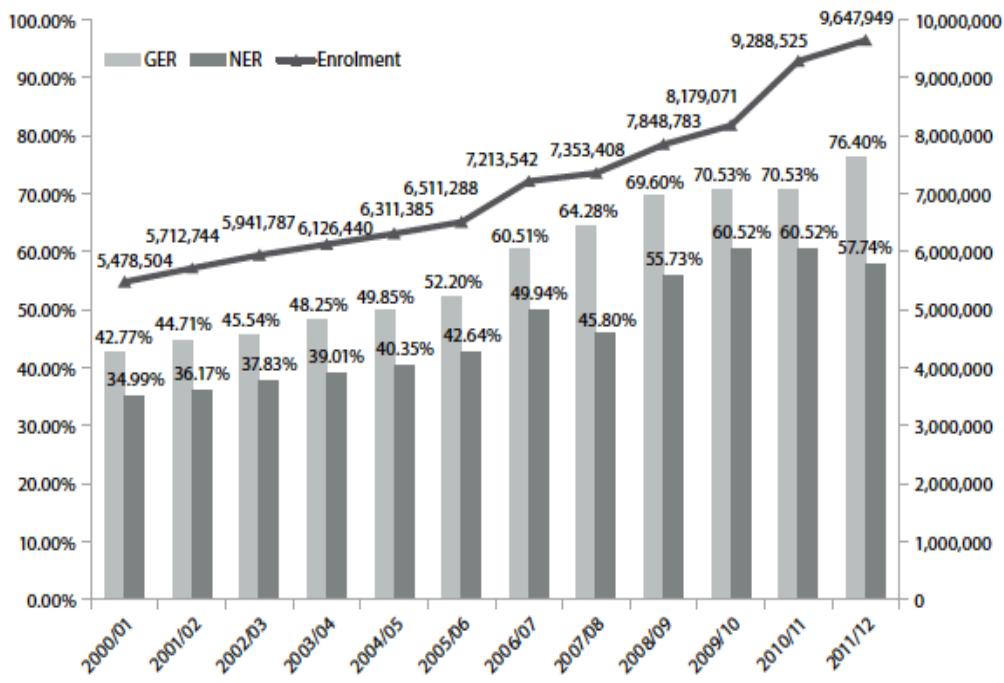
Sixty-seven per cent of SMA students attend public schools and 63 per cent of SMK student attend private schools. The enrolment of girls is falling in the SMK and rising in the SMA.

¹⁴ The study may be found in the appendices to our report.

¹⁵ OECD and Asian Development Bank (2015). *Education in Indonesia: Rising to the Challenge*. Paris. P.159

¹⁶ I bid

Figure 4.1 Gross enrolment rate of senior secondary learners 2006/2006 to 2011/2012



Source : MoEC, *Buku Indikator Kunci Keberhasilan 2000/01 – 2011/12*.

Table 4.2 Senior Secondary Enrolment in 2011/2012

Senior secondary enrolment in 2011/2012				
Type	Public	%	Private	Total
SMA	2 827 517	67%	1 368 950	4 196 467
SMK	1 494 044	37%	2 525 113	4 019 157
	4 321 561		3 894 063	8 215 624

Source: MOEC (Ministry of Education and Culture), 2011.

The general secondary schools (SMA) prepare students for tertiary education through a curriculum with compulsory courses in religion, manners, civics, Bahasa Indonesia, mathematics, history, English, arts, health and sports, and craft and entrepreneurship. Interest-based subjects are offered: mathematics and science, social science, languages, and culture.¹⁷

The curriculum in vocational secondary schools (SMK) is similar to that of the SMA with the exception that the interest subjects are built around careers: Technology and Engineering, Information and Communication Technology, Health, Agribusiness and agro-technology, Fisheries/Marine, Business and Management, Tourism, Art and Craft and Performing arts. These courses of study include a substantial amount of cognitive learning. While both SMA and SMK graduates are eligible to take examinations that lead to university enrolment, 60 per cent of SMA

¹⁷ Islamic schools, including secondary schools, play an important role in Indonesian education but fall outside the terms of reference of the present study.

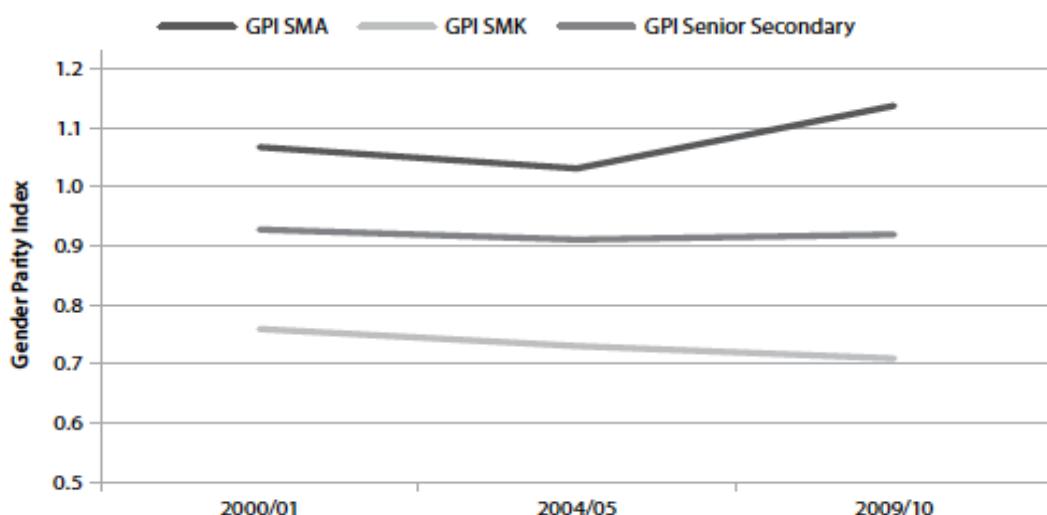
students enter higher education while less than 10 per cent of SMK students do so.¹⁸ As is generally the case for vocational education, students entering the SMK are likely to have lower test scores in the Junior Secondary examination than those students entering the SMA.

Individual SMK provide a selection of courses of study in the national curriculum and the selection varies across their locations, depending on local conditions and employment demand.

SMK provide a higher share of secondary enrolments in urban areas than rural and in Java and Bali relative to other provinces.¹⁹ The enrolment of girls in SMK is declining while their share in SMA enrolments is rising. (Figure 4.2).²⁰

Our projections show that in most sector of the economy demand for SMA graduates is likely to grow more quickly over the next five years than for SMK graduates. Demand for SMK graduates will outstrip SMA graduates in mining and manufacturing only. Girls may well be following labor market signals into occupations and industries where cognitive and interpersonal skills are in rising demand

Figure 4.2 Gender parity indices in senior secondary schooling



Source: MOEC (Ministry of Education and Culture) (2014), *Ikhtisar Data Pendidikan Nasional (Highlights of National Education) 2000-10.*

The SMK are relatively small schools. The average staffing by school of the SMK in our sample is shown in Tables 4-3 and 4-4. On average public SMK have 60 to 80 teachers. The private SMK are much smaller with an average of about 40 teachers. Across the sample there are on average two civil service administrators supported by six non-civil service support staff.²¹

¹⁸ World Bank (2010). *Skills for the Labor Market: Outcomes for Youth in Indonesia.* Washington, D.C p. 25

¹⁹ World Bank (2012). *Indonesia: Preparing Indonesian Youth for Transition.* Washington, D.C. p. 14.

²⁰ OECD and Asian Development Bank. op.cit p. 136

²¹ World Bank (2012) *Preparing Indonesian Youth for Transition*, p.42

Table 4.3 Average Number of SMK Teachers 2015, Sample Schools

Ownership	SMK	
	Male	Female
Central Government	29	30
Provincial Government	29	38
District/City Government	35	47
Private Foundation	16	14

Table 4.4 Average Number of SMK Staff 2015 by Civil Service Status, Sample School

Status	SMK	
	Male	Female
Civil Servant (PNS)	1.46	1.38
Non-PNS	5.43	3.49

The average teacher: student ratio in the public SMK is 1:40 and in the private SMK it is 1:37. Teachers in the public SMK work 20 hours a week while their private counterparts toil 22 hours a week. Twenty-four per cent of teachers in public SMK have second jobs and for private school teachers the proportion rises to forty-six per cent.²²

The Ministry of Education and Culture oversees and regulates secondary schooling in Indonesia and provides financial support to Districts, which manage and finance the schools with both GOI and local financing. Secondary schools have School Advisory Committees representing parent, local government and employers. Schools have broad authority to manage their programs and instruction in the classrooms "...in accordance with local social norms and culture."²³

Accountability for the schools is reported to be weak. Inspections by local education officers have little consequences. Most principals report that they were not well prepared to provide effective leadership and perform such School-based management practices as formulating a vision for school staff, developing a plan for school academic improvement, and making decisions on school curriculum. Similarly, a majority of teachers reported they were not well prepared to plan effective lessons and use various instructional methods and, hence, were unprepared to try alternatives to their routine instructional practices. District staff members, including supervisors, were even less positive about principal and teacher preparedness. School accreditation is granted but rarely updated. School Advisory Committees are reported to be functioning at different levels of effectiveness²⁴ Substantial shares of SMK and BLK report conducting annual surveys of graduates to determine employment outcomes but we found no evidence that the survey results are used subsequently to inform decisions.

4.2. Non-formal Vocational Training (BLK)

BLK are non-formal training centres that provide training to school dropouts and the unemployed. They are administered on a decentralized basis by district. In 2010 there were 162 BLKs financed by government budgets. There are three types of centres. Type A centres (20 per cent of the total)

²² Ibid pp 331-32

²³ Ibid pp 31-32

²⁴ Ibid pp. 42-43

are the largest and are found in urban areas. Types B (10 per cent) are located in smaller urban areas. Types C (70 per cent) are the smallest and are found in rural areas. The large BLKs provide industrial and service skills training and the smaller ones train in appropriate technologies and skills for self-employment²⁵

The BLK system is small, aging and expensive. Appropriately, the MoM and MOEC are considering reforms that could revitalize the BLK through integration with the SMK.

About 230 public BLK now primarily serve unemployed secondary dropouts and adults and graduate about 2200 graduates annually. Compared to the SMK, the BLK constitute a tiny share of Indonesia's vocational education system. They primarily provide short courses of three months or less with curricula built around trades such as welding, automotive, commerce and electricity. New self-paced competency-based training packages have been introduced but they are being implemented in small number of centers. Most BLK conduct training on a classroom schedule. Trainees are assessed internally with little reference to national standards.

The instructor force is aging and over 400 have left employment and only 40 per cent of the vacancies have been filled. The loss of staff is considered a significant threat to training effectiveness. Most BLK have not received new equipment since 2000.

At our focus groups discussion BLK principals discussed the informal relationships that they have with employers and said that these relationships are primarily aimed at helping students find jobs, many of whom work part time while they are still studying.

In addition to the urban BLK the Ministry of Manpower (MOM) operates a successful program of Mobile Training Units (MTU) that provide training in skills appropriate to rural areas and in the informal sector. More than 50,000 persons graduate from MTU programs each year.

Funding comes primarily from the MOM. Little success has been found in generating additional income through sale of training services. The average cost for a three month BLK course is reported to be Rp. 17 million, similar to the cost of one year of education in some public tertiary education institutions.

Meeting the Demand for Vocational Skills in the New Economy

Indonesia's RPJMN 2015 development plan will rely heavily on the skills of the workforce for productivity and competitiveness of new industries, as will the enterprises of the current economy.

While the nature and skill requirements of the new knowledge industries to be developed under the regional economic strategy are not yet known, it is likely that SMK graduates would comprise a smaller share of their workforces than is the case of the present economy. Most of the demand in the enterprises will be for high quality university graduates and technicians. There is considerable uncertainty about the skill requirements of the new industries to be attracted and expanded under the regional economic strategy and also about the pace at which this expansion may proceed.

Although the future is always uncertain it is most likely that for some time to come the skills structure of the current economy will determine most of the demand for skills. Using SAKKERNAS data on the education structure of the current workforce we projected demand for workers across all education levels out to 2018. The projections show that demand for SMA graduates will grow more quickly than for SMK graduates in the Transport and Communications, Finance, Social Services, Trade, Hotel and Restaurant, and construction and Real Estate Sectors. SMK graduates

²⁵ di Groppelo, Emanuela with Aurelien Kruse and Prateek Tandon (2011). Skills for the Labor Market in Indonesia. Trends in Demand, Gaps, and Supply. World Bank. Washington, D.C., p 210

are projected to be in higher demand than SMA graduates only in Mining and Manufacturing. This growing demand for SMA graduates is an early signal of the value employers place on cognitive skills. Sixty per cent of SMA graduates proceed on to post-secondary education while only about ten per cent of SMK graduates follow this path.

Any increase in demand for secondary school graduates is most likely to be met, overall, for three reasons.

- First, Indonesia is on track to achieve universal secondary education over the next ten to fifteen years. SMK are now graduating 1.3 million students annually, of which only half enter formal employment with the rest entering the informal sector. This should rise to close to two million when universal secondary education is achieved and the policy of the government is to ensure that SMK will continue to enrol more students than the SMA.
- Second, improving the quality of SMK education and instituting measures to link it more closely to the economy and skills demand could well increase the share of SMK graduates that are able to enter an expanding formal wage employment as it expands and demand for their skills increases potentially leading to substantial increase in the share of SMK graduates who are prepared for formal employment.
- Third, the MOEC is investing substantially in improving the quality of education at all levels.
- Fourth, and importantly, under the RPJMN 2015 the Government plans to construct new SMK outside of Java Bali in the economic regions. This could very well offer an excellent opportunity to join with employers to design new curricula relevant to local growth industries.

That on average Indonesia's 15 year olds perform well below the OECD norm as well as below the scores of regional competitor countries in OECD's PISA mathematics and reading examination indicates that the quality of basic and junior secondary education is comparatively low. It is likely that the children of economically and educationally disadvantaged people are scoring below the average on the junior secondary examination as well as on the PISA test.²⁶ Improving basic and junior secondary education would make a substantial contribution to the quality and effectiveness of both SMA and SMK education and, over time, enable a much larger share of SMK graduates to be prepared for to enter formal employment.

4.3. Performance in the labor market

How well the SMK and BLK have performed in the enabling young people to obtain productive employment is their key measure of success and the justification for their costs. As noted above, improving the employment outcomes of an SMK education, especially for those SMK students from economically and educationally disadvantaged families, who may well find formal wage jobs if the economy expands as expected, is a key issue for the future.²⁷

4.3.1. SMK – performance in the labor market.

There is a continuing debate in Indonesia over the relative value of academic and vocational secondary education in preparing youth for work. World Bank studies provide useful data on how the two courses of study are seen in the marketplace.

It must be borne in mind that when we speak of graduates from the SMK and SMA we are speaking of teenagers eager for a formal wage job but with only the skills that their curricula

²⁶ David Newhuse and Daniel Suryadarma (2011). "The Value of Vocational Education; High School Type and Labor Market Outcomes in Indonesia." Word Bank Economic Review Vol. 25, no 2, pp 296-322

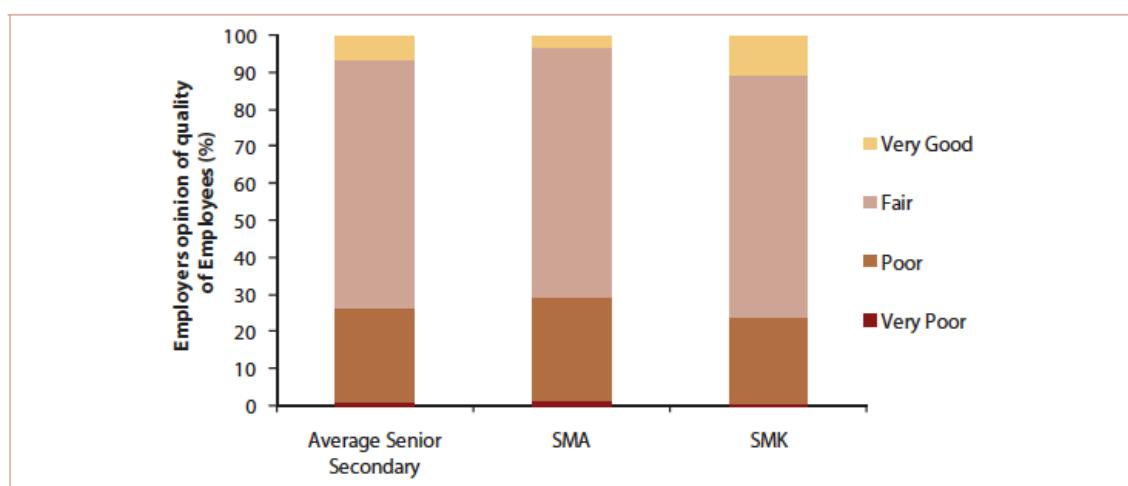
²⁷ In Indonesia, as elsewhere, vocational education costs more than general secondary education.

provided. Across the global economy employers are most concerned about how much it will cost to train these young people to become productive in an entry-level job. They are not expected to bring much specialized skill to work on the first day although graduates from SMK are expected to be generally familiar with the industries that they study such as hospitality and tourism, or business and manufacturing, or accounting. Employers are delighted when these new entrants have strong cognitive and analytical skills – these lower the costs of training.

Formal and supervised internships add to the soft skills of teamwork, problem solving and workplace communication that are critical in the modern enterprises. As we will discuss, internships in Indonesia are not strong.

In 2010 the World Bank reported that employers were not very satisfied with either the SMA or SMK program, with the SMK getting marginally better marks (Figure 4.3). Both programs were largely rated as poor or fair, with the SMK vocational program given a slight edge²⁸

Figure 4.3 Employer's 2010 Opinion of Quality of Employees with Senior Secondary Education (%)



Source: Indonesia Skills Report, World Bank (2010)

Data from surveys in the present study suggest that the employer approval gap between SMK and SMA graduates may be growing in favour of the SMK. Three quarters of firms surveyed agreed that SMK graduates were ready to develop their capacity to work, have skills that match the needs of the company and have an adequate balance of technical concepts, theoretical knowledge and analytical skills. Only 40 per cent of respondents agreed that this was the case for SMA graduates (Table 4.5).

Part of the employers rating gap between SMK and SMA graduates may be explained by the fact that the SMA graduates are drawn from the forty per-cent or so who do not proceed to tertiary education, in part because of low test scores, and may also partly be explained by the intentions of the large majority of SMK graduates to enter employment after graduating so contributing to better understanding of the labor market.

²⁸ World Bank (2010) op.cit. p. 22

Table 4.5 Employer opinion of SMA and SMK graduates 2015

Company Opinion	Region								Totals			
	Sumatra		Java/Bali		Kalimantan		Sulawesi					
	No	Yes	No	Yes	No	Yes	No	Yes	No	%	Yes	%
1. SMA schools have produced graduates that are ready to develop their capacity to work in his company	47	23	205	160	14	8	25	15	291	59	206	41
2. SMA schools have supplied their graduates with skills that match the needs of this company	49	21	223	142	16	6	25	16	313	63	185	37
3. SMA schools have given an adequate balance of technical concepts, theoretical knowledge and analytical skills to their students	49	21	229	136	17	5	24	16	319	64	178	36

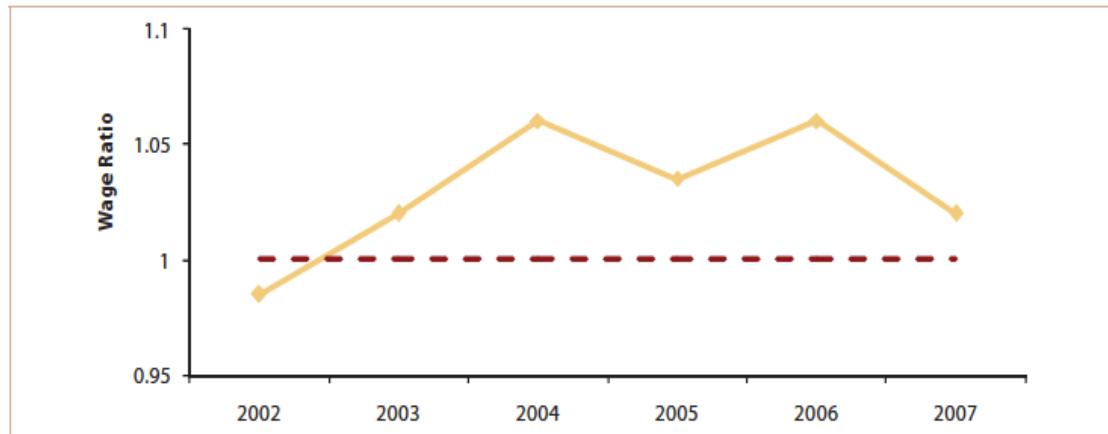
Company Opinion	Region								Totals			
	Sumatra		Java/Bali		Kalimantan		Sulawesi					
	No	Yes	No	Yes	No	Yes	No	Yes	No	%	Yes	%
SMK schools have produced graduates that are ready to develop their capacity to work in this company	24	46	94	267	4	18	2	27	124	25	358	75
SMK schools have supplied their graduates with skills that match the needs of this company	25	45	91	270	5	17	4	24	125	26	356	74
SMK schools have given an adequate balance of technical concepts, theoretical knowledge and analytical skills to their students	22	48	92	292	5	17	24	25	143	27	382	73

The unemployment rates and wages of new employees provide additional signals of their value in the labor market and, monitored over time, can also signal the balance between demand and supply of skills. Monitored and reported regularly, these data can be of considerable help to decide policy and manage the system and also to citizens making decisions about the schooling of their children. Wage data suggest that SMK graduates, and SMA graduates that do not enter post-secondary education, fare the same in the formal sector labor market (Figure 4.4). Unemployment rates are similar (Figure 4.5). ²⁹The time needed to find a job is also similar for SMA and SMK graduates (Figure 4.6)³⁰

²⁹ World Bank (2010) op. cit. pp 24-25

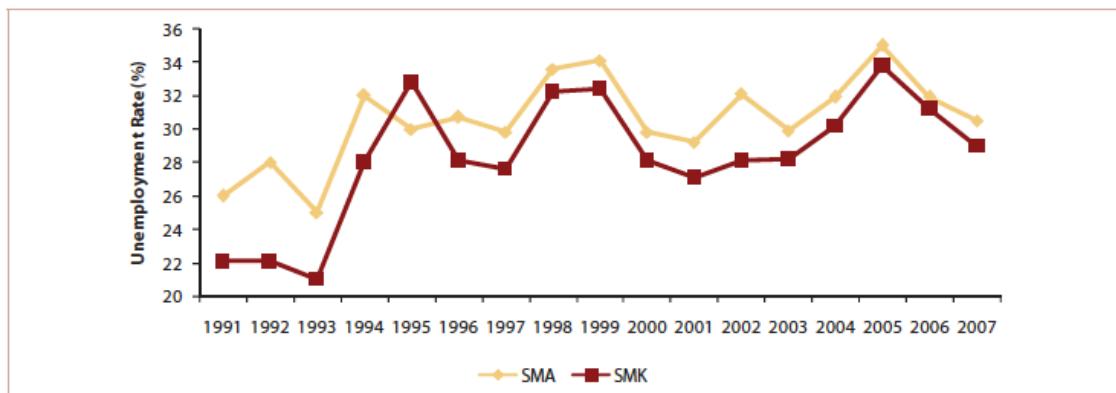
³⁰ Ibid p. 193

Figure 4.4 Relative Wages SMK to SA Graduates, Age 20-24 (2002-2007)



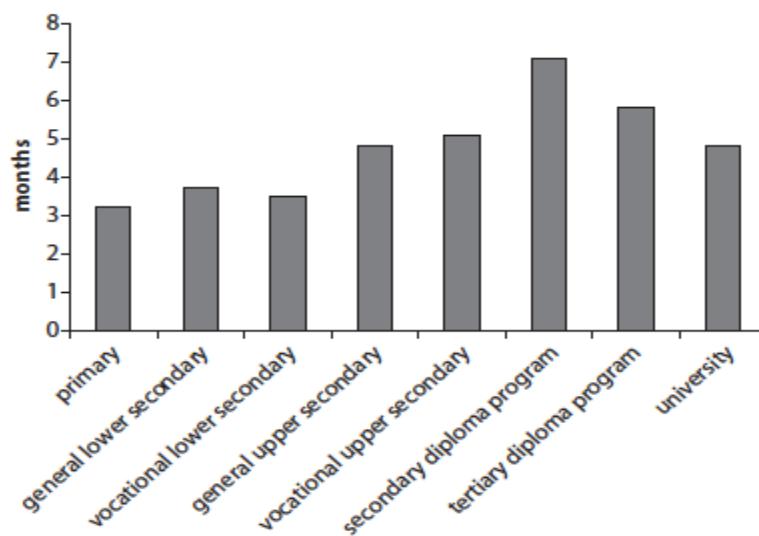
Source: Sakernas 1991-2007.

Figure 4.5 Unemployment Rate for SMK and SMA Graduates



Source: Sakernas (1991-2007)

Figure 4.6 Number of Months to Find a Job, New Graduates, 2006



Source: Moeliodihardjo 2008.

The decline in wage rates of SMK graduates relative to SMA graduates and falling unemployment rates for both in the 1991-2007 period strongly suggests that the supply of SMK graduates was exceeding employment demand for their skills at that time.

Indonesian firms find that SMK and SMA graduates need more training than other recruits. In most countries, employers provide the most training to managers and professionals, but in Indonesia employers provide the most training to skilled workers, even though vacancies for professional and directors are most difficult to fill (see Table 4.6).³¹

This is as it should be, given the youth and relative lack of formal employment of these new employees -- not to speak of a weak internship. Firms are clearly willing to spend a large share of their training resources on the new generation. This was mentioned during our Focus Group Discussions.

Studies highlight concerns about the overall quality of education in Indonesia as an important factor explaining employer opinions of the quality of secondary graduates. Employers, of course, are choosing and training the best. The performance of Indonesian secondary school students on the international PISA tests is below the average of OECD countries and countries in Asia that will be competitors as Indonesia seeks to move to become a high income country (Figure 4.7 below).

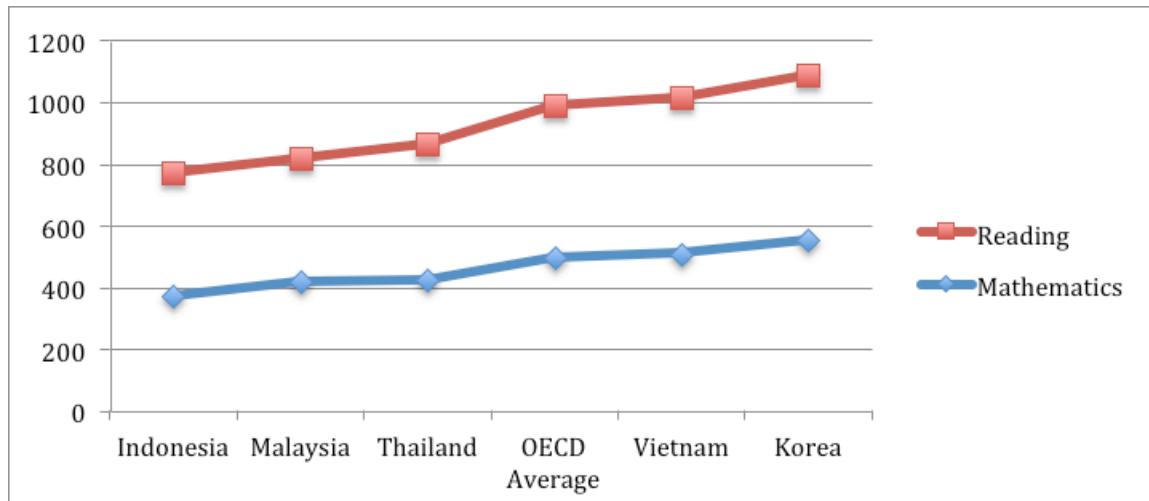
Table 4.6 Share of staff by schooling level identified by firms as in need of training

<i>Schooling level</i>	<i>Share of staff identified by firms as in need of training (%)</i>
Primary (incomplete)	5.36
Primary (complete)	18.47
Lower secondary	22.17
General upper secondary	32.22
Vocational upper secondary	28.90
University	21.37
Diploma program	25.85
Postgraduate	5.90

Source: Indonesia Employer/Employee Survey of Skills/Labor Demand and Job Vacancies 2008, Employer Module.

³¹ di Gropello et. al. op. cit. p 135

Figure 4.7 Mean score in mathematics and reading, PISA, 2012



Source: gpseducation.oecd.org

That employers now report high levels of satisfaction with the balance of technical concept, theoretical knowledge and analytical skills among SMK graduates is encouraging.

These findings suggest that the recent international studies of employment, skills and education in Indonesia may be right in giving priority for medium and long-term development to improving the quality of primary and secondary education not only for employment after school, but also to raise the quality of post-secondary and tertiary education.³²

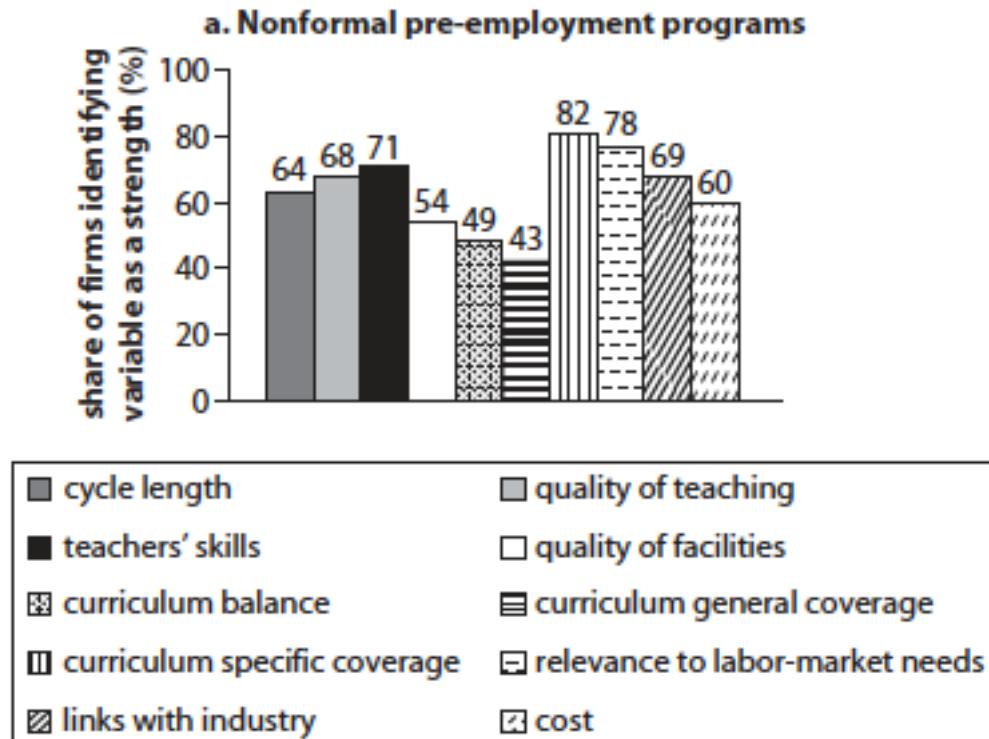
4.3.2. BLK – performance in the labor market.

Relatively little data on BLK performance is available from secondary sources. However, data from the World Bank 2011 study on skills reports that employers are reasonably satisfied with non-formal training programs overall (Figure 4.8).³³

³² Di Gropello et. al. (2011) op cit. (2010). Education, Training and labor Market Outcomes for Youth in Indonesia. Washington, D.C.: OECD and Asian Development Bank (2015). Education in Indonesia. Rising to the Challenge.

³³ Di Gropello op. cit p. 213

Figure 4.8 Main Strengths of Informal Education as Perceived by Employers



BLKs have little autonomy or accountability: there are no rewards or sanctions in the system. But in our focus group discussion in Denpasar, BLK principals demonstrated a very high degree of professional commitment to high quality training and good employment outcomes for their students

4.4. International experience

International experience with vocational education can provide useful benchmarks for assessing the current stage of vocational education in any country. Four national vocational education systems are profiled here: Germany, the USA Australia and Norway.

Our focus on use of labor market information leads logically to an examination of ways in which these systems are governed, as it is governance that determines the standards by which performance is judged at both system and school level and, importantly, the incentives that may or may not be available to guide institutional performance.

Most relevant to Indonesia are the experiences of decentralized countries. Australia, Germany, Norway and the United States all meet this criterion. The USA has an under-regulated system driven by market forces, with very weak governance at the national level but oversight from elected local bodies. Germany has very strong national and Lander (State) monitoring and evaluation system. Australia's system is market-based but managed and monitored by national authorities. Norway's vocational schools are managed by districts within a national framework of legislation and monitored by a national apex organization. The main lessons to be drawn from these experiences include

- The need for strong monitoring, either from apex government bodies, or as in the case of the USA, elected local school boards empowered to monitor outcomes and to dismiss school district superintendents.
- A strong focus on providing careers and labor market advice to students

- A strong commitment to decentralization and enabling education institutions to be empowered to respond to local needs
- The critically important role that well supervised work internships that are formally a part of the curricula play in lowering training costs to employers and enabling students to practice learned skills on the job in teams and, in so doing, have the opportunity to learn and practice the soft skills of communication, negotiation, cooperation and problem-solving in an adult world.

4.5. Findings from surveys of SMK and BLK

Use of Labor Market Information to Support Student Employment

Indonesia's vocational secondary schools (SMK) and non-formal training centres (BLK) have made a start in using practices for accessing and using labor market information to help students find jobs and to improve the quality of instruction. Most SMK and BLK report having access to labor market information (Table 4.7) but are much less likely to maintain the information (Table 4.8).

Schools have access to formal labor market information but prefer to draw information from a network of relationships with employers and alumni: student internships, meetings and job fairs (Table 4.9). SMK are much more likely than BLK to get labor market information from job providers and alumni.

Table 4.7 Per cent of Responding Institutions Reporting Access to Employment Information

	Yes	No
SMK	96.1	3.8%
BLK	97.5	2.5

Table 4.8 Institutions maintain labor market and employment information by per cent of institutions responding yes

	SMK		BLK	
	Yes	No	Yes	No
Labor Market Information	74.82	25.18	52.83	47.17

Table 4.9 SMK and BLK: Source of labor market information by per cent responding

Source	SMK	BLK
Local Labor Agents	28.01	13.21
Government office for Labor	48.94	45.28
Job Provider	79.43	54.72
Alumni of Institution	70.57	33.96
Other (specify)	30.85	33.96

SMK are much more likely to report having a school counsellor assigned to help students find jobs than BLK. Virtually all public SMK report assigning a teacher or counsellor to help students find jobs. Private SMK are somewhat less likely to have counsellors (76 per cent) than public schools: (Table 4.10)

Table 4.10 Counsellor or teacher assigned to help student find jobs. Per cent of institutions responding yes, by ownership

Ownership	SMK	BLK
Central Government	93.75	64.29
Provincial Government	91.3	50
District/City Government	88.89	15.38
Private Foundation	76.26	-

If well informed about the state of labor markets, students, parents and teachers can work productively to help students find jobs. In Indonesia, our data suggest that students are not very well informed through formal labor market information (Table 4.11). But the focus group discussions reveal a more nuanced situation in which teachers use informal relationships with employers to support student job search,

These data, and views expressed by SMK and BLK principals during our Focus Groups suggest that school authorities see labor market information primarily as a resource to help students find jobs. That half or more of SMKs do not share the information with teachers is a concern. Teachers that are well informed about the local labor market are better able to bring relevant information into the classroom not only to help with job search, but also to relate the skills being taught to concrete jobs. If there are incentives to do so, teachers will meet with individual employers to learn more about the specific skills that they expect and bring that knowledge into the classroom in the form of job cases, and take the students to the place of employment to observe the work and talk with employees.

SMK owned by private foundations are much more likely to report providing labor market information to students (51 per cent) than publicly owned schools (Table 4.11). Providing labor market information to students may be an incentive for enrolment in the private vocational education market.

Students in a BLK owned by a Provincial government are more likely to get labor market information than those in institutions owned by central governments or district/city governments. Overall, the proportion of public institutions that provide labor market information to students is quite low. 26 per cent of SMK owned by District and City governments do so, but the shares of schools owned by central and provincial governments that report doing so are less than 10 per cent. Again, the Focus Group data suggest that in responding to the survey teachers and principals had in mind formal written information.

Table 4.11 Labor Market Information Provided to Students/Participants, Per cent of Institutions Responding Yes, by Ownership

Ownership	SMK	BLK
Central Government	5.67	18.87
Provincial Government	8.16	35.85
District/City Government	26.60	20.75
Private Foundation	51.42	-

About half of public and private SMK provide labor market information to teachers (Table 4.12). BLK report a similar level of this practice.

About half of SMK and very few BLK report providing labor market information to parents (Table 4.13). Again, much information is likely to flow through personal networks. A. This suggests that parent/teacher meetings to discuss student progress and employment prospects are not as frequent or as well informed as they might be.

Table 4.12 Labor market information provided to teachers, per cent of institutions responding yes, by ownership

Ownership	SMK	BLK
Central Government	50	42.86
Provincial Government	52.17	15.0930.77
District/City Government	40.74	53.85
Private Foundation	49.07	-

Table 4.13 Labor market information provided to parents by ownership, percentage of institutions responding yes

Ownership	SMK	BLK
Central Government	43	7
Provincial Government	48	12
District/City Government	36	---
Private Foundation	39	-

The variations in use of labor market information across ownership types and the purposes to which the information should be used to raise two issues. For government schools, if there are rules requiring use of labor market information and having school counsellors for job search they are not enforced. And if there are no rules, incentives provided by school leadership are less than effective.

In this context, it is well worth remembering that the public SMK are small schools with on average 1-2 civil service managers. Also, teachers are required to be in school only 24 hours a week, and many have second jobs. There is likely to be little time during the work week to attend to labor market information and its many uses and, as noted in the Focus Group discussions, personal networks with students, teachers and parents are likely to play important roles.

That private schools are more likely than public schools to share labor market information with students and have counsellors suggests that market forces may be at work. But even so, a quite low of share of private schools report providing information to teachers and parents, and only 45 per cent have counsellors. Market incentives are clearly not strong enough to promote high levels of performance.

Clearly, the performance of these decentralized government and private schools in using labor market information and counsellors is not being monitored and there are few, if any, incentives for practices to improve.

Since our sample is drawn from SMK and BLK in urban areas that are thought to have relatively good practices, the use of labor market information very likely to be much lower across the schools and training centres in small cities and rural areas.

4.6. Process of Curriculum Development to Match Industrial Needs Applied by SMK, BLK

Generally speaking, vocational education institutions, like all schools, follow the same curricula from year to year. In contrast, when employers provide training on the job their curricula are determined by the behaviours and skills in current use in the company. The skills taught by employers reflect the technology of work and the ways in which work is managed, including not only technical skills but the behavioral and critical thinking skills that are expected from employees.

Different forces and incentives guide the curricula of SMK and BLK. As secondary schools, SMK curricula are in part oriented to examinations and tests, including those for admission to post-secondary and tertiary education. SMK get and keep accreditation by maintaining these curricula. Without the incentive of post-secondary admission examinations, non-formal training centres like the BLK could have more flexibility in changing and adapting curricula.

But changing curricula is time consuming and can be expensive. Teachers and instructors may or may not have worked in the occupation for which they are preparing students, and if they have, many years may have passed since they did so. In non-formal training centres that are publicly owned (such as all of those in the current sample) the curricula are mandated and are reviewed and approved.

More generally the curricula of pre-employment vocational schools and training centres are intended to prepare students for entry level jobs with enough skills to be productive at a relatively low level but also able to learn efficiently on the job. For employers hiring such workers the main question is how much is it going to cost to train them, and training in the specific operational skills needed to perform an entry-level job is easy and cheap. But training in more general skills – such as using a computer or working in a team – is not easy and is not cheap. This is why general skills are so important in a vocational curriculum aimed at formal wage employment.

General skills are also important in small firms in the informal sector, where a worker may be productive not only by making something but also by dealing with customers and keeping records.

Successful vocational education institutions bridge the gap between their curricula and work by engaging employers in the teaching process.

One way to do this is to engage company employees in the teaching and learning process. The data suggest that half of the SMK and about 40 per cent of the BLK in the sample do so (Table 4.14) and in both cases the preliminary data suggest that employers are not very willing to pay for this (Table 4.15).

By far the most substantial and effective way to bridge the gap between vocational education and training and employment is to build work experience into the curriculum through internships. Here the data suggest that this practice can be found in 90 per cent of SMK and 60 per cent of BLK (Table 4.16). Public SMK are reported to be required to have internships as a condition of funding.³⁴ Nearly all-private SMK offer internships. This may reflect their need to compete in the education market for students – internships could be an attractive feature of their programs.

³⁴ The available data do not tell us how effective the internships are or if these internships are a formal part of the curricula.

Market forces and government regulations provide incentives to the SMK to have internships and the results are good. BLK report a variety of reasons why they do not have internships (Table 4.17). 27 per cent report that internships are arranged by others Ten per cent report that student already have a job, ten per cent report that and another ten per cent report that students are being prepared to be independent entrepreneurs and yet another 10 per cent report that students find jobs by themselves. The responses say quite bit about the independent characteristics of BLK students.

Table 4.14 SMK BLK: Do Employers Provide Additional Instructors or Trainers

Per cent of Institutions Responding Yes

SMK	BLK
51.5	38.8

Table 4.15 SMK BLK: Companies Pay for instructors/Trainers Provided

Per cent of Institutions Responding Yes

SMK	BLK
29	13

Table 4.16 SMK BLK: Institution Has Internship Arrangements with Employers

Per cent of Institutions Responding Yes by Ownership Type

	SMK	BLK
Central Government	93.75	69.23
Provincial Government	95.65	57.69
District/City Government	85.00	53.85
Private Foundation	91.93	-

Table 4.17 Reasons why BLK do not organize internship arrangements with employers

Reasons	Per cent Responding
Arranged by local Labor Office, students or other institutions, or participants already have jobs	45
Training period very limited	18
All training in this institution is financed by headquarters	09
Objective of this institution is prepare participants to be independent or to become an entrepreneur	09
This institution has just been established	09
This institution focuses on training to provide skilled labor	09

It is well worth noting that in our employer surveys most companies reported not offering internships. That most SMK report having them suggests that a relatively few large firms offer many internship opportunities. In these circumstances countries (such as Norway) subsidize student internships as a successful incentive to draw in more and smaller businesses, thus broadening the opportunities for students.

4.7. Industrial-Educational Cooperation in Developing Graduate Competence

The data on SMK and BLK capacity and practices and on curriculum development suggest that cooperation between employers and the SMK is better developed than in the BLK. Private SMKs appear to have the strongest links.

Memoranda of understanding between employers and the SMK and BLK can be taken as formal links between work and school. The available data suggest that SMK are much more likely to have such agreements, but that a substantial two-thirds of BLK also do (Table 4.18)

And unlike the data on labor market use these data suggest that MOU are found in substantial numbers across ownership categories. There are no data on the reasons for the widespread use of MOUs, but they may well be a consequence of government regulation (such as accreditation) or they may simply be seen as a good practice. In our Focus Group Discussions we were told that many of the MoUs held by SMKs and BLKs were inactive, but had been entered into to impress funding and other authorities, sometimes because of their requirements.

Meetings between school and employer staff on student employment are an additional indicator of cooperation. Our data show that this is a very common practice across the public and private SMK and only somewhat less so in the BLK (Table 4.19). Both the SMK and BLK report meetings with employers as a top way to collaborate on curriculum

Regular annual surveys of graduates to determine employment status and the value of the skills provided by the SMK and BLK experience can provide a useful basis not only for strengthening all aspects of the education and training experience, but also as a basis for discussion and collaboration with employers. Very small percentages of Central and Provincial SMK report conducting these surveys. About one in four SMK owned by a district or city do so (Table 4.20). And again private SMK are most likely to follow this practice.

The low use of graduate surveys suggests that public SMK are not held accountable for employment outcomes. Perhaps because of the standard SMK curriculum they have little incentive to conduct the surveys to get information to improve their teaching. Operating in the education market place, private SMK would have more incentives to know and inform potential parents of their employment outcomes.

Table 4.18 Per cent of SMK and BLK with MOUs with Employers by Institution Ownership

Ownership	SMK	BLK
Central Government	100.0	64.0
Provincial Government	100.0	61.0
District/City Government	88.0	38.0
Private Foundation	85.0	0.0

Table 4.19 SMK and BLK: Participate in Meetings on Employment Opportunities, By Ownership

Ownership	SMK		BLK	
Type	Yes	No	Yes	No
Central Government	93.75	6.25	84.62	15.38
Provincial Government	95.65	4.35	69.23	30.77
District/City Government	88.89	11.11	61.54	38.46
Private Foundation	78.88	21.12	-	-

Table 4.20 SMK BLK Graduate survey conducted annually by percentage of institutions responding yes by ownership

Ownership	SMK	BLK
Central Government	5.0	16.9
Provincial Government	7.2	28.2
District/City Government	20.0	18.9
Private Foundation	34.0	

The SMK and BLK report a variety of ways of collaborating with employers. Respondents were asked an open-ended question to identify the ways in which they collaborate with employers in curriculum development. Respondents could provide as many answers as they wished. The three most frequently mentioned methods are shown in Table 4.21. For both the SMK and BLK inviting industry staff to visit the school/training centre and give advice on curriculum was most frequently mentioned. SMK respondents reported collecting information in connection with internships and more generally cooperating with industry, and BLK respondents cited conducting workshops with employers and visiting firms to get more input.³⁵

The data suggest that SMK and BLK have a wide range of other ways to collaborate with employers. This may indicate that institutions have considerable freedom to work out ways for such collaborations.

Table 4.21 Three top ways in which institutions and employers collaborate in curriculum development

SMK		BLK	
INVITING LOCAL INDUSTRIES TO COME TO SCHOOL AND GIVE ADVICE ON CURICULUM	25	INVITING LOCAL INDUSTRIES TO COME TO SCHOOL AND GIVE ADVICE ON CURICULUM	18
COLLECTING INPUTS FROM EMPLOYER WHEN STUDENTS PARTICIPATE IN INERNSHIP	43	CONDUCTING WORKSHOP WITH INDUSTRIES TO IMPROVE CURRICLUM	15
COOPERATING WITH LOCAL INDUSTRIES	32	VISITING FIRMS TO GET MORE INPUT	12

It is worth noting that the methods named all rely on interpersonal relationships and communication.

³⁵ The percentages reported are of the total number of answers provided

4.8. Education-Industrial Links based on RPJMN 2015 (Medium Term Plan)

In this section we examine the findings of the survey across the economic regions on which the RPJMN 2015 Medium Term Plan focuses. Because of the small sample of BLK (53) the number of BLK in individual economic corridor is too small to report findings. Only SMK data are reported.

Data on practices by ownership type are not used because of the quite small numbers in provincial ownership categories other than Java.

With respect to access to and use of labor market information the findings are consistent with the findings discussed earlier. But there are variations across the economic regions, and these, together with the nature of our sample, suggest that the data be treated as only indicative.

4.8.1. Access to and Use of Labor Market Information

The share of SMK respondents reporting access to employment information is 75 per cent or higher across all regions other than Papua, where the share is 50 per cent (Table 4.22). ³⁶ Similar shares are reported for maintaining labor market information (Table 4.23). As with the overall findings the sources of labor market information most frequently named were job providers and alumni. Again, Papua may be an outlier citing government sources as most important (Table 4.24)

Overall, the data suggest that labor market information practices in the SMK cross the economic regions are quite well established.

These data on formal relationships should be set against the relevance of interpersonal networks as we learned through the Focus Group Discussions.

³⁶ The small share reported for Papua may be explained by the small relatively small number of SMK located there.

Table 4.22 Per cent of SMK Reporting Access to Employment Information

By Region

REGION	Per cent
BALI - NT	76
JAVA	96
KALIMANTAN	94
PAPUA	50
SULAWESI	86
SUMATERA	87
Average	92

Table 4.23 Per cent of SMK that Maintain Labor Market Information by Region

REGION	Per cent
BALI - NT	72
JAVA	86
KALIMANTAN	88
PAPUA	50
SULAWESI	86
SUMATERA	87
Average	84

Table 4.24 SMK: Source of Labor Market Information by Region

REGION	Local Labor	Government office for Labor	Job Provider	Alumni of	Other
	Agents			Institution	
BALI - NT	5.3	63	95	89	11
JAVA	1.6	50	93	80	20
KALIMANTAN		33	93	53	13
PAPUA		100	67	67	0
SULAWESI		58	100	50	17
SUMATERA	3.7	56	89	78	48
Average	1.9	52	93	77	22

The patterns of providing labor market information to students, teachers and parents are again consistent with overall findings. SMK responded that students are most likely to receive this information (Table 4.25) followed by teachers and parents. Bali NT's positive responses for parents are much lower than in the overall findings. This may be an anomaly in the data and should be treated with caution.

Table 4.25 SMK: Per cent of Responding Institutions Providing, Labor Market Information to Students, Teachers and Parents, by Region

	Students	Teachers	Parents
REGION			
BALI - NT	76	44	16
JAVA	95	48	44
KALIMANTAN	94	50	13
PAPUA	100	17	17
SULAWESI	100	57	43
SUMATERA	90	42	45
Average	93	47	39

On average, 83 per cent of SMK responding reported assigning a counsellor or teacher to help students find jobs. Only 50 per cent of SMK in Bali NT reported assigning a counsellor or teacher to this task, the lowest among all regions while 89 per cent of those in Java reported doing so (Table 4.26)

Table 4.26 Counsellor or teacher assigned to help students find jobs, by Region

REGION	Per cent
BALI - NT	52
JAVA	89
KALIMANTAN	75
PAPUA	67
SULAWESI	86
SUMATERA	77
Average	83

4.8.2. Collaboration with Employers

Here again the data indicate that SMK practices nationally and across the corridors are similar with some minor variations. With the exception of Papua (where there are few SMK) most schools have MOUs with employer, participate in meetings on employment opportunities with employers and conduct annual surveys of graduates (Tables 4-27, 4-28 and 4-29)

Our focus group discussions emphasized that interpersonal relationships are likely to be more effective than formal MOUs required by regulation.

Table 4.27 SMK Have MOUs with Employers by Region

REGION	Per cent
BALI - NT	56
JAVA	92
KALIMANTAN	100
PAPUA	83
SULAWESI	86
SUMATERA	94
Average	89

Table 4.28 SMK: Participate in Meetings with Employers on Employment Opportunities

SMK	
REGION	Per cent
BALI - NT	72
JAVA	86
KALIMANTAN	88
PAPUA	50
SULAWESI	86
SUMATERA	87
Average	84

Table 4.29 SMK Graduate survey conducted annually, by region

REGION	Per cent
BALI - NT	52
JAVA	66
KALIMANTAN	69
PAPUA	50
SULAWESI	57
SUMATERA	65
Average	64

Patterns of labor market use and collaboration with employers across the regions are similar to the patterns found for the full sample. The data support the idea that schools in the regions are very likely to operate with similar relatively good formal practices and accountability as schools everywhere. And of course, they are small schools operating on a half time basis given limits on teacher hours and are more likely than not to rely on interpersonal networks.

4.8.3. Effectiveness of Fields of Study in Helping Students Find Employment

Respondents were asked to identify the three fields of study that are most effective in enabling students to find jobs, and also the three least effective fields. Table 4.30 provides a summary for Java and Bali-NT separately, because of the much larger number of SMK in the sample in these regions than in the rest of the sample, and then for the rest of the Regions combined.

Table 4.30 Most effective and least effective fields of study in enabling students to find employment, Java and Bali and other regions combined.

Java and Bali

3 Most Effective Fields	3 Least Effective Fields
Hotel and Accommodation Services	Tailoring and Design
Accounting	Office Administration/Secretary
Culinary Arts	Tourism or Accounting

Other Regions Combined

3 Most Effective Fields	3 Least Effective Fields
Hotel and Accommodation Services	Tailoring and Design
Accounting	Office Administration/Secretary
Culinary Arts	Tourism or Accounting

The response patterns show interesting differences that appear consistent with the nature of employment in the different regions. In Java and Bali two of the three most effective fields –Hotel and Accommodation Services and Culinary Services – are not surprising. The bulk of Indonesia's hotel and tourist industry is found in the two regions. The third effective field is accounting, and these skills, of course, are always in demand by enterprises, the largest share of which is found in Java.

The least effective fields in Java and Bali are Tailoring and Design, Office Administration/ Secretary, and Tourism or Accounting. There are several alternative explanations for this finding. Wages for Tailoring and Design may be low, leading to possibly long graduate searches for alternative employment, and the skills are also very narrow. Computerization has sharply reduced demand for Office Administration/Secretary in high-income countries and this may also be the case in Indonesia. Graduates in this field may have difficulty finding jobs. The low effectiveness of Tourism or Accounting is puzzling given that the most effective fields are similar. This may be a result of misalignment of the skills taught in these fields with the labor market or low quality of instruction.

The most effective fields in the other regions combined are Light Vehicle Motor Mechanic, Nautical Science for Merchant Ship and also accounting. In the more rural regions, employer training for Light Vehicle Motor Mechanics may be relatively low (fewer car and motorcycle vendors) contributing to higher demand, or the ratio of public and private vocational schools to the working age population may low, limiting supply. Given the importance of maritime in Indonesia, the effectiveness of Nautical Science for Merchant Ship may reflect high demand relative to other fields of employment in more rural regions. And Accounting jobs are found in both large firms and small.

The least effective fields for the combined regions are, again, Office Administration/ Secretary, Accounting and Computer and Network Engineering. The employment situation for Office Administration/Secretary is the same everywhere. In the smaller regional economies the demand for Computer and Network Engineering may be low relative to supply or the quality of instruction in the smaller SMK that are typically found outside of Java and Bali may be low.

Importantly, the findings strongly suggest that SMK should be enabled to replace less effective fields of study with those that are more effective in a given labor market. This is difficult and costly to do in institutions that rely on public budgets or in those private SMK that are competing in relatively small markets. The civil service status of most SMK teachers is also a factor: a new course could well demand a new and differently skilled teacher, but the teacher in place cannot easily be replaced.

Perhaps most importantly for the RPJMN the data suggests the need for regular – and local monitoring of employment outcomes as one important step toward aligning the SMK with local labor markets. This will be discussed more fully as part of our conclusions and recommendations

Institutional Changes: Constraints and Incentives

As discussed, SMK and BLK have made progress in using labor market information and collaboration with employers. But there is a distance to go before the vocational education and training system is sufficiently linked to employment.

International experience strongly suggests that the effectiveness of vocational schools and training centers is improved when they are adequately and flexibly financed and have the authority to make changes in curricula and improvements in their facilities.³⁷ Accountability for outcomes is the third leg on this stool. We looked into these capacities for the SMK and BLK. For the BLK revitalization we were also interested to find out how the training centers collaborate with other education and training institutions.

Constraints on Flexibility

The mandated national curriculum for the SMK is the major constraint on the ability of the schools to adapt to the skill needs of their locality. Making adjustments would imply at least changing the pattern of courses authorized by the curriculum. But to the extent that RPJMN 2015 brings new kinds of business to the regions this in itself would be inadequate. New courses, ideally developed with employers, would be needed.

And this would raise fundamental questions of education policy. SMK courses are governed by national standards and institutional accreditation, even though courses are very rarely changed or replaced and accreditation is equally rarely renewed.

These policies and practices constitute a serious constraint on the value of the SMK to the strategy of the RPJMN 2015. The new policies of the RPJMN could go a long way toward more flexible curricula better aligned with the skill needs of regional economies.

But even if the regulations could be relaxed to encourage instructional innovation, serious barriers stand in the way. A major one is the reliance on essentially part-time civil service teachers decades away from their last job in the productive sector.

Our respondents reported other constraints, described below.

Resources

About half of the public SMK and BLK surveyed reported that their budgets are inadequate and rigidly constrained. (Table 4.31). Private SMK are most likely to find their budgets to be inadequate but they are less likely to report that their budgets are rigidly constrained.

³⁷ Middleton, John Adrian Ziderman and Arvil Van Adams (1993). *Skills for Productivity. Technical and Vocational Education in Developing Countries*. New York: Oxford University Press and the World Bank.

Table 4.31 SMK BLK: Budget Issues That Constraint Institution, by Ownership

	Insufficient amount		Rigid Regulation on Budget Use	
	SMK	BLK	SMK	BLK
Central Government	43.75	64.29	56.25	50.00
Provincial Government	34.78	56.00	73.91	40.00
District/City Government	53.75	46.15	47.50	15.38
Private Foundation	65.22	-	41.61	-

In many countries public vocational education institutions can recover costs from employers or a wide range of other sources, such as parent fees and contributions from community organizations.

Our data indicate that, overall, a small share of SMK and BLK recover costs from employers. The practice is most likely to be found in the BLK, especially those owned by the Central and Provincial Governments. (Table 4.32). As for other sources of income, the overall use of this practice is again low, with more likely to be reported by BLK than the SMK. Nearly half of BLK owned by the Central Government report other sources of income. (Table 4.33). This would be expected of private SMK. The high share of locally owned (District and City) SMK reporting access to other sources may reflect either that they receive public funding from both central and local governments or that their decentralized status provides more opportunity to raise funds.³⁸

Table 4.32 SMK BLK: Institution Can Raise Funds by Charging Employers

Per cent of Yes Response by Institution Type

SMK	BLK
17.08	28.3

Table 4.33 SMK BLK Other Operational Costs. Per cent of Yes Response by Institution Type and Ownership

	SMK	BLK
Central Government	25.00	40.00
Provincial Government	13.33	11.76
District/City Government	44.00	0.00
Private Foundation	50.00	-

Authority

Budgets and the ability to augment them, discussed above, are the first of three legs on the stool. Authority to make the changes needed to adapt to changing labor markets is the second leg.

³⁸ On this point and others it would be useful to follow up this study with a substantial structured set of interviews at the SMK and BLK level.

Changing curricula and the facilities that support learning can be important to meet changing demand for skills.

Public and private SMK operate within the framework of a national curriculum and accreditation standards. BLK have more curriculum flexibility but train to standards and certification requirements. That half of BLK and nearly half of (SMK) report having authority to change curricula is encouraging from a flexibility perspective (Table 4.34). Given the national curriculum this is most likely to reflect the ability to make incremental changes in teaching in SMK classrooms and workshop. Centrally and provincially owned SMK and BLK are both marginally more likely to report having curriculum authority than institutions owned by cities and districts, more even than private SMK (Table 4.35).³⁹

There seems to be some difference of opinion about whether SMK and BLK have the authority to change their curricula, bearing in mind that both operate within fixed national curricula and standards. Given the control of the national curricula, those responding positively are most likely to be reflecting the ability to change classroom practices in ways that improve the examination scores of their students – not the full restructuring of a course. As might be expected, well over 80 per cent of privately owned SMK report having this authority.

Table 4.34 SMK BLK Do Institutions Have Authority to Change Curricula Yes Response by Institution Type and Ownership

	SMK	BLK
Central Government	50.00	71.43
Provincial Government	52.17	50.00
District/City Government	41.25	38.46
Private Foundation	42.86	-

Relative to curricula, a larger share of SMK and BLK report having authority to develop facilities (Table 4.35). In the public sector, around 70 per cent of centrally owned SMK and BLK, Provincial BLK and SMK owned by Districts and Cities also answer yes to this question. The outliers are the Provincial SMK and District/City BLK where 40 per cent and 23 per cent respectively report having authority to develop their facilities. Why these outliers report having less authority over facilities is not clear.

Table 4.35 SMK BLK: Do Institutions Have the Authority to Develop Facilities?

Per cent of Yes Responses by Ownership

	SMK	BLK
Central Government	68.75	71.43
Provincial Government	39.13	65.38
District/City Government	67.50	23.08
Private Foundation	83.85	-

³⁹ Strategies aimed at improving the labor market effectiveness of SMK and BLK could benefit from closer inquiry into these differences.

Constraints on and Incentives for Improving the Quality of Graduates

The third, and most likely important constraint is the balance between constraints and incentives to change.

Interviewers asked principals in the SMK and BLK to name the main constraints they faced in improving the quality of graduates and also what incentives could help them overcome the constraints. Their three most frequent responses to these open-ended questions on constraints are reported in Tables 4-36 and 4-37 for SMK and BLK respectively.

Both the SMK and BLK respondents were consistent in naming insufficient infrastructure, the low quality of students and the lack of qualified instructors as their most significant constraints across ownership categories. That the highest frequency of mention for any constraint is 32 per cent, indicates that many more were named but less frequently. Overall, the BLK respondents also cited the insufficient infrastructure and the lack of qualified instructors and but also an inadequate amount of budget. By ownership, Central and District BLK cited the same three factors as the SMK, with the exception of Provincial BLK, which cited inadequate budget rather than low student quality. The data indicate that inadequate budget was the fourth most frequently mentioned constraint for Central and District/City BLK.

Facilities, instructors, the quality of students are key ingredients in the mix of factors that determine the quality of educational outcomes. Budgets matter of course, and there must be factors for the Provincial BLK that make it more important than the quality of students.

Given this, it is not surprising that in naming incentives that would help improve student quality both the SMK and BLK overall cited raising instructor salaries and training for teachers, along with improving school facilities as incentives to help overcome constraints. (Table 4-38).

Table 4.36 SMK: Constraints to overcome to improve the Quality of Graduates

Top Three Responses by Ownership

	SMK
Insufficient school facilities and infrastructure	30.25
Students' quality and motivation are low	19.05
The number of qualified instructors is inadequate	17.37
	Central Government
Insufficient school facilities and infrastructure	31.58
Students' quality and motivation are low	31.58
The number of qualified instructors is inadequate	15.79
	Provincial Government
Insufficient school facilities and infrastructure	22.22
The number of qualified instructors is inadequate	
Students' quality and motivation are low	18.52
	14.81
	District/City Government
Insufficient school facilities and infrastructure	33.01
Students' quality and motivation are low	26.21
The number of qualified instructors is inadequate	16.50
	Private Foundation
Insufficient school facilities and infrastructure	29.95
The number of qualified instructors is inadequate	17.87
Students' quality and motivation are low	14.98

Table 4.37 BLK: Constraints to overcome to improve the quality of graduates

Top three responses by ownership

	BLK
Insufficient school facilities and infrastructure	33.87
The number of qualified instructors is inadequate	
Inadequate amount of budget	
	Central Government
Insufficient school facilities and infrastructure	31.25
The number of qualified instructors is inadequate	
Students' quality and motivation are low	
	Provincial Government
Insufficient school facilities and infrastructure	25.00
The number of qualified instructors is inadequate	
Inadequate amount of budget	
	District/City Government
Insufficient school facilities and infrastructure	50.00
The number of qualified instructors is inadequate	
Students' quality and motivation are low	

Table 4.38 SMK BLK: Incentives Needed to Make Changes
Top Three Responses

	SMK	BLK
Raise instructor/teacher salary and benefits	19.50	24.53
Improving school facilities and infrastructures	17.73	15.09
Training for instructors/teachers (capacity building)	17.02	11.32
	Central Government	Central Government
Raise instructor/teacher salary and benefits	43.75	35.71
Training for instructors/teachers (capacity building)	18.75	28.57
Additional budget	12.50	14.29
	Provincial Government	Provincial Government
Raise instructor/teacher salary and benefits	17.39	26.92
Training for instructors/teachers (capacity building)	17.39	19.23
Additional budget	13.04	7.69
	District/City Government	District/City Government
Improving school facilities and infrastructures	22.22	15.38
Training for instructors/teachers (capacity building)	13.58	15.38
Raise instructor/teacher salary and benefits	12.35	7.69
	Private Foundation	
Raise instructor/teacher salary and benefits	21.12	
Improving school facilities and infrastructures	18.63	
Training for instructors/teachers (capacity building)	18.01	

The data provided by respondents on constraints and incentives for change could be a useful contribution to a roadmap for changes as the RPJMN 2015-2019 moves toward implementation.

4.9. Conclusions and recommendations

Our analysis suggests that substantial changes in the curricula, accountability and performance of the SMK are needed if these schools are to meet the skill challenges of the RPJMN 2015. For these changes to take place, a way must be found to relax the requirement of an eight year old national curriculum.

A very positive finding of our study is that employer views of the SMK graduates that they hire are quite positive and much improved over the last eight years.

But there is more to do if the SMK are going to do their part to meet the skill needs of changing regional economies under RPJMN.

While the nature and skill requirements of the new knowledge industries to be developed under the regional economic strategy is not yet known, it is very likely that some of the skills required for entry level workers with a secondary school education will be new and are not now taught in the SMK. This will require changes to improve the effectiveness of the SMK. For example, an eight-year-old standardized curriculum will not be adequate to meet new skill challenges.

The new RPJMN policies for secondary education should greatly strengthen both the quality and flexibility of an SMK education. In our view the government should give very high priority to implementing these policies.

It is our view that any increase in demand for secondary school graduates is most likely to be met in quantitative terms, for three reasons.

- First, Indonesia is on track to achieve universal secondary education over the next ten to fifteen years. SMK are now graduating 1.3 million students annually, of which half enter formal employment. This should rise to close to two million when universal secondary education is achieved and the policy of the government is to ensure that SMK will continue to enrol more students than the SMA.
- Second improving the quality of SMK education and instituting measures to link it more closely to the economy and skills demand could well increase the share of SMK graduates that are able to enter an expanding formal wage employment as it expands and demand for their skills increases potentially leading to a substantial increase in the share of SMK graduates who are prepared for formal employment.
- Third, the MOEC is investing substantially in improving the quality of education at all levels.

But there are challenges to be met in meeting quality standards. That on average Indonesia's 15 year olds perform well below the OECD norm as well as below the scores of regional competitor countries on OECD's PISA mathematics and reading examination indicates that the quality of basic and junior secondary education is comparatively low. It is likely that the children of economically and educationally disadvantaged parents are scoring below the average on the junior secondary examination as well as on the PISA test. Improving basic and junior secondary education would make a substantial contribution to the quality and effectiveness of both SMA and SMK education and, over time, enable a much larger share of SMK graduates to be prepared to enter formal employment.

Available evidence strongly suggests that the effectiveness of the vocational education and training system is not well monitored and, with the exception of periodic high quality reports by donor partners, not well evaluated.

While the importance of interpersonal networks among teachers, parents and employers is recognized as business as usual, better use of formal labor market information can make a solid contribution to the quality of an SMK education, especially when and if SMK are authorized to develop new courses of study to meet the skill needs of RPJMN 2015. These practices have established a foothold in the SMK and BLK, but there is some distance to travel before these become sustained and widespread.

Formal labor market information is used, but data from employers and alumni are by far the largest source. Private SMK do the best job in this respect, although there is room for improvement. Less than half of SMK owned by cities and districts show good use of labor market information. SMKs owned by Provinces and the Central Government report much lower rates of use. Among the specific findings:

- Virtually all SMK, public and private, report having internship arrangements with employers and also Memoranda of Understanding with employers. This is unlikely to be coincidence. It has been reported that MOUs are a requirement of central government funding, and the high level of internships may be tied to financing.
- Only 60 per cent of BLK have internship arrangements with employers, and apparently with good reasons. BLK without internships report that internships are already arranged by Labor Offices other institutions. They also reported that students already had jobs or could find them by themselves and that the BLK prepare students to be independent entrepreneurs.
- Very high shares of SMK respondents reported meeting with employers on job opportunities, and this practice is widely shared at high levels across the economic regions. These meetings may provide a useful venue for discussing and getting feedback on the proposed RPJMN secondary education policy directions
- Data from our survey shows that SMK can rate the effectiveness of different fields of study in leading to graduate employment. Data on effectiveness from Java and Bali as well as the other regions combined make it clear that fields of study may not be well aligned with local labor markets. It is not clear that SMK have the authority to change fields of study or the resources to do so. Changes would require that new teachers replace those whose field was eliminated.

Worrisome from the point of view of monitoring employment outcomes, only 34 per cent of private SMK and 20 per cent of City/District SMK reported conducting annual surveys of graduates. Less than 10 per cent of SMK owned by Provinces and the Central Government follow this practice. BLKs did somewhat better but the highest share reporting the practice was 28 per cent.

The low use of annual surveys may well be caused by the rigid national curriculum and the rigid civil service teacher force of the SMK. These are significant barriers to changing programs and courses, reducing the incentive value of the findings of annual surveys. A survey may show that Accounting courses are not leading to good employment outcomes, but while the course may be modified in the classroom, it cannot be replaced.

Our data further showed that the capacity of SMK to change to meet the skill challenges of a changing economy is limited. There are small schools with few professional staff and in the public schools, civil service teachers who work 24 hours a week. Teachers in private SMK work only a few hours longer. A quarter of public SMK teachers have second jobs and the proportions of private teachers with outside employment is even higher.

It is a testament to the skills and commitment of the public and private SMK staff and administrators that the results are as good as they are. However, four in ten SMK graduates do not find formal jobs. Raising the quality of basic and junior secondary education is the medium terms solution for this problem. Extra budget to SMK for tutors to help students with their studies could have positive returns. Here again, the RPJMN strategy road map could benefit from discussions with students and school personnel on the causes of the problem and possible solutions.

Despite recent strides forward and some of the positive findings of this report, more can be done to increase the skills and productivity of the young people who will drive the productivity of the economy as Indonesia seeks to become a high- income economy. This will require considerably

more funding, and more attention to be paid to the quality of the secondary education system – both vocational and non-vocational – as well as other training facilities.

Two central challenges face the SMK. The first is to improve the quality of instruction generally and, more significantly, to take strong steps to better serve the half of the student body that does not now enter formal employment. If successful, a quality improvement program could increase the share of graduates prepared for work in formal sector from about 600,000 annually now to close to 2 million when universal secondary education is achieved.

For the RPJMN 2015 the very large challenge is to find ways to enable SMK to modify courses of study or indeed to develop new ones to meet changes in skill demand that may follow with the success of the economic strategy. Eight years of a standard curriculum is a long time in the vocational education world. This would be a very large task involving legislation and funding for change. Here some serious pilot tests that fully engaged employers from both current and emerging sectors could shed important light on the feasibility of making such changes more widespread. New courses for the new businesses would very likely raise the cognitive and analytical skills and test scores of SMK students.

The MoEC will clearly have the main responsibility in leading change.

It will not be easy to or cheap to move the SMK toward the performance levels required for a high-income economy. These schools are currently rigid in curricula and staffing, and until these constraints can be eased to better enable them to respond to changing skills needs, some groundwork could be laid.

It will be important that SMK move toward increased flexibility of curriculum and staffing to support the emerging regional economic strategy. Over the medium term, pilot projects could be developed to test new practices across the regions.

In any case some steps could be taken straightaway improve SMK outcomes:

Recommendations to MoEC

- **We recommend that the MoEC take steps to better monitor the use of labor market information by the SMK.** This task could be assigned to District Education Offices with the annual SMK report as a vehicle. This would be a first step in improving accountability.
- **We recommend that the MOEC take further steps to initiate a process aimed at improving accountability and quality in the SMK system.** More accountability combined with modest incentives could bring forth better practices. It could be helpful to convene consultations at Province and District/City levels involving employers, SMK Principals, Government officials, and citizens to develop strategies and proposals for consideration. This process could well be linked with the proposed National Vocational Education Council that is now being considered.
- **We recommend that the MOEC consider strengthening the staffing, expertise and funding of the district and city education offices** that fund and manage more than 80 per cent of the public SMK to enable them to actively monitor and report annually and publicly on the employment outcomes of each SMK in their jurisdiction. Continuing support of local governments for this should be contingent on their performance. Consideration could be given to establishing a local Skills Committee comprised of employers, educators and citizens to guide and oversee this process.
- **We recommend that the MOEC consider the international experience we report on in our enterprise study to institute regular employer consumer surveys for the SMK and**

SMA. Made publicly available, the findings of these surveys could increase the accountability public and private SMK, providing an incentive to improve their performance. These surveys could also generate useful independent monitoring support to local and Provincial governments

- **We recommend that the MOEC establish and support a high-level Working Group to assess and evaluate the present condition of SMK internships** and recommend strategies and action plans to bring these internships closer to international good practice. This working group would need to have access to resources, and also expertise, which we believe should be drawn from among Indonesian institutions.
- **We recommend that, pending the finding of this Working Group, the MOEC consider Norway's internship model of subsidizing the employer costs of a six-month apprenticeship** at the level of half the annual of a year of SMK education with half of the subsidy going to the student in wages as an incentive to employers and students alike.
- Above all, **we recommend that the MOEC determine ways in which the courses of study of the SMK could be regularly updated and periodically replaced as the skill needs and employment opportunities change with the economy.** This will be essential to aligning SMK courses with the changing regional economies under the RPJMN 2015. For example, a district or city government could be empowered and financed to work with employers, schools and citizens to identify courses of study that are not effective in the local economy and seek the support of the MOEC in replacing them with other SMK courses of study in the near term.
- Over the longer term, and depending on progress made in monitoring and accountability, **we recommend that the MOEC should consider providing financial incentives to local governments and to the SMK to reward improvements in the employment outcomes of public and private SMK.**

Recommendations for the BLK

We recommend that ways should be found to better leverage the resources of the BLK. Under discussion is a policy to revitalize the BLK through stronger linkages with the SMK. It is yet to be decided how exactly this will be done but BLK have shown that they can collaborate with SMK and SMK and SMA graduates already enrol in BLK courses

With an aging and shrinking teaching force, an uncertain curriculum reform, deteriorating equipment and facilities, and very high costs, **we recommend that the formal urban BLK should be reformed to better adapt their resources to the future economy.**

Recommendations to MoM

- **We recommend that in developing this reform, the MoM could consider models for linking skills training with formal vocational education that have been well developed in the USA, especially the Area Vocational Centers** that provide accredited courses to secondary school students as well as non-formal training for out of school youth and unemployed adults.
- **We recommend that the Mobile Training Units (MTU) program be continued.** The program is proving useful training services in rural areas on a large scale. Because of the extensive public goods value of skills training for disadvantaged citizens, the MTU program should remain under public management with district governments playing a stronger role.

5. CAPACITY OF HIGHER EDUCATION INSTITUTIONS TO MEET DEMAND FOR SKILLS

There are two dimensions to the question of the capacity of higher education institutions to meet the manpower needs of industry. The first is quantitative – whether on the one hand student demand is sufficient to produce the number of graduates required in the requisite fields and in the different regions, and on the other if universities are physically able to meet growing demand and to produce the graduate output required.

The second dimension of the question of capacity, and in the view of many the more important, concerns the quality of the output. Whether universities are providing high quality education, relevant to the needs of the economy and society, and providing students with the requisite skills required by the wider world.

These two dimensions of capacity are reflected in the results of the survey of employers, which revealed that while on the one hand employers reported that they were reasonably satisfied that they could recruit sufficient graduates to fill present vacancies – and this was generally so across all regions and in all industries – they were nevertheless dissatisfied with the skills possessed by their newly recruited graduates.

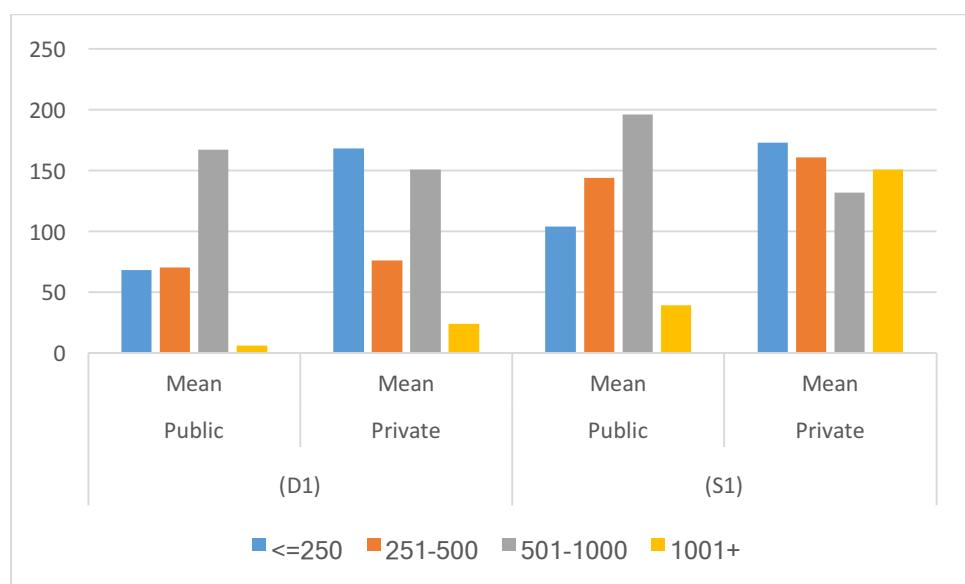
Both these dimensions of capacity are discussed below, drawing on the results of the survey undertaken for this project, the Focus Group Discussions and international experience. The final section of this chapter draws conclusions based on these different sources of evidence to make recommendations for the development of undergraduate education – at both S1 and D1 levels (the next section deals with research and postgraduate output) – in Indonesia and its different regions.

5.1. Student demand and supply

5.1.1. Demand

Looking at the results of the survey for the country as a whole, it appears from Figure 5.1 below that on average demand for higher education places is strong.

Figure 5.1 % growth in the named disciplines between 2009-2014 (D1 & S1)

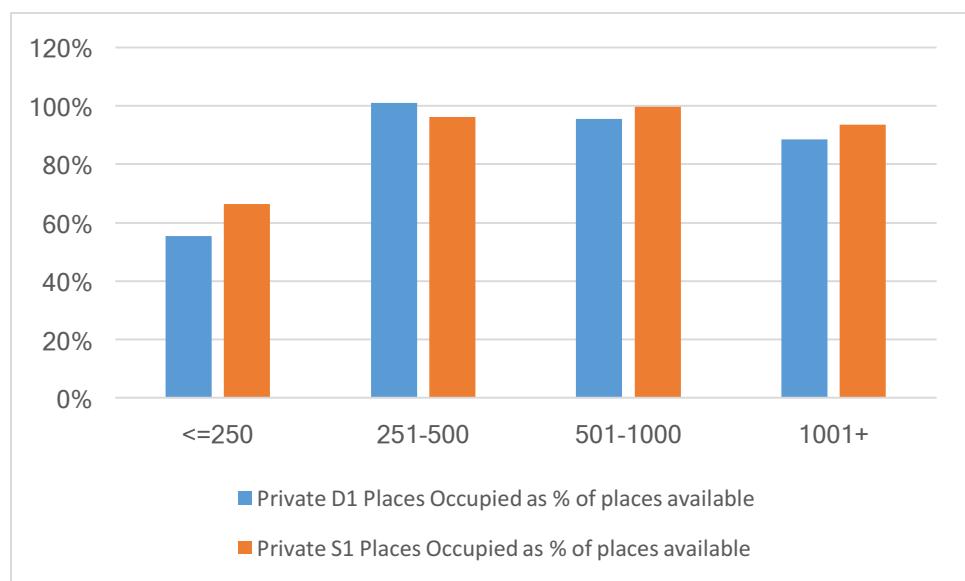


Only in the largest universities (both public and private) has growth not exceeded 50% in the past 5 years. We explored the reason for the relatively small growth in the large universities in the focus groups. The replies suggested that these had not grown by as much because these tended to be the most prestigious universities with a reputation for high quality, and although demand might exist in terms of the number of potential applicants, applicants who had achieved the appropriate standards were not available.

5.1.2. Supply

Moreover, as will be seen from Figure 5.2 below, we found a very good match currently between demand for places and supply.

Figure 5.2 Match between places available and places occupied



Although it is apparent from this that smaller institutions appear to have some difficulty filling their available places, in general it does not appear that lack of demand is a constraining factor, and that is so both for S1 and D1 places. However, it is apparent from the above that on average there are more than 3.6 S1 places available for every D1 place. Although the sample used for our survey is not strictly representative, it is reasonably so, and it is a fair assumption that across the country the ratio of S1 to D1 places is similar. That is a very large imbalance. And although there is no 'absolute' or 'correct' ratio of diploma or technician level to undergraduate or professional level provision – and indeed what would be appropriate in the circumstances of one country would not necessarily be appropriate in another – the present ratio in Indonesia seems out of line with what would generally be considered reasonable⁴⁰.

The problem in Indonesia, as elsewhere, is largely social/cultural, with undergraduate degrees being much more valued than diplomas. This – the enrolment of students who should probably be enrolled on lower level qualifications – is perhaps one of the reasons for the apparent mismatch between the competencies that graduates are supposed to have according to their qualifications and those that they actually have, discussed below. The OECD review of National Policies for Education on Indonesia⁴¹ identified the same issue, and said

⁴⁰ See for example Mason 'the mix of Graduate and Intermediate level skills in Britain: What should the balance be?' National Institute of Social and Economic Research 2000 <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.31.9574&rep=rep1&type=pdf>

⁴¹ 'Education in Indonesia: Rising to the Challenge' OECD 2015

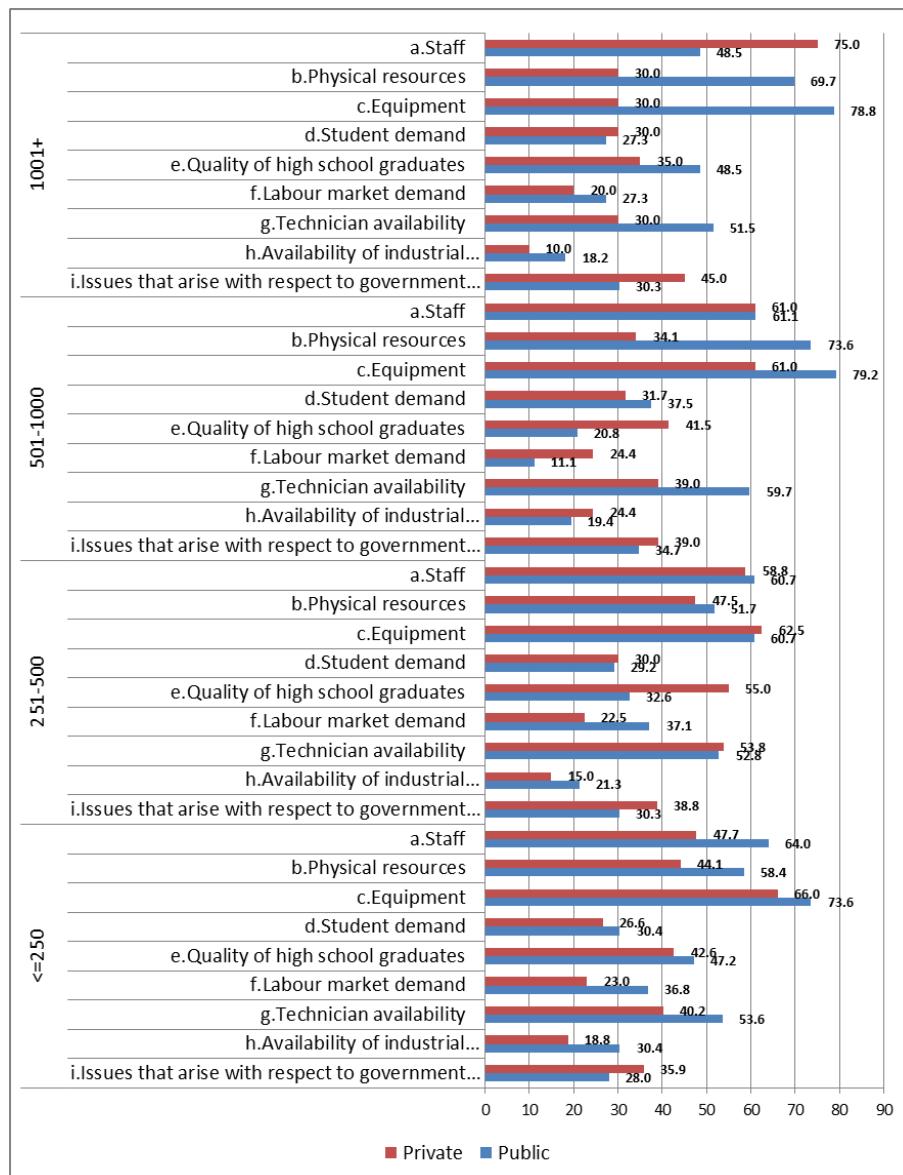
"Expanding the vocational share of tertiary education would provide the skills that are most in demand in the growing industrial and manufacturing sectors."

The government clearly understands this, as evidenced by the Ministry of Research, Technology, and Higher Education's stated intention to establish at least two polytechnics in every province and one community college in every district/city. If those initiatives succeed, they should go some way towards redressing the balance. Our recommendation to the Government is to persist in this intention and explicitly to seek to redress the balance between S1 and D1 level provision while strengthening the quality and standards of both. However, simply expanding the number of places will not itself increase the number of students educated at D1 level. The expansion of places will need to be accompanied by good labour market information, trusted by students and disseminated to them, that shows that they will actually be better off with that level of qualification. That is the view of the OECD review, and that is borne out by responses to an earlier review by the World Bank that showed that employers felt that in some respects students were overqualified for the jobs that they had available⁴².

However, the message from this analysis is that demand and supply at both levels are broadly in balance, as is borne out by the data shown in Figure 5.3 below where in the survey universities do not report lack of demand as a major constraint on expansion, in comparison with other constraints.

⁴² See "Skills for the Labour Market in Indonesia", the World Bank, 2011

Figure 5.3 Constraints on expansion



On the other hand, the replies to this question both in the survey and the Focus Group Discussions suggest that the ability to meet additional demand in the future could be constrained by the availability of plant and equipment on the one hand and (especially for the largest private institutions) suitably qualified staff on the other. The question of suitably qualified staff is a particularly pressing one, and is discussed further below.

Looking in detail at supply of places and demand from students in the different regions and the key subjects relevant to the strategic industries in the different regions set out in the RPJMN 2015 development plan – see Tables 5.1 and 5.2 below - the conclusion does not change. Other, perhaps, than engineering in Java, where supply of places appears to be rather greater than demand for those places, supply and demand in all regions in all disciplines appear to be roughly in balance.

Table 5.1 Places available vs places occupied for S1, 2014

REGION	Minning		Agriculture		Industry		Engineering		Maritim		Transportation, Hotel &		Economic & Business		Science & Education		TOTAL	
	Places available	Places occupied	Places available	Places occupied	Places available	Places occupied	Places available	Places occupied	Places available	Places occupied								
Sumatera	-	536	2,898	4,240	3,995	4,012	673	477	505	1,396	-	-	2,660	2,249	-	-	10,731	12,910
Java	3,203	3,588	4,535	4,214	7,133	7,111	17,836	14,563	2,157	2,149	3,045	2,714	10,525	9,555	2,080	1,922	50,514	45,816
Kalimantan	341	388	200	132	150	92	660	605	35	31	-	-	-	-	-	-	1,386	1,248
Sulawesi	-	-	330	299	280	280	390	390	782	568	-	-	60	60	-	-	1,842	1,597
Bali	-	-	-	-	-	-	-	-	-	-	110	112	-	-	-	-	110	112
Nusa Tenggara	-	-	200	195	-	-	215	203	198	121	-	-	275	253	-	-	888	772
Papua	80	87	-	-	-	-	185	376	50	25	-	-	-	-	-	-	315	488
GRANT TOTAL	3,624	4,599	8,163	9,080	11,558	11,495	19,959	16,614	3,727	4,290	3,155	2,826	13,520	12,117	2,080	1,922	65,786	62,943

Table 5.2 Places available vs places occupied for D1, 2014

REGION	Minning		Agriculture		Industry		Engineering		Maritim		Transportation, Hotel & Tourism		Economic & Business		Science & Education		TOTAL	
	Places available	Places occupied	Places available	Places occupied	Places available	Places occupied	Places available	Places occupied	Places available	Places occupied								
Sumatera	-	-	317	1,232	48	229	208	190	-	-	-	-	-	-	-	-	573	1,651
Java	-	-	914	764	646	622	4,653	3,831	560	520	6,903	5,425	4,114	3,062	848	727	18,638	14,951
Kalimantan	456	389	-	-	-	-	326	326	-	-	-	-	-	-	-	-	782	715
Sulawesi	-	-	66	53	30	26	210	186	-	-	736	687	-	-	-	-	1,042	952
Bali	-	-	-	-	-	-	56	29	-	-	380	310	-	-	-	-	436	339
Nusa Tenggara	-	-	-	-	-	-	180	185	-	-	360	293	100	83	-	-	640	561
Papua	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GRANT TOTAL	456	389	1,297	2,049	724	877	5,633	4,747	560	520	8,379	6,715	4,214	3,145	848	727	22,111	19,169

5.2. Ability of universities to respond to future growth

There seems little doubt that there will be substantially increased demand for higher education places in the next few years.

- The size of the young population is stable – the population of young people aged 7-12 numbered 26.04 million in 2013 compared to 25.35 million 13-18 year olds and 21.19 19-23 year olds⁴³
- Indonesia's gross enrolment ratio – the proportion of young people enrolled in higher education – is not high by international standards (31.5 per cent in Indonesia, compared to 37 per cent in Malaysia and 51.5 per cent in Thailand⁴⁴). There is no reason in principle to think that young people in Indonesia will not demand higher education in due course at a rate similar to that of other similar countries.
- And indeed universities themselves expect demand to grow, as is revealed in Figure 5.3 above and Table 5.3 below. When asked what if anything might limit their ability to grow in future few in any region or subject discipline thought that lack of demand would be a constraining factor. However, the regional and subject breakdown of replies to this question, shown in Table 5.3 below suggest that demand for mining does appear to be an issue, and there are other region-specific subjects where demand constraints are apparent)

Table 5.3 Constraints on developing programs of study – Student Demand

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera	100.00	9.76	6.45	16.67	-		14.29		10.20
Java	36.00	32.00	29.85	30.53	37.93	30.30	33.73	40.74	32.22
Kalimantan	37.50	50.00	-	10.00	-				21.74
Sulawesi		50.00	66.67	83.33	28.57	-			39.39
Bali				-		28.57			25.00
Nusa Tenggara		100.00		-	33.33	66.67	50.00		38.46
Papua	100.00			33.33	-				50.00
GRANT TOTAL	41.67	24.49	23.30	30.00	30.19	29.63	31.00	40.74	29.39

On the other hand, as revealed in Table 5.4 below, a rather higher proportion had doubts about whether the quality of high school graduates will be up to it.

Table 5.4 Constraints on developing programs of study - Quality of High School Graduates

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera	-	39.02	35.48	33.33	-		28.57		33.67
Java	36.00	48.00	47.76	48.42	48.28	27.27	36.14	33.33	42.46
Kalimantan	37.50	100.00	50.00	20.00	100.00				39.13
Sulawesi		25.00	33.33	33.33	35.71	60.00	100.00		39.39
Bali						42.86			37.50
Nusa Tenggara		100.00		25.00	33.33	100.00	50.00		53.85
Papua	-			100.00	-				50.00
GRANT TOTAL	33.33	44.90	43.69	46.36	39.62	33.33	36.00	33.33	41.23

So while overall demand is not seen as a particular constraint, it is in certain fields of study which are important to the achievement of the Government's strategy (mining in Sumatera and Papua, for example, and engineering in Sulawesi).

⁴³ Source Education Statistics 2012/13 , MOEC (Ministry of Education and Culture), reproduced in OECD 2015 idem

⁴⁴ Unesco Institute for Statistics http://data.un.org/Data.aspx?d=UNESCO&f=series%3AGER_56

But will universities anyway be able to respond to growing demand in the way they appear at present to be able to match current demand?

Figure 5.3 above reports the results to the question what if anything might limit their ability to grow in future. Broken down by Region and subject, the results reveal that universities are concerned that their ability to meet future demand may be constrained by

Table 5.5 Shortage of Equipment

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera	100.00	53.66	70.97	50.00	80.00	64.29	64.29		62.24
Java	56.00	76.00	73.13	72.63	75.86	48.19	48.19	74.07	66.67
Kalimantan	62.50	100.00	50.00	50.00	100.00				60.87
Sulawesi		75.00	33.33	66.67	71.43				66.67
Bali				100.00					62.50
Nusa Tenggara				100.00	100.00	50.00	50.00		84.62
Papua	100.00			100.00					83.33
GRAND TOTAL	61.11	66.33	70.87	71.82	75.47	50.00	50.00	74.07	66.30

Table 5.6 Shortage of physical infrastructure

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera	100.00	53.66	70.97	50.00	80.00		64.29		62.24
Java	56.00	76.00	73.13	72.63	75.86	56.06	48.19	74.07	66.67
Kalimantan	62.50	100.00	50.00	50.00	100.00				60.87
Sulawesi		75.00	33.33	66.67	71.43	80.00			66.67
Bali				100.00		57.14			62.50
Nusa Tenggara				100.00	100.00	100.00	50.00		84.62
Papua	100.00			100.00	-				83.33
GRAND TOTAL	61.11	66.33	70.87	71.82	75.47	59.26	50.00	74.07	66.30

Table 5.7 Shortage of appropriately qualified Staff

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera	100.00	34.15	64.52	50.00	60.00		64.29		51.02
Java	64.00	46.00	49.25	57.37	65.52	63.64	62.65	59.26	57.73
Kalimantan	75.00	100.00	50.00	40.00	100.00				60.87
Sulawesi		50.00	33.33	33.33	28.57	40.00			33.33
Bali				-		42.86			37.50
Nusa Tenggara				75.00	66.67	100.00	100.00		76.92
Papua	100.00			66.67	100.00				83.33
GRAND TOTAL	69.44	41.84	53.40	55.91	56.60	61.73	63.00	59.26	56.13

And, as Tables 5.5-5.7 above indicate, these concerns are common across regions and subject fields: although there is some variation by region and specialism, none is immune to these.

5.3. Quality

So altogether, the picture appears to be one of a reasonable match between capacity and demand, in all regions and in all the key subject disciplines, though with some serious constraints on capacity arising because of physical constraints and the availability of suitably qualified faculty.

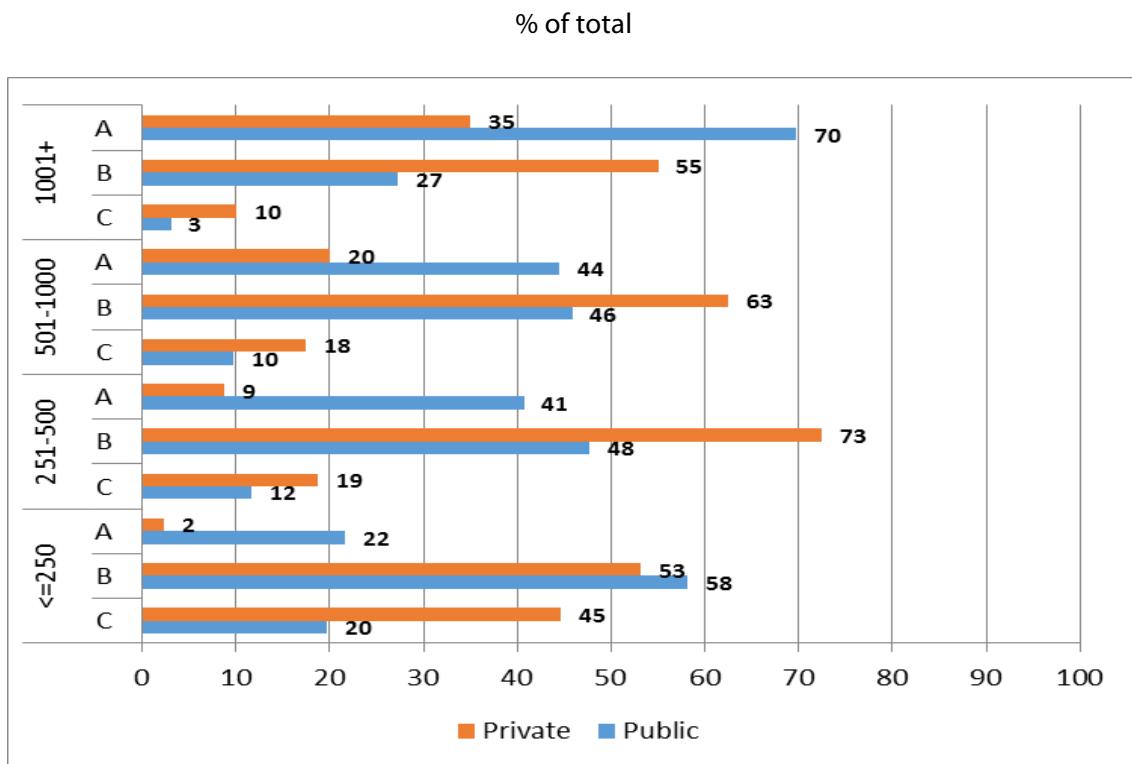
However, there is growing research evidence that the number of graduates is not the main issue when it comes to the ability of the higher education system to respond to national needs. The quality of what is provided and the graduates that are produced is more important than the numbers.

Indicators of quality are universally acknowledged to be difficult to pin down. However, one indication is provided through the availability of accreditation, both national and international. It is of concern that our survey suggests that among the universities surveyed only two programs in public universities and three programs in private have received international accreditation.

5.3.1. Accreditation

Looking at national accreditation, it is well known that private universities on average perform far less well than public in the accreditation process, and that is borne out by our survey. Figure 5.4 below shows that on average about twice the percentage of private universities had C grade accreditation than public, and fully 45% of the smallest private universities were in this category. It is also notable that there appears to be a direct, almost linear, relationship between size of institution and accreditation grade. Care is needed – a C grade is awarded to universities that have been given the right to practice but have not yet been through the accreditation process. So a C grade is not necessarily an indication of poor quality; but the absence of top grades on the other hand does give rise to concerns about quality in this category of institution.

Figure 5.4 Accreditation grades achieved by public and private universities



The regional breakdown of the accreditation picture looks as in Table 5.8 below:

Table 5.8 Accreditation grades achieved by public and private universities by region (% of programs achieving each grade)

REGION	PUBLIC			PRIVATE			TOTAL		
	A	B	C	A	B	C	A	B	C
Sumatera	16	73	11	2	56	42	16	73	11
Java	48	43	9	9	60	32	48	43	9
Kalimantan	-	47	53	-	14	86	-	47	53
Sulawesi	22	56	22	-	40	60	22	56	22
Bali	17	67	17	-	100	-	17	67	17
Nusa Tenggara	-	67	33	-	100	-	-	67	33
Papua	-	-	100	-	25	75	-	-	100

This information about accreditation suggests that at the national level there is particular reason to be concerned about the quality of small private institutions in particular, and especially and more generally about institutions in the Papua, Nusa Tenggara and Kalimantan regions which in our sample have no Category A accreditations in either public or private institutions. These regions are the least well provided in higher education, and more generally, and if the Government's RPJMN 2015 development plan intention to reduce disparities between regions is to be achieved, special attention will need to be given to improving the quality of universities in these regions.

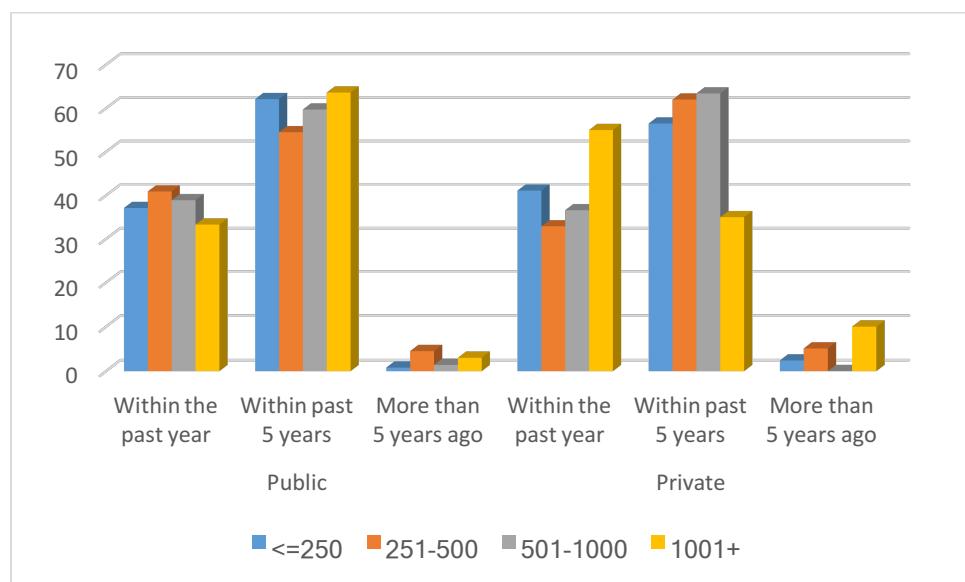
5.3.2. Curriculum review

In order to be of high quality and to ensure that their students are provided with skills and knowledge that are relevant to the world into which they will emerge, programs need to be up to date and reviewed and revised regularly. In reply to questions about whether they had a process in place for regularly reviewing the curriculum, and when the curricula were last reviewed, Figures 5.5 and 5.6 below reveal that public and private universities alike actively monitor and modify their curricula, and in principle curricula are up-to-date throughout the system.

Figure 5.5 Percentage reporting a process to revise curriculum



Figure 5.6 Percentage of institutions that last revised curriculum within the stated time



Nor does the picture vary much between regions and subjects of study. That much is positive and welcome, and in line with best practice.

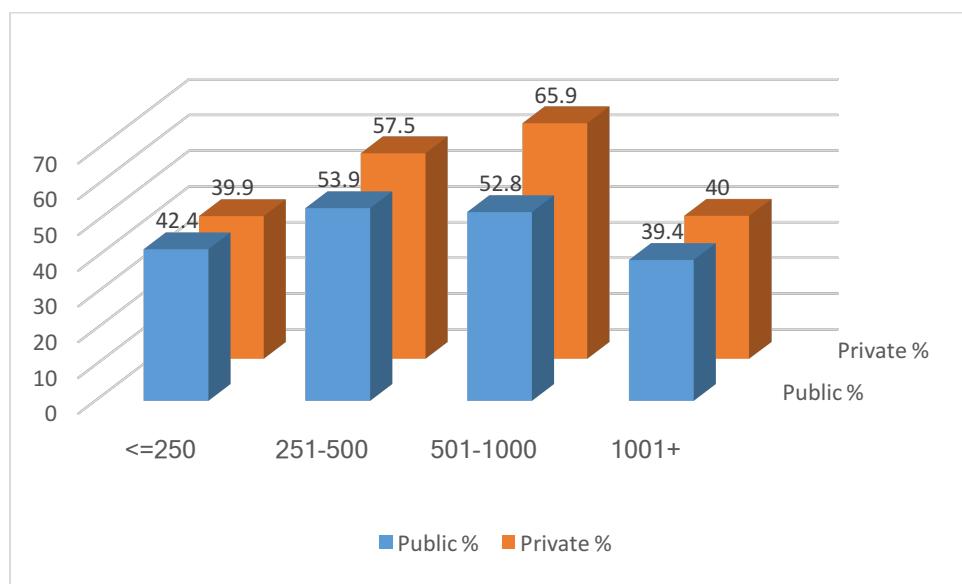
From the survey of employers it is apparent that 70% of employers provide further training to graduates. That is as it should be and is not an indication of the failings of the university system. It needs to be made clear to employers that graduates emerge from universities with technical and generic skills on which the specific skills needed to do a specific job must be built. It is not the function of education to provide "oven ready" graduates. It is therefore encouraging and right that this is recognised by employers in their subsequent actions.

Nevertheless, it is important that universities ensure that their curricula are relevant and focused upon the real world that their graduates will go out into, and therefore it is of concern that the survey of employers reveals that such a high proportion are dissatisfied with the skills of the graduates that they employ. Chapter 3 above reveals that employers reported that they doubted the ability of the education system to produce graduates with the required skills for high skilled occupations such as engineers, technicians, scientific personnel, senior management and senior supervisors. The skills they reported were lacking included technical training, English language capability and soft skills such as the ability to work in teams, critical thinking and innovative capability.

The apparent mismatch between the skills employers require and the skills their graduates have achieved while at university suggests a disconnection between universities and their programs on the one hand and the world of work on the other.

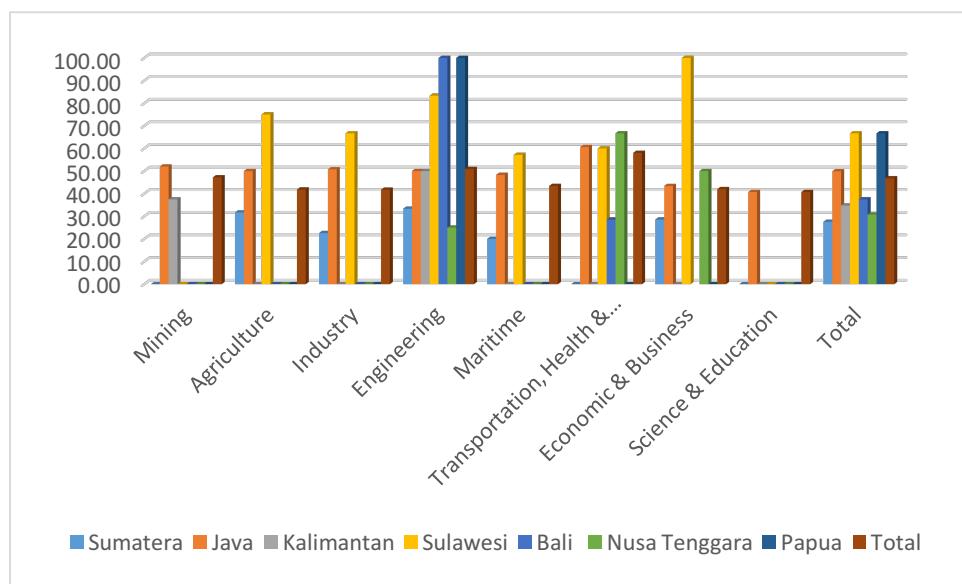
An important factor in ensuring that curricula are up to date and relevant is to consult industry about its requirements and to adjust the curriculum to meet changing needs. That is the Government's policy as articulated in its strategy, and it is best practice internationally to have significant industry representation on curriculum advisory committees to provide such advice. It is therefore notable, as will be seen in Figure 5.7 below, that while a significant proportion of all institutions have such committees with industry representation many – particularly largest institutions - do not.

Figure 5.7 Institutions with curriculum advisory committees with representatives from industry



And the analysis by region and subject discipline also shows wide variation, as Figure 5.8 below shows. For reasons that are not apparent universities in Sumatera appear to have a particularly poor record of engaging industry in their curriculum development in all subject disciplines; and the lack of industry involvement in the development of tourism programs in Bali is a particular concern as is the lack of industry involvement in engineering in Nusa Tenggara.

Figure 5.8 Institutions with curriculum advisory committees with representatives from industry – regional and subject breakdown



In this context it is notable that a high proportion of employers (92%) say that they have no involvement in the development of curricula or other aspects of the activities of universities. This is somewhat in contrast with the perception of universities revealed in Figure 5.7 above, who report that on average in about half of all cases they have curriculum advisory committees that include employer representation.

The Focus Group Discussions shed some helpful light on this apparent disparity of evidence, and indicate that universities do, as they say, involve employers, but a relatively small number, with the vast majority of employers being left untouched by such activity. It is understandable that universities prefer to deal with a small number of firms – that is administratively much easier for them. But that does mean that universities are receiving a very limited view of the needs of employers, that their students are receiving work experience and internships in only a small and perhaps unrepresentative group of employers, and also that the great majority of employers have little contact with their local universities and so may be unaware of their capabilities and the contributions that they might be able to make to help their firms develop and thrive. The Government's strategy requires a closer alignment between employers and education institutions, and that is recommended below.

5.3.3. Real world Experience for students

Whatever the explanation for the apparent disparity of evidence, for students to have a truly high quality learning experience it is essential that links occur, at a detailed level, between universities and firms. We will be saying something about research links below, but at the very least universities should seek to engage firms at the level of individual departments and programs, both to inform and maintain relevance in the curriculum, to provide real-world experience (internships for example) to students on relevant programmes. And on the other side such links enable companies to take advantage of the knowledge and facilities in the universities to ensure that their staff are upgraded and their skills maintained.

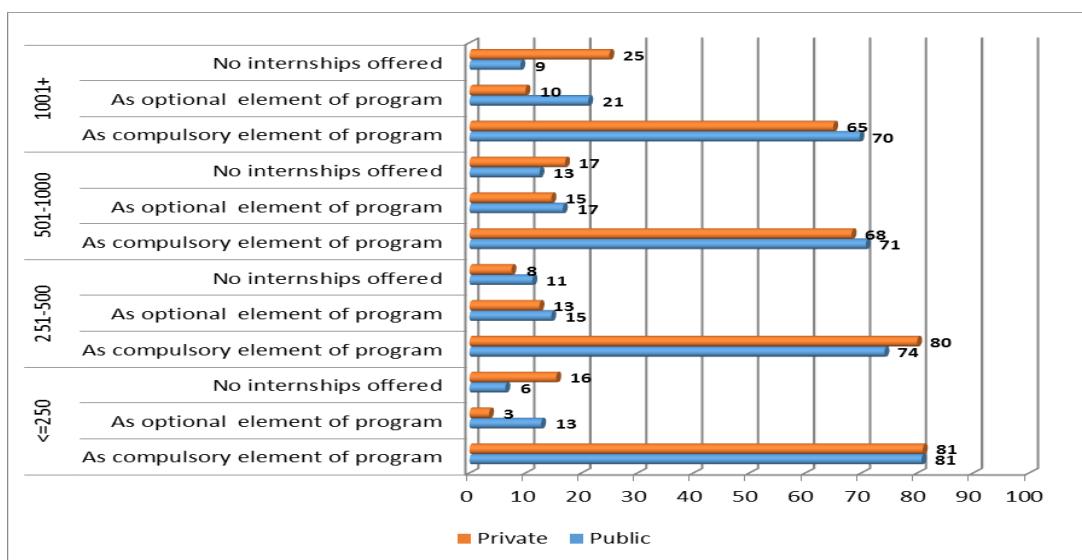
As far as internships and work experience are concerned, these provide an important way of ensuring that students are appropriately educated and are able to put their theoretical knowledge into practice, and that is something that is urged by the Government's strategy. It will be seen from Table 5.9 below that it is almost universal practice in all institutions whether public or private to provide work experience for students.

Table 5.9 Number of institutions whose students get work experience from local firms

Institution Size	Public	Private
	%	%
<=250	92.7	90.6
251-500	91	94.9
501-1000	91.7	90.2
1001+	93.9	90

And in reply to the question whether they provide internships as part of their programs, and if so whether these are compulsory or optional, it is apparent from Figure 5.9 below that the great majority of institutions include internships as a compulsory element in their programs, some include them as options and that relatively few do not include internships at all. That too is an important factor in the effort to ensure that programs are relevant and that students leave their universities with relevant and practical skills. Once again, in this respect there are no differences of note between regions or subject disciplines that would impact on achievement of the Government's RPJMN 2015 development plan.

Figure 5.9 Percentage of institutions providing internships a part of the program



5.3.4. International exposure

Another indicator of quality might be the extent to which students are exposed to international experiences. The OECD team commented that internationalization in Indonesia appears weak, citing the relatively small number (30,000) of Indonesian students studying abroad. Our survey looked at this from a different perspective and our conclusion is the same, as indicated by the extent to which international lecturers are invited to give lectures to students. As will be seen from Table 5.10 below, this is very limited throughout Indonesia, and especially so in Papua, Nusa Tenggara and Kalimantan.

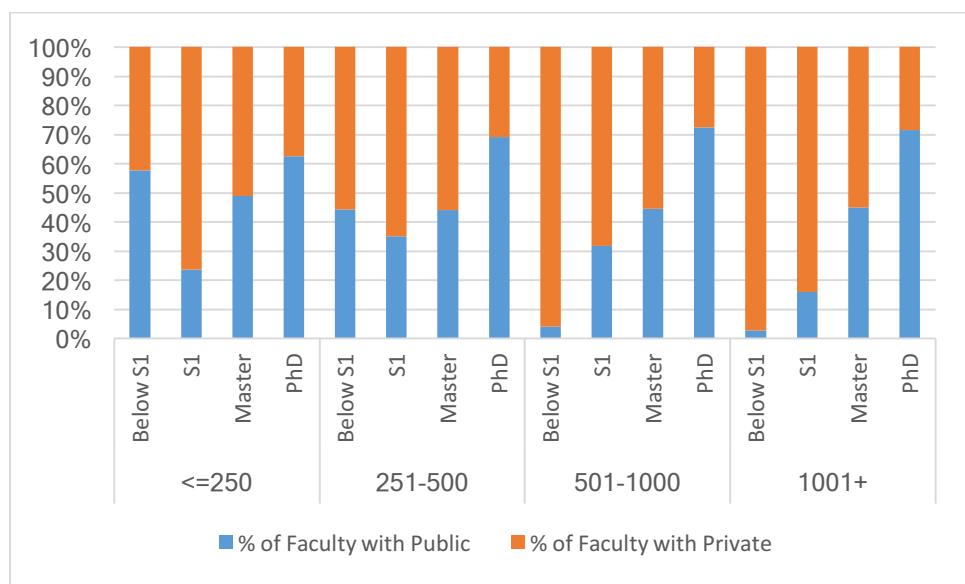
Table 5.10 Average number of lectures by international lecturers

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera	3.00	1.37	1.71	1.50	1.60	-	2.29	-	1.64
Java	2.68	2.12	2.04	1.50	1.97	1.53	2.04	5.23	1.97
Kalimantan	1.25	1.50	1.00	0.50	1.00	-	-	-	0.91
Sulawesi	-	2.00	1.33	2.33	2.21	-	3.00	-	1.82
Bali	-	-	-	2.00	-	2.71	-	-	2.63
Nusa Tenggara	-	-	-	0.25	0.67	2.00	-	-	0.69
Papua	0.50	-	-	1.00	-	-	-	-	0.67
GRAND TOTAL	2.25	1.76	1.90	1.45	1.87	1.56	2.04	5.23	1.86

5.3.5. Faculty Quality

The final indicator of quality that our survey sheds light on concerns the credentials of academic staff – the teachers in the universities. Although there is no direct evidence of a relationship between the quality of education provided and the qualifications of faculty, it is a reasonable supposition that, especially at the high end, better qualified faculty will enable better outcomes for their students.

Figure 5.10 Faculty qualification levels



It is apparent from the analysis in Figure 5.10 above that in universities of all sizes, public and private, by far the most common qualification possessed by faculty is at Masters Level. However, there are significant numbers of PhD holders in public universities (around one third, other than in the smallest where the proportion is around a quarter), whereas in private institutions the proportion of PhD holders is very much smaller (generally less than half that in public institutions). The smaller proportion of PhD holders is not of particular concern – other than for the conduct of research and making provision for postgraduate students, a PhD does not necessarily convey an advantage. However, the relatively much larger number of faculty educated only to S1 level in private universities of all sizes is a concern. Improving the quality of faculty, particularly in private institutions, will be essential if high-quality higher education is to be provided to a substantially increasing number of students in future.

One of the reasons for the relatively lower level of qualification for faculty in private institutions may be that very many more of their faculty are recruited from industry, as will be seen from Table 5.11 below.

Table 5.11 Percentage of faculty recruited from industry

Institution Size	Public		Private	
	%	%	%	%
<=250	5.9		14.1	
251-500	7.7		15.3	
501-1000	2.7		12.6	
1001+	5.5		23.7	

This may not be a bad thing. Especially in vocational subjects, it is positively helpful to have faculty with direct experience of practice of the professions concerned. That is something that we explored in the Focus Group Discussions, but we were disappointed by the responses, which suggested that faculty were employed from outside the academic profession not for positive reasons, but because of the unavailability of academically qualified faculty. Moreover, we were told in the Focus Group Discussions that many public universities forbid their faculty from working in private universities, so that might be a reason for the apparently relatively larger number of

faculty not recruited from the academic profession in private universities. We find this reason unconvincing, but we have not been able to establish the facts.

Changing the focus from differences between public and private institutions to differences between regions and subjects of study, it will be seen from Table 5.12 below that while there are differences, these are not especially remarkable, except that hotel and tourism appears to have a disproportionately large proportion of faculty whose highest qualification is only at S1 level (with over one third of such faculty in Sulawesi). Given the nature of the discipline it is not an especial surprise that this should be the case in regard to hotel and tourism, and indeed it may not be a matter for particular concern, though in general we believe that Masters level should be regarded as the minimum acceptable level for teachers in higher education, and so achievement of the Government's RPJMN 2015 development plan will require enhancing the quality of faculty in universities in some regions and subjects, and especially in private universities where on average more than 10 per cent of faculty hold qualifications below Masters level.

Table 5.12 Number of lecturers with different levels of education qualification

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera									
Below S1	-	-	-	-	-		-	-	-
S1	-	4.20	5.76	5.97	-		2.08	-	4.24
Master	52.63	74.15	72.08	82.24	54.61		81.48	-	73.82
PhD	47.37	21.65	22.16	11.79	45.39		16.43	-	21.94
Java									
Below S1	-	0.26	0.55	1.22	-	1.90	0.70	-	0.87
S1	5.45	7.04	4.70	7.14	5.29	14.73	3.30	4.73	6.86
Master	60.42	60.66	62.59	73.93	58.11	73.70	78.38	66.99	70.11
PhD	34.13	32.05	32.16	17.19	36.61	9.67	17.62	24.58	21.79
Kalimantan									
Below S1	-	-	-	-	-		-	-	-
S1	15.28	-	-	4.30	-		-	-	7.18
Master	75.79	64.55	76.01	90.91	75.00		-	-	81.37
PhD	8.93	35.45	23.99	4.79	25.00		-	-	11.45
Sulawesi									
Below S1	-	-	-	-	-	-	-	-	-
S1	-	6.00	12.73	3.79	1.02	36.29	-	-	8.51
Master	-	56.30	71.40	86.17	53.35	60.63	50.00	-	62.32
PhD	-	37.70	15.87	10.03	45.63	3.08	50.00	-	29.17
Bali									
Below S1	-	-	-	-	-	0.10	-	-	0.09
S1	-	-	-	-	-	11.05	-	-	9.67
Master	-	-	-	88.00	-	78.40	-	-	79.60
PhD	-	-	-	12.00	-	10.45	-	-	10.64
Nusa Tenggara									
Below S1	-	-	-	-	-	-	-	-	-
S1	-	2.41	-	4.17	3.33	1.52	-	-	2.59
Master	-	69.88	-	85.15	91.67	95.45	92.42	-	88.98
PhD	-	27.71	-	10.68	5.00	3.03	7.58	-	8.44
Papua									
Below S1	-	-	-	-	-	-	-	-	-
S1	-	-	-	-	-	-	-	-	-
Master	85.16	-	-	95.14	83.33	-	-	-	89.85
PhD	14.84	-	-	4.86	16.67	-	-	-	10.15
ALL									
Below S1	-	0.13	0.36	1.05	-	1.56	0.58	-	0.65
S1	7.18	5.62	5.16	6.70	3.35	15.26	3.03	4.73	6.49
Master	65.00	66.30	65.96	75.82	59.22	74.10	78.81	66.99	71.23
PhD	27.82	27.95	28.52	15.97	37.43	9.08	17.58	24.58	21.36

5.3.6. Institutional disposition

We have commented on the very different circumstances of the different regions as well as the marked differences in general between public and private institutions. We note also the OECD review's conclusion that very different quality is apparent in the different regions, and we share their view that

There are no easy solutions, but there is a need here for strong political action from the central level. Potential initiatives to tackle the issue include mergers possibly in connection with the conversion of private institutions to public ones, a moratorium on the more or less haphazard establishment of new private institutions, consistent accreditation and more rigorous accreditation procedures.

We also noted above the apparently linear relationship between size of institution and accreditation grade. It certainly is not the case that smaller institutions are poorer in quality than large institutions – there is plenty of international evidence of excellent relatively small institutions. However, it may be the case that in the circumstances of Indonesia there is a quality penalty associated with small size, and if so then there may be a case for government intervention to encourage rationalisation of some kind.

We recommend below that the Government should implement the recommendation of the OECD review that it should

"Conduct a review of the optimum scale of tertiary education providers on a district basis, taking account of the breadth, depth and quality of program offerings, with a view to establishing minimum benchmarks for institutional accreditation. It should then consider offering incentives for buyout and mergers and public-private partnerships to tackle the weaker weakest institutions. It should continue to the moratorium on the establishment of new private higher education institutions".

If it were to do this this would be a major and difficult undertaking, with very substantial political, financial and educational implications. And an alternative to mergers and buyouts would be to take the Irish approach (described below in the section on Research, and seek to create clusters of cooperation, where different institutions – with different strengths and weaknesses, focuses and missions – come together to ensure full coverage and to strengthen quality.

5.4. Student Outcomes

Universities need to know how well their students do on leaving university, both for internal reasons – to know how well they as a university are doing – and for the purpose of accountability – to demonstrate to their stakeholders that they are doing a good job, and adequately preparing their graduates for the world of work. Tracer studies are the most effective way of doing this – surveys of their recent graduates, who are asked, generally within a year of graduating, what they are doing at the time the surveys are carried out. This is good international practice, and it is therefore encouraging that Table 5.13 below reveals that a very high proportion of respondents to the survey reported that they do indeed conduct such surveys, and that there are few notable differences in this respect between regions and subjects.

Table 5.13 Percentage of institutions undertaking tracer studies

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera	100.00	90.24	90.32	83.33	100.00		85.71		89.80
Java	80.00	78.00	86.57	78.42	86.21	84.85	79.52	81.48	81.01
Kalimantan	75.00	100.00	50.00	80.00	100.00				78.26
Sulawesi		100.00	100.00	100.00	85.71	60.00	100.00		87.88
Bali				100.00		100.00			100.00
Nusa Tenggara		100.00		75.00	66.67	100.00	100.00		84.62
Papua	50.00			100.00	-				66.67
GRAND TOTAL	77.78	84.69	87.38	79.55	84.91	85.19	81.00	81.48	82.59

And while the results of the tracer studies generally show unemployment rates below 10 per cent, as shown in Table 5.14 below there are some notable differences. Graduates in Agriculture, Maritime studies and Industry from universities in Kalimantan all have unemployment rates above 20 per cent, as do Agricultural graduates from Nusa Tenggara. And graduates from mining programs in Papua have unemployment rates as high as a remarkable 40 per cent. This has serious implications for the Government's RPJMN 2015 development plan. The industries where there are the highest unemployment levels are precisely in those regions where according to the Strategy those very industries should be encouraged, and therefore more graduates produced. However, unless the employment prospects of graduates in those industries improve, then in the medium term students are likely to be reluctant to pursue those subjects.

Table 5.14 Results of tracer study: graduates in unemployment

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera	5.00	6.89	8.37	5.00	17.00	-	16.42	-	9.05
Java	9.32	7.78	10.51	5.69	7.69	4.75	10.04	4.46	7.35
Kalimantan	3.67	29.15	20.00	7.00	23.00	-	-	-	9.96
Sulawesi	-	6.25	6.67	13.50	12.92	-	10.00	-	10.03
Bali	-	-	-	-	-	7.67	-	-	6.57
Nusa Tenggara	-	20.00	-	12.50	15.00	8.33	12.50	-	12.50
Papua	40.00	-	-	5.00	-	-	-	-	16.67
GRAND TOTAL	9.04	7.99	9.80	6.05	10.78	4.97	11.07	4.46	7.95

One issue related to the quality and standards of student outcomes that was not explored in our survey, but which was raised spontaneously by employers during the Focus Group Discussions, concerns their confidence in the qualifications provided by many universities. That is to say that a student may apply for a position armed with a certificate or other qualification attesting to their ability to do a particular job or more generally to have specific competencies. But when doing the job it too often proves that that they do not have those skills or competencies, whereas on the other hand, others with such certificates from other institutions do.

This question of the variability of standards between institutions, and the integrity of qualifications, is difficult and largely intractable, and a common problem throughout the world, though perhaps not as common elsewhere as in Indonesia. Improved market information such as

information about graduate outcomes and professional body recognition should address this over time. In an environment where universities award their own qualifications, good market information is essential both to provide information to students and their advisers about the relative merits of different institutions, and as a way of encouraging institutions themselves to improve.

Moreover, in many professional fields it is not the certification from the institution that matters, but the license to practice granted by the professional association (architects, accountants, nurses and so on). In those cases, if universities provide certificates that are misleading or wrong then the graduate concerned will not receive the professional license to practice. In time, and with the publication of good information – for example the tracer studies, which we recommend below should be published at a reasonably detailed level, so providing potential students with information about which programs from which institutions are more likely to lead to jobs - this will be resolved eventually.

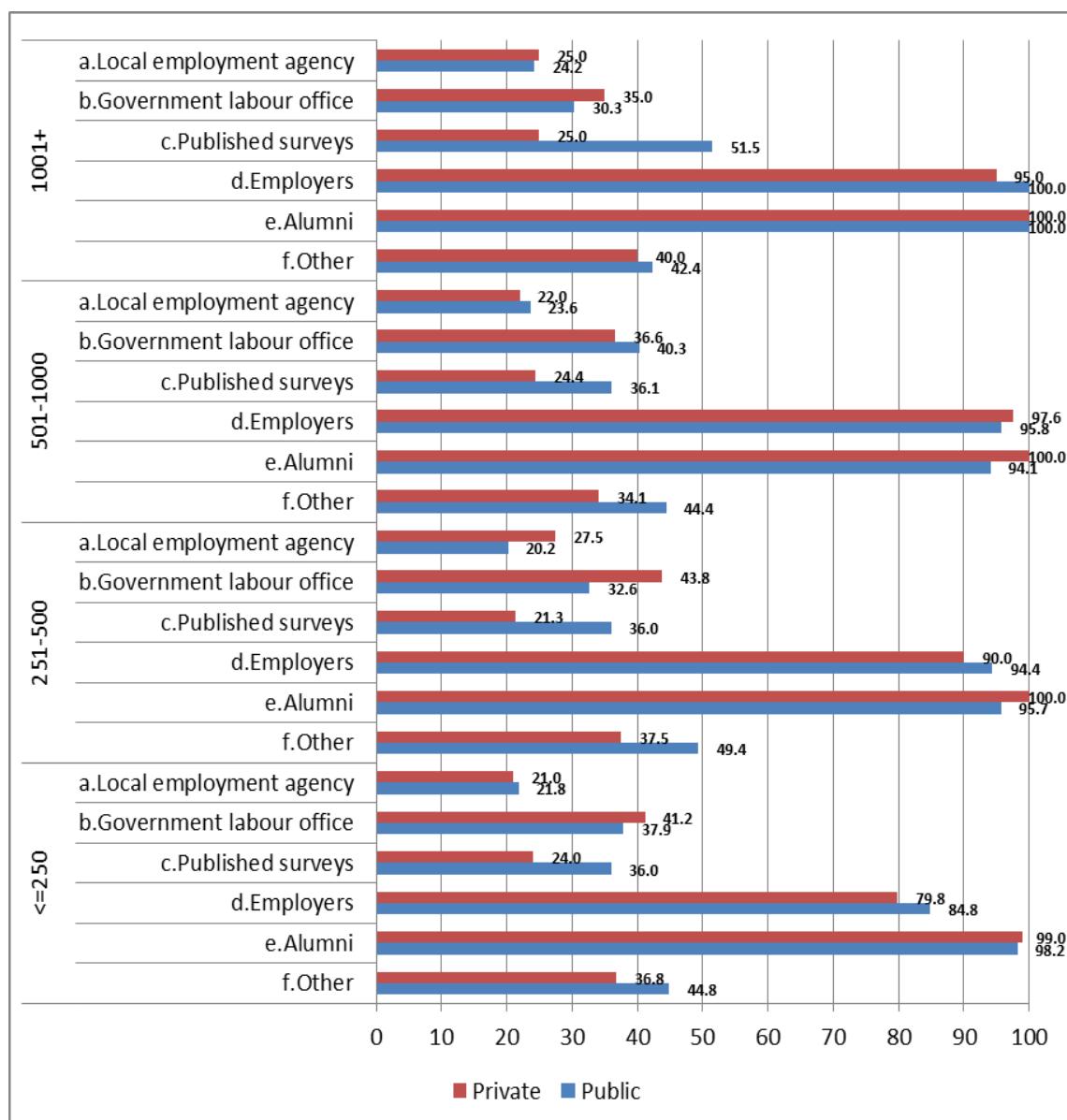
The other development that should in principle impact on this issue is the development of a functioning qualifications framework within the country. In principle, and if it works well, students should not obtain qualifications unless they have achieved the competencies, skills and knowledge required at each point on the framework. And if, as is being considered, the qualifications framework incorporates a diploma supplement, where the skills and experience of students is formally recorded, and if the package of qualifications and a diploma supplement come to be trusted, then that should transform the situation.

It remains to be seen whether the current qualifications framework will function as envisaged, and whether it brings the benefits that potentially it could. But that is the policy of the Ministry of Research, Technology, and Higher Education, and in principle, that might be an enormously important development which will bring the benefit of greater standardization and confidence in the qualifications that students receive. Unless and until that is so, it is an unfortunate fact that employers will continue to have doubts about the competence and skills of graduates whatever their qualifications – other than the qualifications provided by a limited number of highly regarded institutions. That is unfortunate, and unfair on students attending other institutions.

5.5. Use of Labour market information

One of the key hypotheses underlying this study is that educational institutions need to have good labour market information both to provide advice and guidance to their students about employment opportunities, and to inform their own decisions about changing program and curriculum needs. As is shown in Figure 5.11 below, responses to the survey suggest that universities largely ignore the official sources of labour market information – government surveys and labour and employment offices – and rely on informal sources such as their alumni and local employers for this information. Responses by universities during the Focus Group Discussions suggested that this was both because they found the official sources inaccurate and often out of date, and also because in their view the official sources of information do not attach high priority to providing the information that educational institutions need.

Figure 5.11 Sources of information about the labour market



Nor does an analysis of the responses by region or subject suggest any significant differences – the responses almost all paint a similar picture.

This is unfortunate. Universities need good information about the changing needs of the labour market in order to be able not only to advise their students but to modify their program offerings and curricula. The availability of good labour market information is essential for this. At present, while it is true that universities have information from employers, that is haphazard and unsystematic. Nor do decisions by students themselves about what subjects to study provide a sufficient basis for universities to make such decisions. Students are not necessarily well-informed about the needs of the labour market, and certainly not well informed about how the labour market might evolve.

On the other hand, care is needed not to encourage students to pursue subjects just because they because the Government's RPJMN 2015 development plan deems them to be important, if the jobs are not there for them to go into after their studies. Higher education needs to develop in line

with the development of the economic and industrial strategy, not independently of it. Otherwise there would be a danger of preparing students for unemployment.

There is a difficulty here. If students are responding to the market as it is, and that job market reflects the current economic and industrial reality, it may not be in the interests of students to encourage them to focus on subjects required by the Government's RPJMN 2015 development plan if that strategy is not yet producing the jobs for them to graduate into. On the other hand, there is a chicken and egg problem. If graduates with the required skills are not available, then that itself will ensure that the industries at the heart of the Government strategy will not develop as envisaged. It is essential for the two to go hand in hand and for there to be good coordination on the part of the Government and also good information provided to universities to enable them to develop programs and provide the students with skills that are required by the market as it is and as it is likely to develop – not just as required to fulfil the strategy if the strategy is not developing in the way envisaged.

The answer is to avoid excessively focused and instrumentalist higher education, which is dangerous and risks preparing students for unemployment or at best for limited employment opportunities. That is why it is encouraging that employers in their response to our survey rated generic skills as being so important, and that, as is shown in Table 5.15 below, University respondents to our survey almost all rated the provision of generic skills as extremely important and that these occupied a significant part of the curriculum.

Table 5.15 Percentage of institutions offering training in generic skills

	Public	Private
	%	%
<=250	88	96
251-500	94	100
501-1000	86	98
1001+	94	95

The discussion in the preceding chapters of this report concerning employer needs and the response from SMK/BLK suggest that the best sort of labour market information comes from networks of local employers and education institutions, meeting and working together to identify and resolve local needs. That is certainly so for universities as well – though universities necessarily work on a larger geographic area than schools - and it is important for universities to be connected with such local networks. However, that does not reduce the need for universities also to receive more strategic labour market information, provided by the Government and government agencies, about the longer term and wider development in the job market and industry.

5.6. Conclusions and recommendations

Our analysis of human resource capacity in universities has identified a number of areas where modifications to current practice would yield benefits, and these recommendations are aimed at addressing those.

As far as student demand is concerned, no actions appear to be required. It is clear that by and large demand will not be issue, and that assuming that universities in all regions and in all the relevant disciplines wish to and are able to respond, and that there are no other constraints, there

will be sufficient students to meet the needs of the economy and industry. Although there is a concern about the quality and standards achieved by students applying to university, that is not in the hands of the higher education system to resolve. As improvements are made in the school system then those concerns will be addressed.

However, there may be constraints arising from a lack of physical resources and appropriately qualified faculty.

As far as physical resources are concerned, there seems no reason why universities would not make the necessary investment if they believe that income from increased student recruitment would be sufficient to enable them to repay that investment. **We recommend that this is something that the Government should review, and if it appears necessary, we recommend that the Government should provide bank guarantees to universities to take the necessary loans so unlocking the necessary funds, at, potentially, no cost to the Government. There would need to be conditions on eligibility for such guarantees, and these will need to be decided at the appropriate time.**

The availability of appropriately trained faculty is an entirely different and more intractable issue. It is also an even more serious issue when it comes to the question of the research and innovation, considered in the next section. For the majority of teaching in the majority of universities, faculty do not need a PhD. But a PhD is essential for faculty who are to undertake significant amounts of research and teach postgraduate and elite students at the cutting edge of their subject.

However, a Masters qualification is a sufficient basis to undertake teaching of the majority of students at S1 and D1 levels. Considering the Government's policy, announced by Minister of Finance Bambang Brodjonegoro⁴⁵ on 31 July 2015, to increase the production of Masters Graduates by seven fold within ten years, then, despite the concerns recorded in the replies to our survey, there seems no reason why qualified faculty should be an obstacle towards achievement of the economic and industrial strategy. **We therefore recommend the Government to implement its stated policy of substantially increasing the number of Masters Students in the immediate future, and to ensure that these are well distributed between the different regions.**

The number of S1 and D1 students in the system seem out of balance, as was remarked upon by the OECD study, and **we recommend the Government to persist in its intention to redress the balance between S1 and D1 level provision while strengthening the quality and standards of both, and we further recommend that the labour market information systems that are developed should specifically identify the opportunities available at skills levels below first degree.**

As has been mentioned several times already, physical supply and demand – the production of graduates in sufficient numbers – is one thing. More important is to ensure that their quality and the quality of the education that they receive, is sufficient. The mechanisms for ensuring this in Indonesia seem inadequate compared with best practice in advanced higher education systems. Detailed recommendations for achieving high quality and relevant education are provided further below, but a generic and systemic point is first made that the absence of a robust and comprehensive quality assurance process in Indonesia is a serious gap.

Undoubtedly, BAN-PT does as good a job as is possible with the resources it has at its disposal and within its remit. However, both are inadequate. Its remit is limited to accreditation of institutions

⁴⁵ Recorded in Antara News, 31 July 2015

that have been granted a license to practice, and that function is largely rule-bound and inflexible. It has abandoned plans to accredit programs of study – not surprising in view of its limited resources and the fact that there are more than 20,000 such programs. But the plan to give that responsibility to independent accreditation agencies that focus on specific professional areas (LAM) has not materialized either, with only one having been created so far.

In order to help the assurance of quality widely throughout the University system **we recommend that BAN-PT should be provided significantly increased resources and that its remit should widen from accreditation to one of quality assurance more generally.** But whether it is BAN-PT or independent accreditation agencies that perform the function of quality assurance of programs, **we recommend that in carrying out this wider quality assurance function, among the things that should be looked at are**

- **Whether the University conducts tracer studies regularly, and how it responds to those – that should be a requirement for re-accreditation**
- **The employment and other outcomes for its students revealed by tracer studies – so outcomes would be considered, not just inputs**
- **The mechanisms a university has for reviewing and revising curricula and whether these are implemented**
- **The extent of a university's engagement with employers in its curriculum development**

We recommend that all institutions should ensure that all their programs of study are reviewed at least once every five years to ensure that the curriculum is up-to-date and that the programs are in demand in the labour market. Relying just on student demand – where students are often poorly informed – does not provide a sufficient basis for making decisions about program provision. The results of tracer studies that show the employment outcomes of graduates emerging from these programs should actively be used to inform these decisions. So **we recommend that all institutions should be required to undertake annual tracer studies showing the employment and other outcomes for their graduates, and we recommend also that this should be a condition of any grant provided by any government agency or ministry, and should be a condition of accreditation.**

Indeed, **it would be even better if the Government were to conduct tracer studies itself, covering all universities, and we recommend that.** These could be undertaken at provincial level, but to a common standard across the entire nation. That would enable the performance of universities across the country to be compared, and it would itself provide a significant stimulus for universities to improve.

And **we recommend that all universities should ensure that all relevant programmes – that is to say programs that aim to prepare students for specific occupations – are informed by curriculum advisory committees at faculty, departmental and even program level with representatives from industry to ensure that curricula are up-to-date and relevant to the changing skills needs of employers.**

It is admirable that such a high proportion of universities claim to ensure that their students obtain work experience, and that of these such a high proportion include internships as a compulsory part of their programs. Internships can be very hard to arrange – firms are not always willing easily to accept interns – and so it would be a step too far to require internships to be an integral part of all programs. So in this respect **we recommend simply that universities maintain their present practices and do whatever they can to ensure adequate and relevant work experience for as many of their students as possible.**

Our recommendations concerning labour market information and its use in universities are influenced by the fact that the information that we have received is that the quality of official labour market information received and its fitness for purpose is limited. As things stand we see no benefit in requiring universities to change their present practices – except in as far as **we recommend below that universities should create and join local networks to ensure that they are geared into the local employment environment** – but we envisage that as labour market information provided centrally improves this will change.

But in any case, as is discussed in the sections on employer demand, on labour market information and on the response of SMK/BLK, old-fashioned manpower planning is no longer considered to be good practice or effective. What is essential is that universities are responsive and flexible, and able to receive and respond to the needs of employers, and labour markets more generally, rapidly and effectively. For that they need to have mechanisms to be aware of changing needs, and these will often be quite specific to a locality, province or region. That is why in the section on SMK/BLK we have recommended the creation of local networks in which education institutions sit together with local businesses, government representatives and others to discuss developing local skills and employment needs and the responses required of education institutions. **We recommend that higher education institutions should be part of these networks and play an active part.**

We noted above the complaint of employers about the variability of standards of graduates and the fact that in many cases the skills and knowledge that a graduate recruit possesses do not match those claimed in the certificate, diploma or degree that they have achieved. We also noted that this is an intractable (and common) problem throughout the world, though perhaps not as common elsewhere as in Indonesia. We noted too that this is something that good market information such as information about graduate outcomes and professional body recognition should address over time. This is important. In a largely liberal and free market environment, as is the case in Indonesia, where universities award their own qualifications, good market information is essential both to provide information to students and their advisers about the relative merits of different institutions, and as a way of encouraging institutions themselves to improve.

So we recommend that the Government should take steps to publish a relatively small number of performance indicators covering all universities in the country, providing information about student outcomes. We also recommend that the Government should consider following the lead of other countries in organising and publishing a student satisfaction survey. Mechanisms need to be found to oblige private universities to participate and provide the data, but even if they do not, if participation is sufficiently widespread, the market will demand that non-participants participate eventually.

In the discussion above we noted the potential importance of the qualifications framework to achieving greater standardization of outcomes and increasing confidence in the qualifications awarded by different universities. We make no recommendation about that here, except that **we recommend that the Government should implement the recommendations of the study of the implementation of a qualifications framework currently being conducted as ACDB20.**

Meanwhile, it will be up to the quality assurance body that we envisage that BAN-PT should transform into – or any other body that is entrusted with the function of quality assurance – to use such information – together with the information about the success of graduates from each institution in securing professional recognition where appropriate – in order to begin to address the issue.

We have noted, as did the OECD review, that there are marked differences of quality between regions and also between public and private universities in general. Some of the issues might be

addressed by modifying the disposition of institutions (encouraging mergers etc.), and some by creating formal cooperative arrangements. **We recommend that the Government should conduct the review proposed by the OECD, aimed at rationalizing provision on a provincial level**, as one instrument in the improvement of quality, and that this review should specifically consider how smaller institutions might be rationalised and their quality increased.

It is notable that the majority of institutions – both public and private – reported that in the survey that they were not inhibited from being flexible in their responses to societal and market changes and needs. Nevertheless, we are aware of the difficulties the Government and the universities concerned have had in increasing the autonomy of public universities, attempts to achieve which have extended over 15 years or so with little progress so far.

Based on our knowledge and experience of university systems around the world we can confirm that the most effective universities are largely autonomous and free of detailed government control. In Indonesia, where the majority of universities are private, this may not seem to be an issue, but even for private universities there are numerous regulations that govern their activities; and for public universities there remains the problem that some central authorities appear to find it difficult to reconcile the notion of a publicly financed institution with that of an institution that is nevertheless autonomous. However, many other countries – those with the most successful university systems – have reconciled these concepts, and until that has been achieved in Indonesia its universities are unlikely to fulfil their full potential.

This is the conclusion of the OECD report and is one which we strongly endorse. The mechanisms and conditions for greater autonomy are complex – and Indonesia has been grappling with the issue for many years. We do not – and it is beyond our terms of reference to – review these.

However, **we do recommend that a separate and serious study should be undertaken – or better still studies that have previously taken place should be reviewed – with a view to an unequivocal commitment to increase the autonomy of public institutions** – both managerial, governance, financial and academic autonomy – beginning with those judged to be of the highest standards and which are most prepared for autonomy.

We do not underestimate the difficulties. Greater autonomy must be accompanied by appropriate levels of accountability – such as accountability for quality and standards, to a greater extent than at present – and confidence that the universities possess the management and governance capacity to exercise greater autonomy. But these have been achieved elsewhere, and if the will is in place there is no reason why these should not be achieved in Indonesia.

6. RESEARCH AND INNOVATION CAPACITY

6.1. Introduction

Economically successful countries have well developed research and innovation systems, and there are numerous examples of countries that have sought to develop their economies doing so by developing these – and their higher education generally – as one of the elements on the way to achieving that.

Causality is difficult to demonstrate, but there is sufficient coincidence and correlation to make it a reasonable supposition that developing an excellent higher education, and in particular an excellent research and innovation, system is a prerequisite to the sort of economic development that Indonesia aspires to. Of course, it is not limited to that – all the other prerequisites, such as regulatory and financial infrastructures - need to be established in parallel. The establishment and development of a higher education, research and innovation infrastructure appears to be a necessary but insufficient condition.

Although couched in terms of improving the performance of universities more generally, the unspoken – and sometimes explicit – intention is often to improve research and innovation performance, and most of the investment and activity is with this in view. The underlying assumption is that a small number of research and innovation powerhouses will have a catalytic impact on the entire system.

6.2. The Current Situation in Indonesia

The report commissioned by the Indonesian Academy of Sciences and the World Bank into the creation of an Indonesian Science Fund (ISF)⁴⁶, which contains a comprehensive and authoritative assessment of the state of the research and innovation infrastructure in Indonesia, observes that “By population, Indonesia, with its over 230 million people, is the fourth-largest country in the world. Illiteracy rates are very low, and the country has several good universities and research institutes. But for the years 1996–2010, Indonesia is in 64th place in the world in numbers of papers published in peer-reviewed journals. ”, and that there is a similar picture with regard to patents. That report goes on to provide a series of statistics that shows how poorly Indonesia performs in relation to other countries, including the majority of its neighbours. Focusing just on the question of research outputs, as manifested in peer-reviewed publications in international journals, Table 6.1, taken from that report, is eloquent in demonstrating the low level of research activity.

⁴⁶ Creating an Indonesian Science Fund by Satryo Soemantri Brodjonegoro and Michael P. Greene

Table 6.1 Country Rank of Scientific Publications, 1996–2010⁴⁷

Rank	Country	No. of documents	Citable documents	Citations
1	United States	5,322,590	4,972,679	100,496,612
2	China	1,848,727	1,833,463	7,396,935
3	United Kingdom	1,533,434	1,392,982	24,535,306
4	Japan	1,464,273	1,429,881	16,452,234
10	India	533,006	507,792	3,211,864
11	Australia	520,045	485,249	7,083,995
14	Korea Rep.	430,438	422,745	3,344,131
15	Brazil	328,361	318,294	2,409,214
17	Taiwan	308,498	301,775	2,391,691
21	Turkey	231,178	219,280	1,380,599
31	Iran	120,350	117,469	499,322
32	Singapore	109,346	105,665	1,092,233
33	New Zealand	101,286	95,295	1,309,197
42	Thailand	59,332	57,509	442,250
43	Malaysia	55,211	53,979	218,280
62	Estonia	14,366	14,106	150,084
63	Bangladesh	13,657	13,304	80,533
64	Indonesia	13,047	12,776	105,759
65	Kenya	12,982	12,350	153,702
67	Kuwait	10,981	10,723	69,937
68	Vietnam	10,904	10,676	89,244
70	Philippines	9,717	9,440	103,428

Source: Creating an Indonesian Science Fund by Satryo Soemantri Brodjonegoro and Michael P. Greene

What is striking, however, is that the low volume of publications is nevertheless accompanied by a relatively high rate of citation for the articles that have been published⁴⁸. That indicates that whereas productivity of the science base may be low, its quality is relatively high. What is wanted of course is high productivity and high quality, but the relatively high quality at least provides something on which to build.

One reason for the relatively high quality of research conducted in Indonesia may be the high proportion that is carried out as international collaborations. Although that is cited in the ISF report as a matter for concern, in fact there is research evidence⁴⁹ that research that is carried out a

⁴⁷ Idem Table 6

⁴⁸ See footnote 4 of the ISF report "On April 28, 2012, KOMPAS, the largest newspaper in Indonesia, published an interview with Wong WoeiFuh, managing director of Asia Pacific Intellectual Property and Science at Thomson Reuters. Wong said that research carried out by his company ranked Indonesia third in Southeast Asia in quality of research [judged by research citations], after Singapore and the Philippines Areas of greatest strength were found to be botany, zoology, medicine, environment, geology, and agriculture."

⁴⁹ See for example Adams, Nature V.497, P 557

collaboratively across borders is of higher quality and attracts higher citation rates than research that is carried out solo or between collaborators within a single country. This tendency for international collaborations is therefore to be welcomed and is something else on which to build.

The above discussion is in terms of publications in scientific journals – academic output. The same is true of application oriented research, of which the number of patents filed may be a proxy. In this respect too, Indonesia's performance is among the least successful in the region. In 2008, according to the US Patent and Trademark Office, a total of 19 patents were granted to Indonesian entities and individuals compared to, say 22 from the Philippines, 40 from Thailand, 168 from Malaysia and 8731 from Korea. A similar picture is provided by the World Intellectual Property Organization, as shown in Table 6.2 below⁵⁰.

Table 6.2 World Intellectual Property Organization patent filings by origin and office, 2007

Economy	Patent filings by office			Patent filings by origin
	Total	Resident	Non-resident	Total
Japan	396,291	333,498	62,793	501,270
Singapore	9,951	696	9,255	3,538
Korea, Rep.	172,469	128,701	43,768	174,896
Malaysia	2,372	670	1,702	1,144
Thailand	1,388	877	511	1,049
China	245,161	153,060	92,101	160,523
Indonesia	4,606	282	4,324	308
Philippines	3,265	231	3,034	310
Vietnam	0	0	0	13

Source: WIPO 2009.

Note: Data for Indonesia and the Philippines are for 2006.

The Indonesian Science Fund report, referred to above, points to funding issues and concludes that these are largely the cause of the low level of research activity. The issues that it points to are of two types

- Low levels of funding
- Bureaucratic and administrative issues that complicate and de-incentivize the pursuit of external funding by university researchers.

No matter what parameters are studied, the levels of funding for Indonesian research are extremely low. Again, as one example taken from the ISF report, compared with the majority of its competitors, Indonesia has very low levels of funding provided by private industry – 14%⁵¹. Also, with 80% of R&D funding coming from the Government, Indonesia is an outlier in this respect as well. Similarly, investment in R&D is less than 0.1% of GDP. There are many ways of looking at the

⁵⁰ From "Putting Higher Education to Work: Skills and Research for Growth in East Asia", World Bank, 2012

⁵¹ Idem - see Table 1 on page 15,

same issue, but it is clear that levels of funding and the sources of that funding are important reasons for Indonesia's performance with regard to research activity.

So the conclusion that funding issues impact seriously on Indonesia's research output is almost certainly correct. So the substantial increase in the research budget of the Ministry of Research technology and Higher Education, accompanied by the creation of the Indonesian Science Fund is likely to prove to be an important step forward in the development of Indonesia's research capacity.

As will be seen from what follows below, other countries have seen the funding, the expansion and the development of their research infrastructure – and in particular university research – as critical to the development of their societies and economy. Indeed, there is no developed country in the world, and certainly none with the size of economy that Indonesia aspires to achieve, that does not have a highly developed research and innovation system. As was pointed out in the ISF report, the implication is that for Indonesia to achieve an economy the same size as that of Germany it would have to develop an R&D system capable of producing 100,000 peer-reviewed publications per year, compared with the 2,000 or so produced in 2010. That may be overstating the issue – peer-reviewed publications are not the only type of research outcome and may not be the most relevant to Indonesia's needs in all cases – but it provides a measure of the size of effort that will be required.

It is therefore an important and positive step forward that increased funding has been made available for research, and that an Indonesian Science Fund has been established. Apart from anything else, that could help to achieve one of the goals of the present project, which is to attract direct inward investment for downstream industries. Without a well-functioning and recognised research infrastructure foreign firms are unlikely to wish to make investments that require highly qualified people and research facilities: without such a research infrastructure it will be impossible to entice companies conducting downstream activity at the cutting edge if they do not believe that the manpower, facilities and other infrastructure will be present to enable them to conduct their business.

While the development of the Indonesian Science Fund potentially represents an important step forward and is to be welcomed, how the fund operates, its priorities, parameters and programs will be of the utmost importance to ensure that its benefits are maximized. Among the lessons to be drawn from the international experience discussed below are the following:

- There is a balance to be struck between supporting excellent research and building capacity. Although building capacity is an important consideration, limited research funds mean that in a competitive environment there is an opportunity cost associated with overlooking excellence as the key consideration. The ISF must, for example, resist the temptation to direct the majority of its funds to Government research institutes, where the majority of government research funds go at present, but where the staff are much less well qualified than in universities.
- Nevertheless, the ISF can legitimately – and should – identify research priorities, topics et cetera judged to be in the national interest
- In order to be able to bid for and conduct research projects institutions need to have research capacity and infrastructure – both staff and facilities. Other countries ensure this in different ways – sometimes providing these through core funding of universities, and sometimes by ensuring that project grants carry a sufficient overhead to enable universities to build up their infrastructure and capacity. In the Indonesian environment, where the majority of universities are privately funded and students cannot be expected

to provide the research infrastructure through the fees that they pay, it probably makes more sense for project grants to carry a sufficient overhead.

- Collaborative research projects with international collaborators should be encouraged. One way of doing this would be to include within the ISF a program explicitly for projects conducted with international collaborators.

Finally, the size of the need is daunting, and raises the question where all the scientists and researchers that are required will come from. The numbers are such that it cannot be just from the small number of existing science-strong institutions though these have to be nurtured and developed. Ways have to be found of broadening the base of excellent research while continuing to focus on areas of research strength.

Availability of staff is a constraint. Table 6.3 below repeats the data shown in Table 5.12. above, and shows that in only three Regions – Java, Sumatra and Sulawesi – do more than 20 per cent of faculty have PhDs, and in all the others the proportion is nearer just 10 per cent. This is no basis for developing a strong research base – and it is essential that there is some research strength throughout the country.

Table 6.3 Percentage of lecturers with different levels of education qualification

REGION	Mining	Agriculture	Industry	Engineering	Maritim	Transportation, Hotel & Tourism	Economic & Business	Science & Education	TOTAL
Sumatera									
Below S1	-	-	-	-	-		-	-	-
S1	-	4.20	5.76	5.97	-		2.08		4.24
Master	52.63	74.15	72.08	82.24	54.61		81.48		73.82
PhD	47.37	21.65	22.16	11.79	45.39		16.43		21.94
Java									
Below S1	-	0.26	0.55	1.22	-	1.90	0.70	-	0.87
S1	5.45	7.04	4.70	7.14	5.29	14.73	3.30	4.73	6.86
Master	60.42	60.66	62.59	73.93	58.11	73.70	78.38	66.99	70.11
PhD	34.13	32.05	32.16	17.19	36.61	9.67	17.62	24.58	21.79
Kalimantan									
Below S1	-	-	-	-	-				-
S1	15.28	-	-	4.30	-				7.18
Master	75.79	64.55	76.01	90.91	75.00				81.37
PhD	8.93	35.45	23.99	4.79	25.00				11.45
Sulawesi									
Below S1	-	-	-	-	-	-	-	-	-
S1	-	6.00	12.73	3.79	1.02	36.29	-		8.51
Master	-	56.30	71.40	86.17	53.35	60.63	50.00		62.32
PhD	-	37.70	15.87	10.03	45.63	3.08	50.00		29.17
Bali									
Below S1	-	-	-	-	-	0.10			0.09
S1	-	-	-	-	-	11.05			9.67
Master	-	-	-	88.00		78.40			79.60
PhD	-	-	-	12.00		10.45			10.64
Nusa Tenggara									
Below S1	-	-	-	-	-	-	-	-	-
S1	-	2.41	-	4.17	3.33	1.52	-		2.59
Master	-	69.88	-	85.15	91.67	95.45	92.42		88.98
PhD	-	27.71	-	10.68	5.00	3.03	7.58		8.44
Papua									
Below S1	-	-	-	-	-				-
S1	-	-	-	-	-				-
Master	85.16	-	-	95.14	83.33				89.85
PhD	14.84	-	-	4.86	16.67				10.15
ALL									
Below S1	-	0.13	0.36	1.05	-	1.56	0.58	-	0.65
S1	7.18	5.62	5.16	6.70	3.35	15.26	3.03	4.73	6.49
Master	65.00	66.30	65.96	75.82	59.22	74.10	78.81	66.99	71.23
PhD	27.82	27.95	28.52	15.97	37.43	9.08	17.58	24.58	21.36

For our research survey we had a different sample of institutions – those identified as research active. The findings in relation to the qualifications of faculty are similar. Table 6.4 below shows the average number of faculty in each research institution surveyed with the different qualification levels:

Table 6.4 Average Number of Researcher in Each Institution by Education Level

REGION	PUBLIC			PRIVATE			TOTAL		
	S1	S2	S3	S1	S2	S3	S1	S2	S3
Sumatera	2	87	51	0	22	3	1	35	13
Java	28	138	57	2	33	7	7	51	16
Kalimantan	5	102	4	-	22	0	3	72	3
Sulawesi	1	27	26	1	7	3	1	15	12
Bali	18	34	3	7	10	-	15	28	2
Nusa Tenggara	-	88	12	2	9	2	1	56	8
Papua	10	46	3	-	20	1	3	26	2
GRAND TOTAL	17	105	39	2	29	6	6	47	14

It will be seen that in whereas the average public university in Java and Sumatera – and to a lesser extent Sulawesi – has reasonable numbers of PhD students, even public universities in Kalimantan, Bali and Papua have very few indeed – and the average for Private universities is very poor indeed. It is clear that very few private universities are in a position to undertake significant research. Given that gifted researchers are the key to undertaking significant research – and every region needs a research capability - this is a situation that will need to be addressed if the Government's RPJMN 2015 development plan aims of creating more knowledge based industries through the regions, and of reducing disparities between regions are to be achieved. There can be no quick fix to this issue, but we suggest below two approaches the Government might adopt:

- One approach would be to enable universities to send staff abroad for PhDs with the requirement that they should return to their parent university. This already happens to a limited extent, but as was pointed out to us by attendees at a number of the Focus Group Discussions, the problem is not lack of money, but of suitable candidates. Nevertheless it is a measure that should be built upon.
- Second, a concerted campaign to persuade Indonesian scientists working abroad to return could provide some benefit. It will be difficult to compete with the salaries paid by the foreign universities where they are working already. However, the Government's commitment to increase the resources devoted to research – alongside the recent creation of the ISF – could be of real appeal to young researchers, ambitious to further their research careers, and we believe that a focused campaign, explicitly aimed at Indonesians undertaking research in overseas institutions, and concentrated on a relatively small number of Indonesian universities, has a real prospect of success.

6.3. International efforts to improve R&D capacity

Almost every model of macroeconomics identifies productivity and innovation as central drivers of economic growth. It is unsurprising therefore that direct investment in R&D by the state and other public policy measures in support of research and scientific (and thus productivity) advancement and innovation are now strong features of state intervention across modern economies. The underlying policy rationale arises from a view that the private sector is unlikely to deliver the socially optimal level of R&D investment, and that the state needs to intervene in order to optimise research, development and innovation.

There are a large number of initiatives, most found in Asia, Europe and the Middle East, intended to drive/maintain national competitiveness and attractiveness to mobile investment and talent, as some governments have become concerned that they are/have been under-investing vis-à-vis their competitors. These realizations are leading many countries to restructure their higher education and research systems and prioritize some universities. France, Germany, Russia, Spain, China, South Korea, Taiwan, Malaysia, Finland, India, Japan, Singapore, Sri Lanka and Latvia –

among many other countries – have all launched initiatives with the primary objective of ensuring that some of their universities become outstanding in research, and are able to match the best in other countries⁵².

In the USA too, individual states are seeking to build or boost flagship universities to what is known as Tier One status, with the aim of enhancing attractiveness for investment and hence economic growth – as with the aforementioned national strategies. In a quote that could have been about Indonesia Proposition 4 (a constitutional amendment put to the Texan electorate in 2009) said

“The most important natural resource Texas has is Texans. Unfortunately, our state suffers from a “brain drain” as many of our best and brightest students leave to further their education. A contributing cause is a lack of “tier one” universities in Texas. Proposition 4 (a [state] constitutional amendment to create a National Research University Fund to help fund certain state universities to become nationally recognized research institutions) would provide funding to Texas universities seeking to attain tier-one status. With more university research, the state hopes for new jobs, increased wages, and more state and local tax revenue.”

Jamil Salmi, former head of tertiary education at the World Bank, identifies three different policy approaches⁵³: a government may

- Seek to upgrade a few existing universities (picking winners)
- Encourage several universities to merge and transform themselves (hybrid model)
- Create a new world-class university from scratch (clean-slate approach).

With its plethora of existing universities the last approach seems inappropriate in Indonesia. Elements of all three approaches are evident in the examples reviewed, from which a number of strands are apparent:

- Increased public investment, where the increased funding of the Ministry of Research, Technology and Higher Education represents an important step forward
- Highly selective distribution of that investment - The World Bank study referred to above⁵⁴, suggests that Indonesia should limit its ambitions to develop research capacity to a few institutions. That is probably realistic in Indonesia's present circumstances.
- Mergers, in order to achieve universities with critical mass – on the assumption that critical mass is necessary for high-quality.
- Importing talent is a feature that appears in some of the strategies. That is a process that can be extremely difficult, since talented individuals tend to be in demand widely around the world, and therefore command relatively high salaries. It would be difficult for Indonesian universities to compete with other better resourced institutions in other countries, and even if it were possible to offer competitive salaries the distortions and difficulties that that might cause internally within universities may cause more problems than any benefits that such a strategy would bring. However, one strategy might be for the Government to begin a campaign to persuade Indonesian researchers and academics working abroad to return (see below) – a strategy that China has successfully implemented

⁵² See E. Hazelkorn (2nd edition 2015) Rankings and the Reshaping of Higher Education. The Battle for World-Class Excellence, Basingstoke, Palgrave MacMillan.

⁵³ Salmi “The Challenge of Establishing World-Class Universities” World Bank 2009

⁵⁴ “Putting Higher Education to Work: Skills and Research for Growth in East Asia”, World Bank, 2012

Mergers are the ultimate form of cooperation, but there are stages short of merger that recognise that not all universities can carry out all the functions needed in a higher education system, but which, by encouraging cooperation and mutual support, ensure that all universities in a particular area or region play their part to ensure that all functions are covered. So, for example, it is not necessary for every university to be outstanding in research – indeed that would be impossible to achieve and probably not desirable – but through cooperation it is possible to ensure that different types and levels of research activity in different subjects are available throughout the country. Similarly, teaching provision at various levels and in various subjects can be orchestrated to ensure that institutions in a region, or even across the country as a whole, can be mutually supportive, and to ensure comprehensive coverage.

Ireland is an example of a country that has actually, because of its economic difficulties, reduced its investment in higher education and research over the last few years, but which has introduced the notion of "clusters" whereby all universities in a region come together to agree on their respective roles and how they will deliver the national strategy for higher education and the economy together. The implementation of that approach is in its early stages and so it is not possible to say how successful it has been, but on paper at least there has been significant progress: all regions are covered by a cluster and all institutions are part of a cluster, with their respective roles agreed.

Among the case studies considered, it is notable that, with the exception of Vietnam and to a lesser extent Nigeria improving education is not an explicit strategy or aim of the interventions that have been described. This may be because improvement in research performance is seen as the key to improvement in higher education more generally, leading to improved national economic performance. Or it may be because of the influence of the international rankings, all of which are fundamentally based upon research performance, and so the only way of improving the position of a university in the international rankings is to improve its research.

Indeed, it is notable also that so many of the countries studied have identified improving the position of their universities in the international rankings as a prime driving force. This is unfortunate. First, it is a zero-sum game – if one improves it is at the expense of another, and so it is a logical impossibility for all to improve, as is apparently their aim. But more worryingly, the very narrow focus of the international rankings, which effectively reflect research performance and outcomes alone, means that there is a serious danger of distorting university activity and government policy in these respects. So while it is understandable that it is the policy of the Ministry of Research Technology and Higher Education to have five Indonesian universities in the world's top 500 within five years⁵⁵ – and this is a reasonable aspiration given Indonesia's size and importance – it is essential that that should be a byproduct of the results of implementation of core policies, rather than a policy itself that drives other considerations.

So all these various strands need to be considered together.

What is notable in all the approaches considered is the emphasis on the development of basic and applied research, which provide the cornerstone – the sine qua non – of innovation and applied research.

Innovation and entrepreneurship do not exist independent of basic research, fundamental discoveries, and the availability and development of the staff needed in order to innovate and exploit these discoveries. Innovation and entrepreneurship are concerned with ensuring that a nation obtains the best returns possible from the outputs from its universities and its research

⁵⁵ See report of statement by Director General Science Institutional Affairs and Higher Education Kemristek Dikti Patdono Suwignjo, reported in Kompas, August 21 2015

infrastructure more widely, and the initiatives considered here – while ultimately to do with economic improvement – in the main take as their starting point the development and improvement of the nation’s basic research infrastructure.

As noted in the World Bank report “Putting Higher Education to Work: Skills and Research for Growth in East Asia⁵⁶” “research enables universities to produce ideas for the business community, thereby contributing to knowledge and technological innovation through basic and applied research and technology transfer. But international rankings and research outputs indicate that low- and middle-income East Asian higher education systems are not providing research of adequate quality. Even mere university involvement in technology adaptation and upgrading is limited in lower- and middle-income East Asia, with the possible exception of China”. This certainly seems to be the case in Indonesia.

So, from the above analysis, among the pointers suggested for Indonesia include:

- Increased and targeted funding for basic science.
- The identification of strategic topics and the most promising people and institutions in which to invest. This ought to be done as a result of a systematic review of research strengths around the country.
- Nurturing talented individuals to keep them in the country – possibly through salary enhancements but certainly through the provision of facilities that will enable them to pursue their research
- Encouraging small institutions to merge to create institutions of viable size, and beyond that to create structures that will enable independent institutions to engage in increasingly deep collaboration and cooperation to ensure that all regions benefit from the advantages provided by research and innovation.

Analysing more closely the activities of other countries intended to enhance innovation, applied research and entrepreneurship, three distinctive elements are apparent:

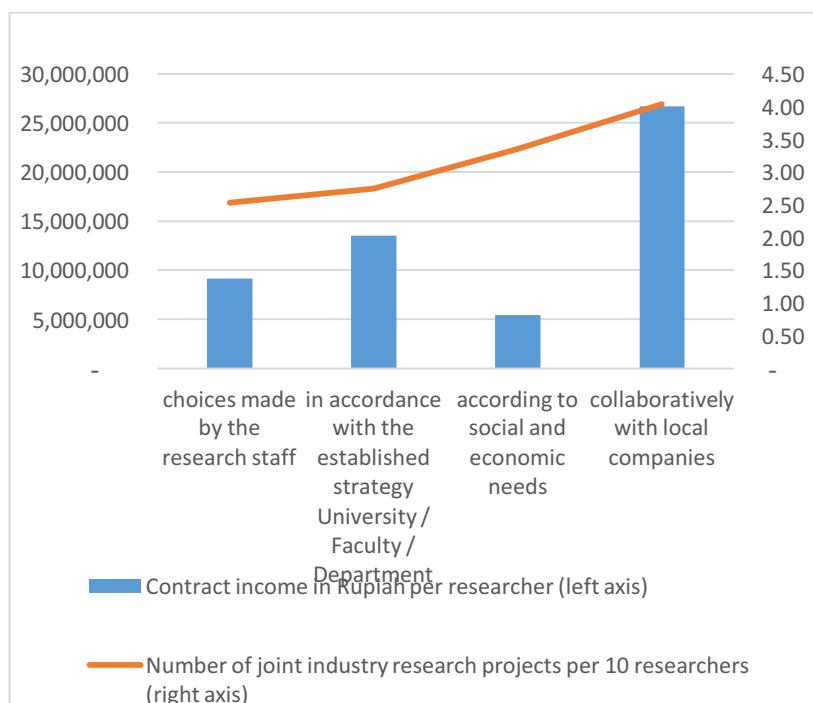
- The innovation infrastructure
- Developing entrepreneurship
 - In students
 - In faculty
- Fostering relations between university and industry.

There is experience of good and successful practice in all of these respects from other countries, and each is discussed in more detail below.

The generic need that all this activity represents is the need to optimise relations between universities and the economic world – businesses in particular. The importance of such relations is indicated by the responses in our survey to questions that shed light on the correlation between the basis upon which decisions are taken about research topics to be investigated, income from research contracts and the number of joint research projects. It will be seen from Figure 6.1 below that both the level of contract income and the number of joint research projects are enhanced when research topics are chosen collaboratively with local industrial partners.

⁵⁶ “Putting Higher Education to Work: Skills and Research for Growth in East Asia”, World Bank, 2012

Figure 6.1 Effect of different levels of decision making about research topics



A recent report that looked at education/higher education industry relations in Indonesia – ACDP 25⁵⁷ – comprehensively considered the matter and the main lessons to be drawn from international experience in this respect. There is nothing in that report with which to disagree, and it comprehensively and accurately sets out the main lessons for Indonesia. Its recommendations should be implemented, with the prospect that that would bring considerable benefit to Indonesia.

In particular, that report concludes that education/industry links are in fact part of a tripod of relationships of which higher education institutions and companies are two pillars, the third being the Government, whose role it should be to stimulate, to provide seed finance and to ensure that the regulatory and environmental conditions are in place to encourage developing links between higher education institutions and companies. The experience described in this present report reinforces that message, and tells how in successful and aspiring economies universities are the drivers of discoveries and innovation and exploiters of these discoveries, to exploit the knowledge and skills of faculty and students. And it tells also of how in many countries governments recognise their role in encouraging and enabling this.

There are numerous and increasing examples of actions that are being taken in other countries to stimulate and encourage increasing links between higher education and industry, and the tripod, whereby government is the third leg of these relations is increasingly recognised, particularly the enabling role the Government plays.

Businesses and industry benefit greatly from university research and innovation. Universities are constantly looking for ways to connect their research and students' education to emerging industry interests. In recent years, universities have put greater emphasis on supporting start-up companies, while continuing to engage established companies that have traditionally been their licensing partners. To facilitate greater collaboration and innovation, universities are opening up

⁵⁷ "Development of Strategies for University-Industry-Government Partnership" by Bagyo Y. Moeliodihardjo, Biemo W. Soemardi, Satryo S. Brodjonegoro, and Sachi Hatakenaka

their facilities, faculty and students to businesses (small and large) in the hopes of creating greater economic value. Universities are strategically partnering with companies, offering internships and externships, sharing facilities with start-ups, such as accelerators, and creating venture funds and incentive programs funded by industry, all of which drive increased innovation and product development by university students, faculty, and staff. The lessons arising from some of the most effective practices are summarised below.

6.3.1. Innovation

Although logically a different concept from entrepreneurship – innovation refers to the production of new products and services, and their dissemination, putting knowledge and discoveries to the service of industry and society more generally, often on the basis of new research discoveries; entrepreneurship refers to taking these to the market with the risks involved – discussion of the issues involved and the support provided often merge the two.

The aim of innovation support – whether from universities or from Government – is to unlock the capacity of universities and their staff for innovation, bringing to bear their theoretical knowledge into exploitable goods and services. So in order to support innovation it is necessary to provide encouragement and infrastructures. There is widespread recognition of this, and a multitude of ground breaking actions aimed at encouraging innovation activity.

The policy goal for innovation support for universities should remain broad: to enhance the economic and the social impact of universities. Innovation is about people as well as about discoveries and products. It is not just to promote scientific innovations to help develop new technologies or industries; nor is it just to ensure universities are helpful to existing industries; nor even just to assist specific regions with economic development agenda. The goals – and so the incentives - have to be broad enough to encompass all of these. So support of innovation needs to remain very diverse as each university should respond to external needs in its own way, and it is vital that any support that the Government provides should not lead to straight jacketing or even to a narrowing of focus.

The overarching policy objective should be to instill economic and social impact as 'values' within universities, and the first step in this respect must be to internalize economic and social impact as end goals in the institutional, and individual, thinking. Without that, innovation activities risk being seen as no more than income generating opportunities and institutions would simply maximize their own revenues rather than worry about the wider economic and social impacts. In contrast, some of the best US universities have a culture that means they would, for example, choose 'openness' over patenting if that was a more effective route for generating public benefits.

On the other hand, many innovation-related activities can – though not as a core purpose - also lead to additional income for universities, and it is not obvious how public funding should support such activities. In general, if the outcomes provide public benefit, the fact that the university also benefits should not inhibit public support.

To the extent that the law prohibits innovation and entrepreneurship, then we strongly urge that the law be changed. Far from entrepreneurial and innovative behaviour being suppressed, they should be encouraged. It is clear that the Government recognises the importance of encouraging innovation, as evidenced recently by the statement of Minister of Research, Technology, and

Higher Education M Nasir, to the effect that innovations should be generated by universities and absorbed by industry⁵⁸.

6.3.2. Lessons

The lessons from international experience with innovation activities include:

- Activities to support innovation on the one hand and entrepreneurship on the other overlap a very considerable extent. Although the concepts are logically distinct the supporting activities are not
- The approaches taken need to be broad, and the most important thing for universities is to understand that those that are most successful in innovation have an innovation culture that permeates every aspect of their activities – from the design and content of their undergraduate programs right through to the research that they conduct
- The broad policy goal for innovation should be to enhance the economic and social impact of universities, not only, but including, by exploiting the results of the research conducted by their faculty
- Governments can play a key role by providing seed funding to enable universities to move promising research results into innovative projects
- People are often at the heart of successful innovative activity – for example making students and faculty available to businesses to enable them to resolve problems. Again, governments can help by creating programs that systematize that sort of activity
- There are technical issues connected with innovation that are generally beyond the competence of individual faculty and students, which universities can help resolve by providing a central service. Technology transfer offices, centrally located, can play an invaluable role in helping innovators tackle technical issues like intellectual property rights.

6.3.3. Entrepreneurship

The promotion of entrepreneurship is beginning to be regarded as increasingly important, as countries seek to develop their economies. There are good economic reasons for public encouragement of entrepreneurial activity: to the extent that entrepreneurs create businesses and jobs, they play an essential role in economic development.

In the United States even, a well-developed economy, small start-up businesses are reckoned to account for the great majority of the 2 million new jobs created over the past few years. And entrepreneurship, of course, takes place throughout the economy, not just at the high end, and not just among universities, university graduates and university faculty. Nevertheless, given the sort of economy that Indonesia seeks to develop, increasing the role of a higher education in developing entrepreneurship – both among students and among faculty – is likely to be extremely important. Universities have a role not just to provide entrepreneurship training but actually to positively encourage entrepreneurship among students and faculty.

A McKinsey Global Institute (MGI) report on entrepreneurship indicated that there are three pillars to the platform that enables innovation and entrepreneurship to flourish, and universities are increasingly driving or involved in each of these factors:

- Developing fertile innovation ecosystems,
- Creating an entrepreneurial culture, and

⁵⁸ As reported in Media Indonesia August 21 2015

- Providing sustained financing for new ventures.⁵⁹

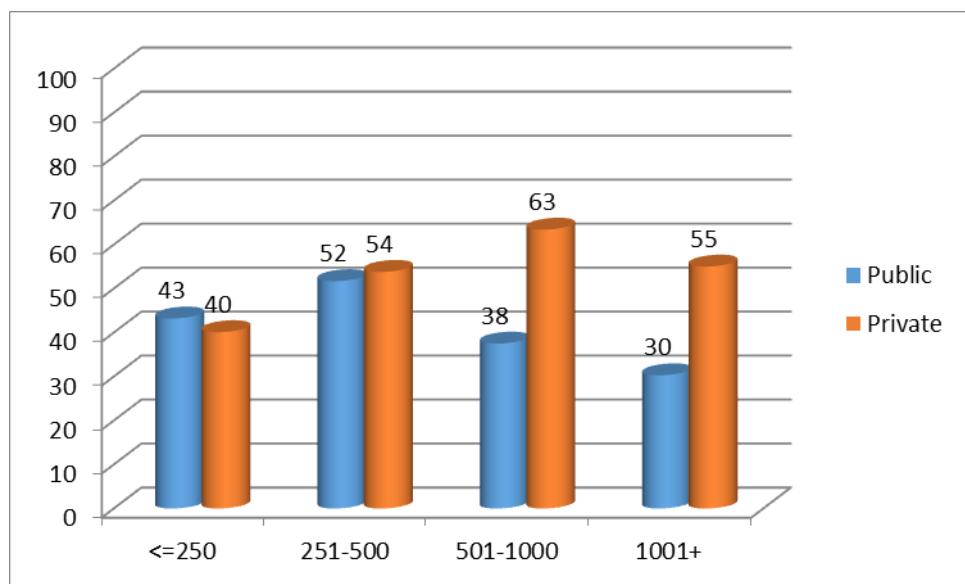
Foremost, creating an innovation ecosystem is critical for the long-term success and quality of entrepreneurial activity.

Many countries have recognised this, and entrepreneurship support of various kinds is offered widely.

A recent Word Bank report on Entrepreneurship discusses experience in a wide range of countries, and the same report covers the questions of research and innovation as well as entrepreneurship.

The perception of universities themselves appears to be that they are active supporters of innovation and entrepreneurial activity. Figure 6.2 below shows that significant number of the institutions in our survey reported that they provide support for enterprises spun out of their universities:

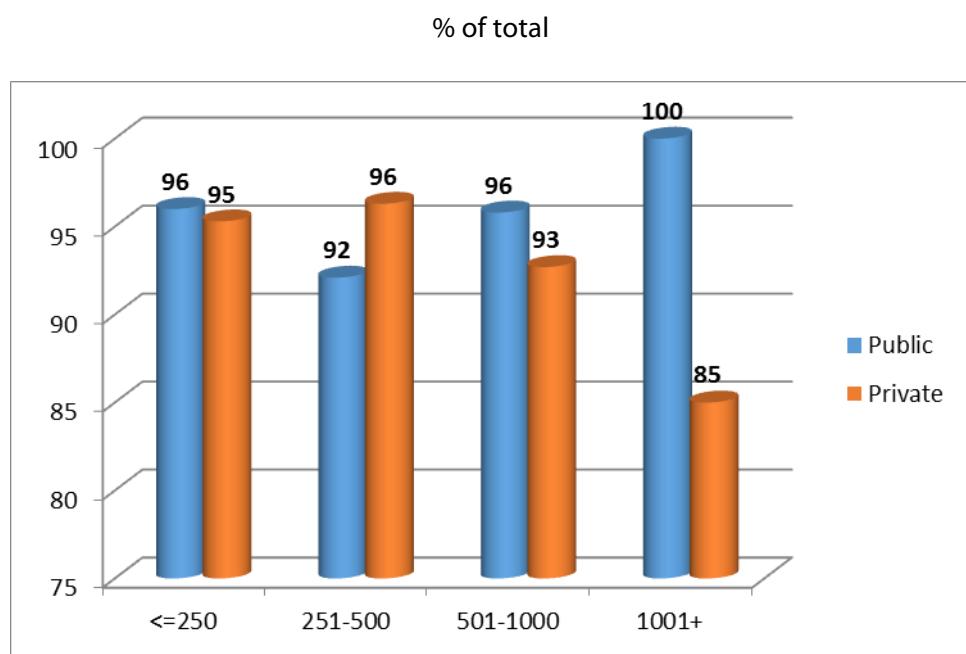
Figure 6.2 Universities providing start-up support for spin-out enterprises



And almost all reported that they offer courses in entrepreneurship, as will be seen from Figure 6.3 below:

⁵⁹ McKinsey & Company, "The Power of Many: Realizing the Socioeconomic Potential of Entrepreneurs in the 21st Century Economy," G20 Young Entrepreneur Summit, October 2011. See <http://www.mckinsey.com/locations/paris/home/The%20Power%20of%20Many-%20McKinsey%20Report-20111005.pdf>.

Figure 6.3 Universities offering courses in entrepreneurship



Despite these perceptions of universities of their own performance, on many objective counts entrepreneurial culture appears to be weak in Indonesia. For example, on the Ernst and Young G20 Entrepreneurship Barometer for 2013 Indonesia appeared in 29th place, in the ranking for 'Entrepreneurial Culture', just ahead of Russia in last place⁶⁰. And Table 6.5 below⁶¹ shows the Indonesia has the lowest density of new businesses (number of new businesses per 1000 population) in the region other than Philippines, Kiribati and Lao. Although it does have the second highest number of new companies that is simply a function of its size.

Table 6.5 New businesses created

Economy	Region	Year	New business density ▼	Number of new limited liability companies
Hong Kong SAR, China	East Asia & Pacific	2012	28.12	150,165
Singapore	East Asia & Pacific	2012	8.04	31,532
Timor-Leste	East Asia & Pacific	2012	2.76	1,686
Vanuatu	East Asia & Pacific	2009	2.34	311
Malaysia	East Asia & Pacific	2012	2.28	45,441
Tonga	East Asia & Pacific	2012	1.91	114
Samoa	East Asia & Pacific	2012	1.04	112
Thailand	East Asia & Pacific	2012	0.86	41,210
Indonesia	East Asia & Pacific	2012	0.29	47,549
Philippines	East Asia & Pacific	2012	0.27	16,143
Kiribati	East Asia & Pacific	2011	0.11	7
Lao PDR	East Asia & Pacific	2011	0.1	

Source: World Bank Group 'Doing Business'

⁶⁰ "The Power of Three" Accessed 4 June 2015 [http://www.ey.com/Publication/vwLUAssets/EY-G20-country-report-2013-Indonesia/\\$FILE/EY-G20-country-report-2013-Indonesia.pdf](http://www.ey.com/Publication/vwLUAssets/EY-G20-country-report-2013-Indonesia/$FILE/EY-G20-country-report-2013-Indonesia.pdf)

⁶¹ Taken from World Bank Report <http://www.doingbusiness.org/data/exploretopics/entrepreneurship> accessed 4 June 2015

It is no surprise, therefore, that the Indonesian government has recently – in the RPJMN 2015 development plan - stated its desire to promote entrepreneurship and has encouraged education institutions to do likewise. The RPJMN 2015 development plan policy repeats the sentiments of Dr. Gusti Muhammad Hatta, the previous Minister of Higher Education who was quoted in Forbes magazine as saying⁶²

"We need more entrepreneurs. Entrepreneurship is weak here, thanks to a cluster of dominant natural resource industries such as mining and agriculture that have had their way with regulators for too long, difficult access to capital for small businesses, and poor education for would-be entrepreneurs. The result: one of the lowest rates of new business formation in Asia.

It is also a cultural problem. Indonesians are far less likely to want to start their own business, based on a Global Entrepreneurship Monitor study, that found that 14.5 per cent of Americans and 7.2 per cent of Singaporeans want to do so, but fewer than 1 per cent of Indonesians

A strong entrepreneurial sector can create employment and other business opportunities that a handful of legacy industries cannot hope to match."

Some of the most successful international models of support for entrepreneurship are university-based, and assist students and faculty to develop and market the results of their research, sometimes to the great benefit of universities themselves. These models involve

- Programs to help university students develop entrepreneurial attitudes and skills
- Support for faculty who wish to engage in entrepreneurial activity (and encouragement to them to do so)
- Incubators and similar support where new businesses can operate and share facilities and consult with experienced businessmen and women, and where they can gain access to venture capital and other resources. In some countries, grants can be given to universities to establish incubators to serve the academic community and others.

6.3.4. Lessons

Development of entrepreneurship seems to be increasingly recognised as a key to economic development, with the majority of new jobs - particularly in advanced industries – being created in small and start-up businesses. This is clearly recognised in Indonesia where the Government has expressed its wish that entrepreneurship should be fostered.

It appears to be generally agreed that the most important thing in encouraging entrepreneurship is to foster an entrepreneurial culture and attitude among faculty and students.

One way of doing this is to run entrepreneurship courses for students throughout a university. While there are in existence full Bachelors or Masters programs in entrepreneurship those appear to be less important than more generally developing the culture with shorter optional courses.

Fostering entrepreneurship among faculty is as important if not more so. Universities need to encourage entrepreneurial activity among faculty both by ensuring that the rules do not inhibit this (for example rules about time spent on private activities and about private earnings) but also

⁶² "Indonesia Minister: We Need Four Million Entrepreneurs," Forbes website, [forbes.com](http://www.forbes.com/sites/donaldfrazier/2012/05/14/indonesian-minister-we-need-four-million-entrepreneurs/), accessed 29 May 2015

that, as with innovation activity, they provide the infrastructure support to enable entrepreneurs to thrive within the university – things like the technology transfer offices already discussed.

One specific and productive way in which universities can encourage entrepreneurship among students and faculty is to provide start-up or incubator facilities. Not all Universities should do this, but this is an area where cooperation between universities could provide significant benefit. This is something that the Government may consider encouraging with a seed funding program.

6.4. Conclusions and Recommendations – Actions for Indonesia

It is clear from the various reports that have been produced by international and local bodies that Indonesia is well behind many of its regional competitors in its development of research and innovation, and it would be unrealistic to expect a general improvement on a large scale in the short term.

What is inescapable is that strength in basic research is key and that is something that needs to be developed, and it is to be hoped, with the increase in funding for the Ministry of Research, Technology and Higher Education and the creation of the Indonesian Science Fund, will now begin to flourish in Indonesia.

There is a balance to be struck between supporting excellent research and building capacity. The best approach, as proposed by the World Bank in its report "Putting Higher Education to Work Skills and Research for Growth in East Asia" would be to invest selectively but substantially in a relatively small number of institutions in order to boost their research capacity and output, but do so in a way that might have spin-offs for other institutions. It will be for the Indonesian Science Fund to consider its strategy in this respect, but requiring principal investigators and the universities to form some sort of relationship with others as a condition of project grant funding might be a worthwhile approach.

The aim should be to encourage cooperation and clusters so that every region has at least one research university that aims to be of national significance and a beacon for research into the topics of research significance for that region; and that each province has at least one university where significant research activity takes place – though at a lower level of intensity than in the regional research universities. And the aim should be that ultimately 3 or 4 universities in the country develop their research capability to be world class. This will not be achieved swiftly, but that should be the aim. This will need strategic planning, and strategic investment, and should be a responsibility placed on the Indonesian Science Fund, to work through with the relevant national, regional and provincial authorities.

And those same institutions where basic research is developed will be the natural homes of measures to support innovation – and in particular the development of incubators and science parks. These can be self-financing, but may need encouragement with start-up seed funding, and that will be something for the Government to consider.

However, the development of entrepreneurship is repeated regularly in the various studies that have been conducted as being as much to do with attitude of mind and awareness of possibilities as with the availability of those possibilities, and that is something that should be widespread throughout the higher education system. All universities should be encouraged to develop entrepreneurship programs – which can be done collaboratively between institutions, not necessarily discretely by individual institutions, and again this is something that might be centrally encouraged by the Government. And of course, although it should be expected that the most

research intensive institutions are also those most engaged in innovation, that does not mean that other institutions should not also be so engaged.

Once a basic entrepreneurial approach takes hold, other measures will follow – providing services to local industry, seeking out and facilitating venture capital and so on.

Our recommendations follow from the above analysis.

There should be increased and targeted funding for basic science – targeted both in the sense of identifying strategic topics, and also identifying those institutions where research is to be concentrated, and where funding is to be principally directed.

We recommend that this ought to be achieved as a result of a systematic review by the Indonesian Science ISF of research strengths - strategic topics, the most promising people and the institutions with the greatest potential - around the country.

And we recommend that the aim should be that every region has at least one research university, that each province has at least one university where significant research activity takes place, and that ultimately 3 or 4 universities in the country develop their research capability to be world class.

In order to be able to bid for and conduct research projects institutions need to have research capacity and infrastructure – both staff and facilities. In the circumstances of Indonesia which is substantially regionalized, and where most universities are private, **we recommend that project grants from grant awarding bodies should carry a sufficient overhead.**

Collaborative research projects with international collaborators should be encouraged. We recommend that one way of doing this would be to include within the ISF a program explicitly for projects conducted with international collaborators

In order to address the problem of the lack of suitable faculty capable of conducting research of the highest quality, **we recommend that there should be a focused campaign, explicitly concentrated on drawing Indonesians undertaking research in overseas institutions to return to a relatively small number of Indonesian universities.** It should be borne in mind that it is not only salary enhancements that will be effective in achieving this, but facilities and opportunities to pursue their research and further their careers.

Another approach to the need to build up a cadre of research active faculty would be to enable universities to send faculty abroad to undertake PhDs with the requirement that they return to their parent university. **We recommend that a programme to finance faculty to go abroad to undertake PhDs could be financed by the Government and administered through the Indonesian Science Fund,** which will need to take particular account of the great disparity in faculty qualified with PhDs in public and private universities and between regions. This will need to be taken into account in the review by the ISF that we recommend above.

There are technical issues connected with innovation that are generally beyond the competence of individual faculty and students, which universities can help resolve by providing a central service. Technology transfer offices, centrally located, can play an invaluable role in helping innovators tackle technical issues like intellectual property rights, and **we recommend that the Government should encourage those universities in receipt of Government funds – whether through the ISF or otherwise – to establish central services like technology transfer offices.**

We recommend that all universities should be encouraged to develop entrepreneurship programs for students – which can be done collaboratively between institutions, not necessarily discretely by individual institutions, and again, again, again, we recommend that the development of entrepreneurship programs is something that might be centrally encouraged by the Government.

Fostering entrepreneurship among faculty is as important as measures to stimulate entrepreneurship among students, if not more so. **We recommend that universities should encourage entrepreneurial activity among faculty both by ensuring that the rules do not inhibit this (for example rules about time spent on private activities and about private earnings) but also that, as with innovation activity, they provide the infrastructure support to enable entrepreneurs to thrive within the university – things like the technology transfer offices already discussed.**

The Government needs to do the same. **We recommend that to the extent that the law may need changing to ensure that there is no doubt about the ability of faculty to engage in entrepreneurial and innovative activity then the law should be changed.**

One specific and productive way in which universities can encourage entrepreneurship among students and faculty is to provide start-up or incubator facilities and science parks. Not all universities should do this, but this is an area where cooperation between universities could provide significant benefit. **We recommend that the development of incubator facilities and science parks is something that the Government should consider encouraging with a seed funding program**

Specifically, **we recommend that the Government should nurture entrepreneurship among faculty by co-financing science parks located in universities and providing financial incentives to universities to encourage innovative activity among their faculty** by rewarding patents granted, spin-off companies created and so on. Care will be needed not to provide perverse incentives – such as the filing of trivial patent applications, or creating fictional companies. **One government action demonstrated to be effective elsewhere is to provide dollar for dollar funds for any money generated by universities from entrepreneurial activity and we recommend that the Government should consider such a programme.**

7. Strengthening the Labour Market Information System in Indonesia

In this chapter we look at measures that can strengthen the labour market information system (LMIS) in Indonesia in order to better match the graduate output from the educational institutions with the needs of the labour market. A number of actions were undertaken to address this issue:

- A review of international best practice in the development of LMIS was conducted.
- A survey was conducted of government institutions involved with the development and dissemination of labour market information
- Recommendations were developed to strengthen the LMIS in Indonesia and promote a more demand driven education system.

7.1. Review of International Best Practice in LMIS Development

We undertook a review of international best practice in LMI's development to address one of the key activities for the study to 'Link the Master Plan for the Acceleration and Expansion of Economic Development to Programming in the Education Sector'; that is to review international best practice in the development of labour market information systems (LMIS) in selected countries and the methods they use to identify skills gaps and shortages linked to projections of labour demand and economic development. That complements the findings from the surveys conducted as part of the study to identify how government departments, education institutions, and employers in Indonesia are making use of labour market information (LMI). The overall objective is to develop recommendations to improve the current LMIS and skill forecasting system in Indonesia.

7.1.1. Background to the review

Determining and predicting skill needs in labour markets has been one of the central tasks facing manpower planners and labour market analysts over the past four to five decades. In the 1960s and 1970s policy-makers attempted to identify the precise nature of their human resource requirements using complex, econometric manpower planning models which were initially developed by the OECD and subsequently used, at least to a certain extent, in many developing economies. This approach was in accordance with a development model which allowed for strong involvement of the government in the economy, and a focus on the "formal" part of the labour market. It was an exponent of the belief that economic growth and development could be planned, and that development would soon result in benefits for the population as a whole.

A number of factors have contributed to the gradual demise of detailed manpower planning. In methodological terms, the most significant limitation of the original manpower requirements approach is the assumption that a fixed relationship exists between labour and the quantity of goods and services produced, as well as between labour productivity and education or skills. However, after decades of experience it is recognized that labour markets are more complex and labour market actors are more unpredictable than these econometric models assume. In reality the relationship between economic output, as measured by gross domestic product (GDP), and employment levels is more dynamic, affected by changes in technology, new forms of work organization, migration and, in many developing countries, widespread disease such as malaria and AIDS. Perhaps just as important as methodological shortcomings, economic planning had become increasingly controversial during the 1980s in political as well as policy terms. Economic policies became focused on the role of markets and the management of crises, leaving less scope for detailed interventions such as those suggested by manpower requirements forecasting.

Neither the demise of traditional manpower planning, nor the blessings of the market, have fully resolved labour and manpower issues in developing economies, and the question has remained how to ensure that education and training policies are in accordance with economic development and labour market needs. Successive waves of economic as well as education and training reforms during the 1980s and 1990s have left many developing economies struggling with the issue of how to inform market-based or demand-driven skills development, and how to forge effective links between skill formation and economic development.

Skill formation has become more important in the context of the emergence of the knowledge economy. Ironically, some of the factors that make labour markets and skill needs difficult to predict, such as rapid technological change, innovation, and changes in work organization, have also contributed to a dramatic increase in the value of knowledge for economic success. In meeting the needs of the knowledge economy, industrialized as well as developing countries have widely adopted the framework of lifelong learning to shape education and training strategies. Such strategies require skills development policies that allow people to take charge of their own knowledge and skills development in a complex and rapidly changing economic and social environment. Development of these strategies has not reduced the need for information on future skill needs, but does have implications for the type of data and analysis that is involved.

Labour market information and analysis (LMIA) is increasingly becoming important in identifying and quantifying current and future skills issues and to provide the information needed by employers, workers, providers of education and training and governments to make choices in education and training investments.

The review of current literature on the development of labour market information systems reveals three major points:

- Basic labour market information and analysis is a necessary precondition for the early identification of skill needs
- The early identification of skill needs becomes more complex as economies develop and better integrate into the global economy, and will increasingly rely on various methods based on both quantitative and qualitative information
- Apart from the production of information on the early identification of skill needs, it is important that institutional arrangements are in place to translate information into policy action, which should be aligned to broader economic policies, including trade, investment and technology policies.

7.1.2. Elements of successful LMIS in different countries

In general what distinguishes the development of LMIS in more advanced countries from less developed countries is the capacity to generate, analyse and disseminate LMI from a variety of sources to benefit a broad spectrum of users. As part of the review of international best practice four countries were assessed: Canada, Singapore, Hong Kong and Australia.

7.1.3. Canada

LMI is clearly recognized in Canada as a public good which should be freely accessible to all. The Government of Canada has placed a high priority on LMI over the last two decades. Public investment in such information has been considerable, and the products impressive. This effort resulted in a highly developed LMI system, enabling Canadians, including public policy makers,

employers, workers, job seekers and educational institutions, to make informed labour market decisions.

Complex, decentralized, and involving many players, the LMI system in Canada is structured to reflect the constitutional and legislative divisions of responsibilities between federal and provincial/territorial governments in education, training, and labour market matters. It is also designed to adapt to cultural and ethnic diversity and to reflect economic developments in Canada's labour market.

The Government of Canada plays a significant role in the production of LMI. Increasingly, this role is shared with provinces/territories as many have requested the transfer of federal funding and responsibilities through Labour Market Development Agreements (LMDAs). At the federal level, four departments and agencies are key LMI providers: Human Resources Development Canada (HRDC), Industry Canada, Citizenship and Immigration Canada (CIC), and Statistics Canada.

HRDC is the main department responsible for Labour Market Information. Its activities include producing labour market data and providing key LMI resources at the national, regional and local levels; participating collaboratively with other departments such as CIC, and developing strategic plans to continually improve the efficacy of the LMI system; and enhancing quality and access of LMI through directly funding organizations.

Statistics Canada is the national central statistical agency that collects and produces data related to LMI. It conducts a Census every five years and hosts many surveys such as the Labour Force Survey (LFS), Workplace and Employee Survey (WES), Survey of Employment, Payrolls and Hours (SEPH), and the National Graduate Survey (NGS), which provide policy makers with a solid foundation for analysis

Provinces and regional territories in Canada play an important role in collecting and distributing LMI. Through the Labour Market Development Agreements (LMDAs), the provincial and territorial governments have transferred labour market services from the federal government (Alberta, Manitoba, New Brunswick, North West Territories, Nunavut, Quebec and Saskatchewan) or co-manage labour market services with the federal government (British Columbia, Newfoundland and Labrador, Nova Scotia, Prince Edward Island and Yukon). Ontario is the only province which still receives labour market programs directly through HRDC. Federal and provincial co-ordination in relation to labour market matters is managed through the Forum of Labour Market Ministers (FLMM), which established a Labour Market Information Working Group to co-ordinate federal, provincial and territorial governments' work for more accurate and relevant LMI.

Most provinces and territories (except Quebec) have established a one-stop information platform that produces and disseminates LMI for their own residents through the initiative Canada WorkInfoNet (WIN), which provides three types of information: career planning, learning and employment. Usually, the LMI users targeted are job seekers and employers, with a particular emphasis on youth, recent immigrants, aboriginal people, and persons with a disability.

Canada's LMI collection mechanisms are among the best in the world as assessed by the OECD. There are several reasons for this. First, an elaborate network consisting of a number of information experts, methodologists, statisticians, economists, researchers and analysts is brought together.

Second, due to a good relationship between LMI collection agencies at the national level (i.e. Statistics Canada) and the provincial or territorial level, ensures that information can be gathered in a timely manner. For example, Statistics Canada gathers data through such vehicles as the National Census, Labour Force Survey, WES and other specially-designed surveys at the national level, and

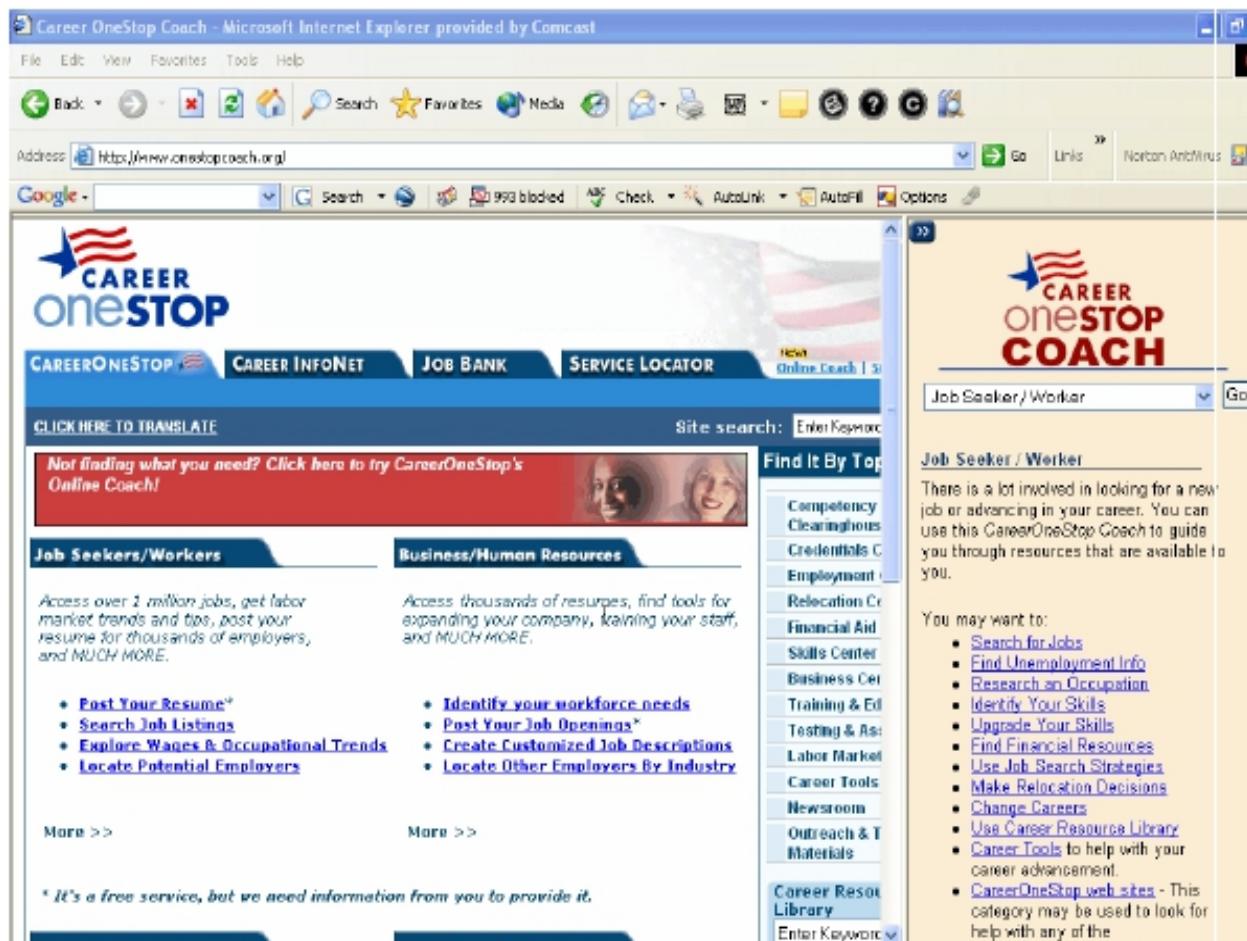
provincial LMI collection agencies also conduct numerous surveys as Statistics Canada's liaisons. Third, the Forum of Labour Market Ministers plays a key role in coordinating the different provincial governments and building a wide range of national and local LMI networks.

A computerised National Labour Market Information System exists in Canada which provides general and detailed information on local labour markets across the country. Human Resources Development Canada (HRDC), under the Ministry of Human Resources Development is at the helm of the LMIS in Canada. It has a network of 10 Provincial/Regional Offices and more than 320 local offices across the country from where its services can be accessed. Local Offices are referred to as Human Resources Development Centres. These centres are one stop shops which offer a wide assortment of on line self-services to employers, job seekers, students, potential entrepreneurs, the retrenched and the retired, etc. These offices are closely networked and computers with Internet access are available for use freely by different users. The National HRDC Labour Market Information Site provides information on occupation, job seekers, industry sectors, and the changing nature of the world of work and current labour market trends. Each Provincial/Regional Office generates information on occupational profiles, labour market reviews and labour market bulletins.

The Canadian LMI system promotes strong linkages between the education institutions and the labour market. It recognizes the importance of providing tools to help students better utilize information, with or without assistance from counsellors or career practitioners. In Canada the approach has been to integrate career planning into the educational system. Just as lifelong learning is quickly becoming the norm for many participants in the labour market, career planning and decision making are lifelong processes and teaching career decision-making skills may help individuals throughout their lifetimes as they make major decisions on education, training, and job choices. In Canada for instance public and private organizations have undertaken several initiatives to educate students on career planning. They recognize the growing interest of students in the internet and the influence of user friendly concepts such as gaming. For example Human Resources and Skills Development Canada has introduced a number of initiatives:

- The Real Game Series, which introduces career planning through a game approach with various versions designed for different student populations including university students. This program is now available to students in a number of different countries outside of Canada.
- The Job Futures site operated by Services Canada provides easy access to key information for career planning as well as a simple "Know yourself quiz."
- The development of Web "online coaches" (See Figure 7.1 below). The online coaches allow a user to respond to a series of questions or options that then move the user through the system. The online coach allows a student or other user to respond to a series of questions or options that then guide them through the system.

Figure 7.1 Career one stop coach website



7.1.4. Lessons learned from the Canadian LMIS

Canada has a comprehensive LMIS in place. The main characteristics of Canada's system are as follows:

- Central government through the HRDC has had a significant role in all LMI areas, by delivering, initiating and funding LMI products. Industry Canada, Citizenship and Immigration Canada, Statistics Canada and provincial governments are also major players in the production and distribution of LMI.
- Canada has a decentralized system with extensive provincial and regional input into the collection and dissemination of LMI. The LMI is exchanged at all levels and results in effective labour forecasting and skills development. In addition labour market committees operate in many regions and they are responsible for advising and making decisions on labour market matters.
- The LMI delivery mechanism combines various delivery channels with various distribution formats. Internet and CD-ROM based LMI is growing rapidly in Canada. Traditional delivery channels, such as class-based activities and printed publications, are also widely used to ensure accessibility. There is very good co-ordination of LMI data-collection and delivery between the national and provincial/territorial levels. These arrangements are rightly claimed to be among the best in the world according to the OECD.
- The LMI system makes extensive use of information and communication technologies (ICT) tools. Canada makes significant use of ICT in its provision of LMI products. The web-based LMI

has been well organized through both the public and the private sectors. This arrangement maximizes access to labour market information and reduces the costs in the provision of LMI.

7.1.5. Singapore

The Ministry of Manpower (MOM), formerly the Ministry of Labour is responsible for co-ordinating the LMIS in Singapore. It is also responsible for the overall co-ordination of labour forecasting, development and management activities in Singapore. Its Manpower Planning Department (MPD) is tasked with the labour forecasting function. It performs three main roles:

- Labour forecasting and analysis of employment trends
- Formulation of policies
- Collection and dissemination of LMI

Singapore's labour forecasting strategy is strongly built on the principle of tri-partism, which means that the social partners are jointly responsible for the successes and failures to be derived from manpower policies and programmes. The Government mainly plays a coordinative and facilitative role through the provision of timely and accessible labour market information and analysis.

Singapore is one country that is now addressing the development of sectoral plans to address the skill requirements within industry sectors up to the year 2020. Through the Skills Future programme sectoral manpower plans will comprise three components: the economic outlook in each sector, how they will develop in the coming years and the manpower and skills that will be required. The sectoral plan will spell out how companies can attract, retain and develop a deep pool of talent in their sector. The intention is to ensure that all Singapore citizens at different stages of their career development can obtain relevant skills that will advance their careers. The sectoral growth clusters identified so far include advanced manufacturing, health sciences, logistics and aerospace and global financial services. A key component of the Skills Future programme will be developing the workforce in small and medium enterprises and involving them in the process of skills development.

In 2000 Singapore launched 'The Manpower 21', which is a strategic blueprint policy framework to guide the process of manpower development. This was a result of joint effort between the MOM, the NTCU, educational institutions, as well as representatives of industries and community groups. This strategic manpower vision has received full support from the government and the total commitment of all the stakeholders who have agreed to uphold the objectives of Manpower 21 and work towards their attainment. The Manpower 21 has in total 41 recommendations, and each of them clearly specifies the partner agencies responsible for the execution of each recommendation. Of particular interest are the first two recommendations. In the first recommendation:

'Singapore seeks to establish an enhanced Manpower Information System to provide relevant labour market information to policy makers, employers, training providers and individuals to enhance manpower planning and policy formulation and to facilitate an efficient labour market'

And in the second recommendation:

'To establish a National Manpower Council (NMC), chaired by the Minister of Manpower to set strategic directions and oversee national manpower planning, development and augmentation strategies and targets'.

Thus, at the helm of the manpower planning framework is this tripartite body, whose other members include the Minister of Trade and Industry, Minister of Education, and Communication and Information Technology, Singapore National Employment Federation, National Trade Union Congress and representatives from economic agencies and government ministries. The Manpower Planning Department is the secretariat to the NMC.

The production and analysis of LMI in Singapore is aimed at satisfying the LMI needs of policy makers, industrial users, education and training institutions, public agencies like Employment Services concerned with labour market issues, as well as the general public. The major producers of LMI are the MOM, through its Manpower Research and Statistics Department (MRSD) and the Ministry of Industry, through its Department of Statistics. Other producers include, universities, research institutions, employers and employee organisations.

The MRSD generates labour statistics from a variety of surveys, i.e.; labour force surveys, establishment surveys, administrative records and research studies. Quantitative statistics collected from surveys and administrative records is complemented by qualitative information collected from interviews with industrialists through the industry visits programme.

The Employment Trends and Outlook is a major publication produced by the Manpower Planning Department (MPD) and its partners. It pulls manpower information from various sources into a single publication, serving as a one-stop reference guide on manpower statistics, issues, trends and outlook pertaining to each industry. It can also be downloaded free of charge from the Internet. This report serves as a useful reference for individuals, companies, training institutions and planners when devising manpower strategies and programmes. The main sources of information from which this publication draws are also provided in the publications, these include:

- -Manpower Demand and Skills Needs Survey (MOM and its partners)
- Economic Survey Series (Singapore Department of Statistics)
- Yearbook of Statistics (Singapore Department of Statistics)
- Mid-Year Labour Force Survey (MOM)
- Occupational Wages Survey (MOM)
- Labour Market Survey (MOM).

The MRSD also produces a 'Manpower Statistics Brief', a pocket sized booklet which provides easy reference of key manpower statistics in Singapore; and the Profile of the Labour Force of Singapore, which outlines the labour force changes and trends over a ten year period. Various other occasional papers, such as "Manpower News" are also published.

The Manpower Planning Group organises bi- monthly meetings with MOM and the relevant Economic Agencies and representatives of specific sectors. Discussions focus on manpower trends, problems and prospects in specific sectors, and these are complemented by industry visits.

An Employment Review Committee meets 2-4 times a year, to review position papers affecting employment in selected sectors, as well as industry sector manpower and training needs among other issues.

The Computerised Time Series Database is a Public Access Time Series (PATS) set up by the Department Of Statistics (DOS) to enhance the accessibility of LMI to the general public. Subscribers can retrieve up-to-date statistics from various sources without having to search in different locations. Data can easily be downloaded and kept on individual PCs.

The evaluation of LMI is done by the DOS, which is the national statistical coordinator. It conducts regular surveys of public sector organisations and monitors their statistical activities.

7.1.6. Information Dissemination Practices

Information collected from different surveys is analysed and published in various publications. Hard copies are available at cost to members of the public and free of charge to organisations actively involved in manpower planning and development. Soft copies can be downloaded free from the Internet site of the MOM.

7.1.7. Lessons learned from the Singapore LMIS

The multi-agency collaborative approach to labour forecasting adopted by Singapore shows its commitment to developing a highly competitive workforce to support its knowledge driven industries as well as provide a strategic fit between demand for and supply of labour, which is paramount to sustained economic growth. In this integrated approach to labour forecasting the MOM, seeks to ensure that the vision and goals of its partners (private sector, unions, other government agencies, as well as its international partners) are aligned to a national manpower vision. Manpower planning issues are thus examined from a totally national perspective, with an integrated and comprehensive strategy for meeting the national manpower needs in numbers and quality.

The greatest challenge for Singapore's MOM is to facilitate an efficient labour market through the provision of timely and reliable labour market information, which makes it possible for policy makers, employers, training institutions, students and other labour market participants to make informed and timely labour market decisions.

Greater efforts and resources are being committed to improving data availability through the publication of easy to read material as well as free downloads of information publications/statistics over the Internet.

The MOM seeks to continuously improve the monitoring of the impact of structural transitions on workers, data collection on the extent of adult training and adoption of new non-standard work arrangements.

Singapore's use of sectoral development plans is an innovative approach to matching the needs of the growing labour market with outputs from the nation's education institutions.

7.1.8. Hong Kong

The Hong Kong Special Administrative Region (SAR) is part of the People's Republic of China, but retains a separate political governance structure and economic system. Hong Kong, has a highly successful economic record as it has achieved growth rates of over 5 per cent during a period of 25 years or more. A number of factors have resulted in Hong Kong's reputation as a leading manufacturing and service centre in Asia. Perhaps the most important amongst these are: free enterprise and free trade; the rule of law and a well-educated workforce.

Despite having a very hands-off policy towards the economy, the government plays a significant role in supporting the development of vocational skills. Perhaps the most significant organization influencing skill formation is the Education and Manpower Bureau, whose responsibility is to:

- Provide a well-trained workforce equipped to meet the demands of a dynamic economy; and
- To contribute to the overall economic competitiveness of Hong Kong.

Under the Education and Manpower Bureau is the Vocational Training Council (VTC), the largest provider of skills in Hong Kong, China. The VTC is a tripartite body representing the interests of employers, employees and academics. A total of 22 people sit on this board and together they determine overall policy and strategy for the sector. Emphasis is on pre-employment training and programmes of study leading to a diploma or higher diploma-level qualification, and on developing practical competencies. Around 70 per cent of the time in many programmes is spent on practical activities and the remaining 30 per cent on theory. An estimated 160,000 young people graduate from the VTC each year.

The Education and Manpower Bureau is responsible for the following program areas:

- Kindergarten education,
- Primary education,
- Secondary education,
- Special education,
- Tertiary education,
- Vocational training and employees retraining,
- Construction industry training,
- Employment services,
- Labour relations,
- Employee's rights and benefits and
- Occupational safety and health.

The first program for these different areas was developed in 1997, covering a ten-year period. The Government is now in the process of developing a second program. Within each of these programs emphasis is on broad aims, as opposed to specific outcomes or targets.

With regard to skills and TVET the mandate of the Education and Manpower Bureau is to advise the Government on the coordination, regulation and promotion of vocational post- secondary and continuing education sectors. In addition, the Bureau advises on future skill needs and on the disbursement of funds to training providers. As specified previously, under the Bureau is the Vocational Training Council, the largest provider of skills in Hong Kong, China. Under the VTC are 21 vocational training boards (VTBs) covering all sectors of the economy, the composition of which are tripartite. These boards meet every six months to review their sector and to provide feed-back to the VTC on any important trends within their sector. A number of other bodies report to the VTC including the Employees Retraining Board (ERB), the Apprenticeship unit, the Clothing Industry Training Authority (CLITA) and the Construction Industry Training Authority (CITA).

The final scheme, the Skills Upgrading Scheme (SUS) was launched in 2001 to enhance the employability of low-skilled workers by providing them with industry-specific skills. However, in order to claim a grant, the training has to occur in an expanding industry and one that employs a

significant amount of local people. A total of 24 industries have been identified for skills upgrading. The purpose of this scheme is to enable low-skill workers to become more employable in sectors that are expanding.

More recently, the Government has endorsed the country's qualification framework, consisting of a hierarchy of seven levels, each of which contains generic descriptions. The development of the different competencies are the responsibility of the Industry Training Advisory Committees, consisting of employer associations, trade unions, professional bodies and other bodies. The Education and Manpower Bureau is responsible for helping to establish these committees and so far nine have been established in the following areas:

- Watchmaking and clock manufacturers
- Printing and publishing
- Chinese catering
- Hairdressing
- Property management
- Electrical and mechanical services
- Jewelry manufacture
- Information and communications technology and
- Automotive.

7.1.9. Organizations involved in the LMI process

The Education and Manpower Bureau, in combination with the VTC, is responsible for tracking skills that are in high demand, and has a particular focus on the demand and supply of skills in sectors that are strategic to the development of Hong Kong. At present the following sectors have been defined as strategic by the Economic Development and Labour Bureau:

- Financial services
- Trading and logistics
- Tourism
- Professional services
- Creative industries
- Information technology
- Information services.

Within each of these sectors the EMB identifies broad macro requirements for the medium term (three to five years). The intention is to provide a general reference or signal to planners, but not specific details on the numbers or type of occupations. The methodology involves a two-pronged approach, consisting of a number of quantitative projections and a series of qualitative studies. The quantitative projections identify demand for broad occupational groups in specific sectors and how they change over time. This is supplemented by a series of establishment surveys, mostly undertaken by the VTBs, as well as qualitative information. Each of these Boards undertakes a survey of skill requirements in their sector every two years.

The EMB determines the manpower requirements for a period of five to six years, allowing them to understand which sectors are most likely to expand and contract. Besides changes to the employment levels, the EMB predicts manpower requirements by major occupational categories. Having documented anticipated changes in employment levels within different sectors and the corresponding impact on the occupational structure of the labour force, the EMB anticipates the educational attainment over the same time period. The second component for understanding

demand involves the 22 Vocational Training Boards, each of which undertakes an annual manpower survey.

One of the first issues to be investigated by each of the Vocational Training Board's surveys is the structure and characteristics of their sector. Similarly, employers are asked how many new people will be employed over the next 12 months and in what occupational areas. Another important issue investigated by the survey are the minimal educational qualifications for those working in different occupations within the industry. This has important implications for helping to predict the future labour supply.

7.1.10. How LMI is used to inform and influence policy

Most of the labour market information produced by the EMB and the Vocational Training Boards is used to guide future policies. In response the VTC will review this information and where necessary influence the supply coming onto the labour market through the appropriate vocational training institution. In turn the activities of the VTC are guided by a strategic plan covering a period of eight years, but this is fluid and updated annually in response to new demands outlined by the VTBs. Attempts are also made to influence student choice through career campaigns and career guidance.

The way in which courses are funded also has an impact on student supply. For instance, where there is high economic demand for a particular programme of study, and one that requires high capital investment, tuition fees will be paid by the government. However, in subject areas where student demand is high and there is no capital investment, such as accounting or business studies, the government will not pay tuition fees. This strategy ensures that state investment occurs in strategic skill areas that the private sector would not support.

The provision of work visas is also used as a mechanism for obtaining skills not available locally. Under this process a firm has to advertise locally, and if they are unable to recruit an appropriately skilled person, they will have to approach the immigration board for a work permit. In turn, the immigration board will approach the VTC to find out whether this skill is in short supply. If the application is approved the employer will be required to pay a levy. This levy will be subsequently used to support the upgrading of local skills through the employees retraining scheme.

There are also two other bodies that respond to employment and skill needs, namely the University sector and the country's Employment Services. The University sector has no direct relationship with the VTC and reports directly to the Ministry. As a consequence the Universities are responsible for making their own decisions about the labour market, with the result that the majority identify what are the most appropriate courses for the market place.

With regard to the Employment Services, they offer a free recruitment service to employers and jobseekers. There are a total of 12 job-based centres and each is linked by an interactive employment website. This website enables employers to register their vacancies and jobseekers to register their CV. In order to support this process of matching vacancies to employee, there is a telephone employment service centre and a processing centre. The employment service centre handles over 600 calls a day and the processing centre receives around half a million vacancies from employers each year.

7.1.11. Lessons learned from the Hong Kong LMIS

Hong Kong provides an example of how labour market information and analysis can be used to develop a coherent framework for future policies, including an identification of future occupations and an indication of the growth and reduction in the number of people needed at different skill levels. This country example illustrates that despite the criticism of manpower planning, it still has a useful role to play in the planning process. However, the evidence also confirms that manpower planning is being used as a tool to signal broad changes in future demand, as opposed to providing a prescriptive blueprint.

The valuable lessons from Hong Kong relate to how the analysis of LMI is used to directly influence the output of graduates from the country's education system. The close synergy between the country's 22 Vocational Training Councils and the Vocational Training Board help ensure that labour market information has a direct impact on future supply. In this system there is also a deliberate attempt to understand future demand in a strategic manner and to carefully monitor how this changes over time for occupations in different economic sectors. The experience of Hong Kong also illustrates the importance of having the appropriate institutional structures in place to collect, analyse and utilize information. Moreover, within this approach there is a very short lead time between the identification of skills in high demand and changes in supply, ensuring that the TVET system is responsive to changing labour market demand.

7.1.12. Australia

In Australia, major labour market and education related governmental responsibilities are divided between the Commonwealth and the six states and two territories. The Commonwealth is responsible for public employment services, which have been largely contracted out to private providers. The states are responsible for providing schooling. The Commonwealth provides additional funding to the states for education. The provision of university education is primarily a Commonwealth responsibility. In addition, through the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), the Commonwealth works with states to identify national standards and priorities in the labour market and in the education system.

Generally, the public sector is the primary producer of LMI. In some cases, the public sector provides LMI directly; in other cases, it contracts out production to private LMI providers. In Australia, there is a larger private sector in the LMI field than in many other countries. The private sector works well under public management, providing comprehensive information to the general public. This can be viewed as one of the strengths of the Australian LMI system. Other features include:

- Efforts are made to offer students LMI in school in order to help youth understand the labour market and succeed in the initial transition from school to work. Recently, the Australian LMI system has become strongly influenced by two key policy issues.
 - The first is to promote Vocational Education and Training (VET) pathways in schools.
 - The second is the growing concern for school drop-outs. As a consequence the LMI system has concentrated more on forging partnerships across the traditional boundaries between educational institutions and employers.
- An increased focus on local labour market information through national initiatives such as the National Career Information System. There is a growing recognition of the need for coordination between national and state governments in order to address the changing needs of information users in the labour market. The LMI produced at the national level is mainly regionalized at the

state level, and the LMI produced by the states is more likely to have sub-state regional information. This makes it easier for the Australian LMI system to reflect labour market trends.

All of these strengths in the Australian LMI system help to ensure that LMI provides opportunities for Australians, in particular youth, to develop the skills that will enable them to manage their careers in the changing labour market.

7.1.13. Public sector LMI providers

The Commonwealth Department of Education, Training and Youth Affairs (DEST) and the Commonwealth Department of Employment and Workplace Relations (DEWR) are the key agencies that provide LMI to the public. State education/training authorities and ministries or sub-ministries responsible for employment provide local LMI across the country.

At the Commonwealth government level, DEST provides funding to national and local projects in order to encourage other public and private sector organizations to play a role in the provision of LMI in their sector or region. In addition, it promotes innovation and creativity in the field by funding organizations such as the Enterprise and Career Education Foundation (ECEF) which produces LMI related to local regions and supports local education-industry partnerships.

The main LMI sources produced or supported by DEST include the Job Guide, the Australian Courses and Careers Database (OZJAC) and the National Career Information System (NCIS).

As a national coordinator, DEWR also produces complementary LMI for all Australians. However, compared to DEST's LMI, DEWR's LMI focuses more on statistical information concerning occupations, employment by industry, job prospects and the availability of relevant training. The LMI products supported by DEWR include the Job Outlook, Vacancy Reports and National Skills Shortage List. All of them are located within the Australian Workplace portal website (www.workplace.gov.au). These products are not only presented online, but also distributed through hard copy publication.

At the state government level, there is considerable unevenness in the production and provision of LMI. For example, the state of Victoria has a Youth Employment Link (YEL) site, which includes localized occupational profiles and course information. Western Australia's GetAccess websites contain over 300 occupational profiles with a local labour market flavor. Some states have also developed LMI for specific clients. For instance, New South Wales has produced a range of resource materials for its aboriginal population.

7.1.14. LMI delivered through the educational system

State education authorities are involved in the production of career information through the development of curriculum materials, which increasingly have employment related content built in. However, state policies regarding the provision of LMI in schools vary considerably. For example, New South Wales has a full-time career adviser in each secondary school, complemented by school counsellors. The two roles are combined in the form of guidance officers in Queensland. In Western Australia, there is no state policy regarding the structure of career guidance provision and schools make their own decisions. In addition, the location of LMI in state curriculum frameworks varies. In some cases, it is located within personal development, health and physical education syllabuses. In others, it is located within social studies.

The provision of LMI is supposed to start in Year 7 or earlier. The main materials provided in school are the Job Guide and the OZJAC. These are usually supported by a variety of other activities,

including careers exhibitions, careers visits, university open days, guest speakers, information seminars, careers libraries and the like. The Real Game, a Canadian career and life skills program referred to above, was imported in some schools in order to improve the quality of LMI provided.

Technical and further education (TAFE) institutes are the largest provider of vocational education and training (VET) in Australia. Responsibility for the management and delivery of LMI regarding VET resides with state training authorities. State VET systems produce course handbooks, brochures and fact sheets which sometimes contain information on job prospects and career pathways related to courses provided. Students can obtain the LMI directly. They can also receive LMI from the TAFE career counsellors.

Some universities produce LMI through their career service centres and relationships with industry and professional associations. The material contains career pathway opportunities for special courses, stories of alumni, as well as detailed information on courses. In universities, LMI is provided in all formats: handbooks, fact sheets, brochures and electronic-based media.

The universities in Australia also support the Graduate Career Council of Australia (GCCA), which conducts graduate destination surveys and provides comprehensive analysis of the trends in the graduate labour market for all Australians.

7.1.15. Private LMI providers

In recent years the Australian government has tended to contract out the production of LMI to the private sector. The government also encourages partnerships between the public and private sectors in the provision of LMI. The research and production of much of the LMI provided by DEST is contracted to private companies.

With respect to Job Outlook, officers within DEWR have undertaken most of the research and data manipulation. However, some information such as job turnover estimates and economic employment-modelling forecasts is privately provided.

The private sector in the LMI field is strong in Australia. Most of these private companies are publishing companies or research organizations with an interest in labour market issues. It is estimated that there are more than 250 outplacement agencies and 600 individuals or organizations offering career counselling to the general public.

In effect, many of these providers have participated successfully in a number of the government programs. However, the operation in this sector is less transparent, compared to the public sector. Australia is conducting surveys to evaluate the effectiveness of the private sector in the provision of LMI and its potential for expansion.

7.1.16. Lessons learned

The public/ private arrangement in Australia has proven effective in the provision of LMI by the private sector on a competitive basis. Much of the LMI is based on partnerships between government and the private sector. However, this arrangement also includes some risk. The government will likely have to continue taking actions to improve the LMI quality provided by the private sector.

Addressing young people's LMI needs in the educational system and addressing the needs of high school drop-outs are very important for the LMI system in Australia, since the specialized skill needs of the future labour market can only be met through shaping the skills of all labour force

participants, in particular young people. Programs in Australia such as Vocational Education and Training (VET) effectively satisfy the youth LMI needs.

In order to address the changing needs of LMI users in the labour market, local market information should be provided, which can only be done through the coordination between different level of governments or agencies.

The other lesson from Australia, like Canada, that is particularly relevant to Indonesia is that in a decentralised system each arm of government has an important part to play, but it is the role of central government to coordinate the activities and instigate them.

7.1.17. Features of an optimal LMIS

Based on our review seven fundamental features of an optimal LMIS were identified. These are:

- Good governance and cost-effectiveness
- Timely, accurate and relevant data
- Effective analysis and interpretation of data
- Competent labour market analysts
- Information that is easily accessible to users through a variety of outlets
- Knowledgeable intermediaries; and
- Development of education and guides for effectively using LMI.

The importance of effective governance cannot be overstated, many different public and private organizations are likely to be involved formally and informally in developing and delivering LMI. Governance is instrumental to a systematic approach to LMI and must be a fundamental strategy and not an afterthought

Data sets included in the system must be considered against several dimensions, most significantly:

- Time period, geographical detail
- Measurement criteria and methods
- Classification of data
- Timeliness, accuracy
- Interrelationships of data sets, and
- Establishment of data standards.

Multiple data development approaches need to be considered in an optimal system, including the use of informal data.

Human expertise in LMI is often overlooked. Informed labour market analysts are the core of an optimal system and are important in developing LMI, interpreting and analyzing information, providing qualitative information and serving as intelligence "agents," providing user support.

Flexible, easily accessible delivery systems should focus not on the number of products but on how an integrated set of LMI products and services can most effectively be offered to users.

An optimal LMI system can help intermediaries to better serve more individuals by providing tailored, easily useable products and services for counsellors and other intermediaries.

Use of LMI should be part of a lifelong learning process, particularly as individuals, businesses, and schools operate in a dynamic global economy. It is important for consumers to build their knowledge and skills in how to use LMI to help more effectively participate in the labour market.

7.1.18. Conclusion

The examples of best practice in LMI development and labour forecasting presented in other countries complement the findings from the surveys of employers, education institutions and government agencies which are part of this study. The results from the surveys help to provide us with a better understanding of how LMI is accessed and used by different stakeholders, the linkages between government agencies at the national and regional levels and the linkages between the education institutions and employers in determining the demand for new skills and the impact on training programmes. Based on the findings we are in a position to make recommendations to strengthen the LMIS in Indonesia and provide suggestions on how the best model to collect and disseminate LMI can be developed.

7.2. Current Assessment of Labour Market Information Systems in Indonesia

7.2.1. Present Arrangements

The Labour market Information System in Indonesia has been developed systematically since the beginning of New Order in 1970s through a centralised system. The Statistical Central Bureau (Biro Pusat Statistik – BPS) was responsible for macro level surveys on the labour force (National Labour Force Survey (Survey Angkatan Kerja Nasional or SAKERNAS)). BPS has branches from district to national levels and it has the authority to conduct censuses and surveys. Before the decentralisation policy applied in 2001, the Ministry of Manpower (MoM) as the technical ministry was responsible for collecting labour data administratively through its Regional Offices (Kantor Wilayah) at province level.

Since 2001, when the Government of Indonesia adopted a new decentralised public management system, the responsibility for labour management was decentralized to regional level. Since then, the labour market information system has been developed at three levels, at district, province and national levels. The regional offices have been decentralised to districts and provinces and through Labour Offices (Dinas Ketenagakerjaan). The Chairperson of the Labour Office is appointed by Bupati/Walikota (Head of District Government) and reports directly to Bupati/Walikota. The Ministry of Manpower (MoM) does not have direct authority to collect data from the Labour Offices and can only communicate indirectly through Bupati/Walikota to obtain the data at district and province level.

The current structure of Labour market Information System in Indonesia could be described as follows:

At national level:

- Badan Pusat Statistik (BPS) is responsible for conducting regular surveys at macro level. The data on labour is collected at household level through the National Labour Force Surveys (Survey Angkatan Kerja Nasional, or SAKERNAS) mainly collected and published twice per year, in February and August. SAKERNAS provide comprehensive household data on employment. The Population Census (Sensus Penduduk) and Population Survey among Census (Survey Populasi Antar Sensus, or SUPAS) provide the main information on employment every five years.

- The Ministry of Manpower (MoM) receives reports regularly from Labour Offices at district and province levels. The report from Labour offices are sent to the Center of Data and Information (Pusat Data dan Informasi Ketenagakerjaan, or PUSDATIN) and several related directorates such as Labour Replacement (Penempatan Tenaga Kerja), Industrial Relations (Hubungan Industrial) and Monitoring (Pengawasan)

At regional level:

Dinas of Labour at Kabupaten is responsible for collecting administrative data regularly from firms among others on the number of workers and on wages. It also reports on industrial relations such as labour disputes of termination on employment (Pemutusan Hubungan Kerja, or PHK) and minimum wages.

The system for reporting these administrative data from local to central level is fragmented. Several related Directorate Generals and Directorates at Ministry of Manpower (MoM) provide different guidelines for different purposes. At the time of writing this report, the Ministry of Manpower (MoM) still struggles to improve its Labour market Information System institutionally. The Data and Information Center (PUSDATIN) at the Ministry of Manpower (MoM) is regularly requesting and receiving reports from district and province levels, although the response rate of these reports are relatively low.

7.2.2. Limitations of the Current Labour Market Information System in Indonesia:

Government has established rules and regulations related to compulsory reporting from firms to the Office of Labour at district level but the implementation of these is not yet effective:

- The data collected administratively from firms at local level only covers a relatively small proportion of the total number of firms. Therefore it could not represent the population of labour hired by firms.
- The consistency of data from firms at district level is relatively weak. At district level, although a Labour market Information system has been established, its implementation is relatively limited. The Labour Office cannot regularly monitor the flow of labour at the level of firms and the response rate to data requests is low. Furthermore only some regions report to the Ministry of Manpower (MoM) regularly. Therefore, the website that has been established by the Ministry of Manpower (MoM) for this purpose is unable to produce a complete data set from regions and is unable to present national data effectively.

7.2.3. The impact on Labour market Information System Performance

- The development of effective labour and human resource policies in Indonesia is obliged to rely on BPS macro level data since labour data collected administratively at micro level are unreliable in comparison. There is very great scope for improving the Labour market Information System at district level.
- The main related stakeholders such as government officials concerned with tax and social security agencies at district level that need firms level employment data usually establish their own reporting systems which are not integrated with labour administrative data at district level. Thus there is a risk of government policy inconsistencies and inefficiencies among responsible government agencies both at district and national levels.

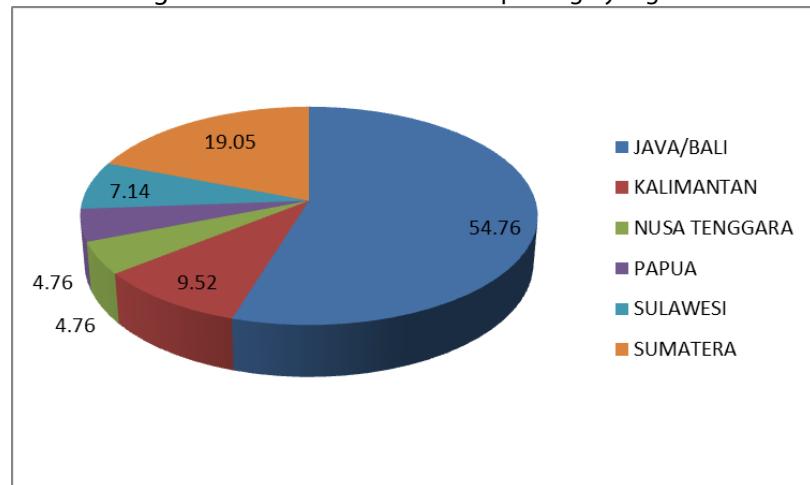
In order to provide further information regarding the current state of labour market information systems in Indonesia, a survey was completed of a sample of local labour offices and a number of regional government offices (BAPPEDA) to gain a better understanding of how LMI is developed

and disseminated in Indonesia. The local labour offices are responsible for placing job candidates with employers, providing them with career guidance, access to information on jobs and some provide free use of desktop computers to access job opportunities on the internet.

7.2.4. Local labour offices

Forty-two local labour offices were surveyed in six regions to assess how they made use of LMI in serving their clients and the transmission of LMI between local offices and with head office.

Figure 7.2 Local labour offices reporting by region



Of the 42 local labour offices surveyed, the highest number was in Java, 23 or 54%. In the remaining regions; eight offices were surveyed in Sumatra, four in Kalimantan, three in Sulawesi, and two each in Nusa Tenggara and Papua.

7.2.5. Collection of LMI

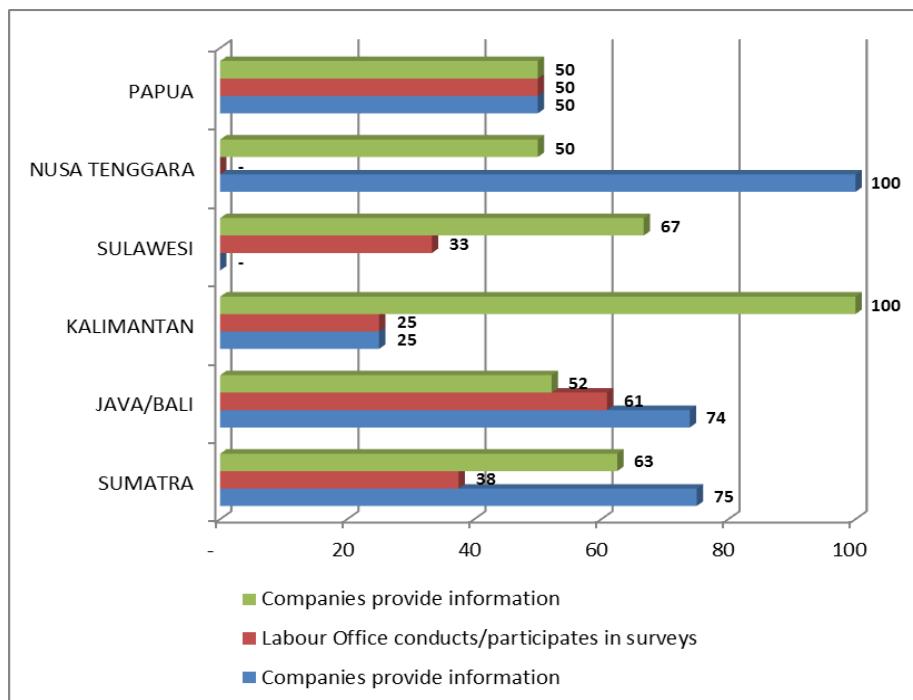
The majority of LMI collected by the labour offices related to job seekers and employers using the services of the office, including vacancy information, number and type of job seekers, number of placements, results from job fairs, training data and the outcomes from job fairs.

Local labour offices surveyed obtain job vacancy information in three principal ways:

- Companies voluntarily provide it
- The labour office conducts or participates in surveys and
- Companies are requested to provide data. In the Java/ Bali region there are government regulations that require companies to provide vacancy data.

Survey results show that 27 of the 42 labour offices received some labour market data from employers. This still means that 25 or almost 50% of employers did not receive or exchange any information with local employers. Twenty-five of the labour offices requested LMI from employers and received it, 19 offices requested it but did not receive anything.

Figure 7.3 How local labour offices obtain vacancy information from employers



7.2.6. LMI reporting

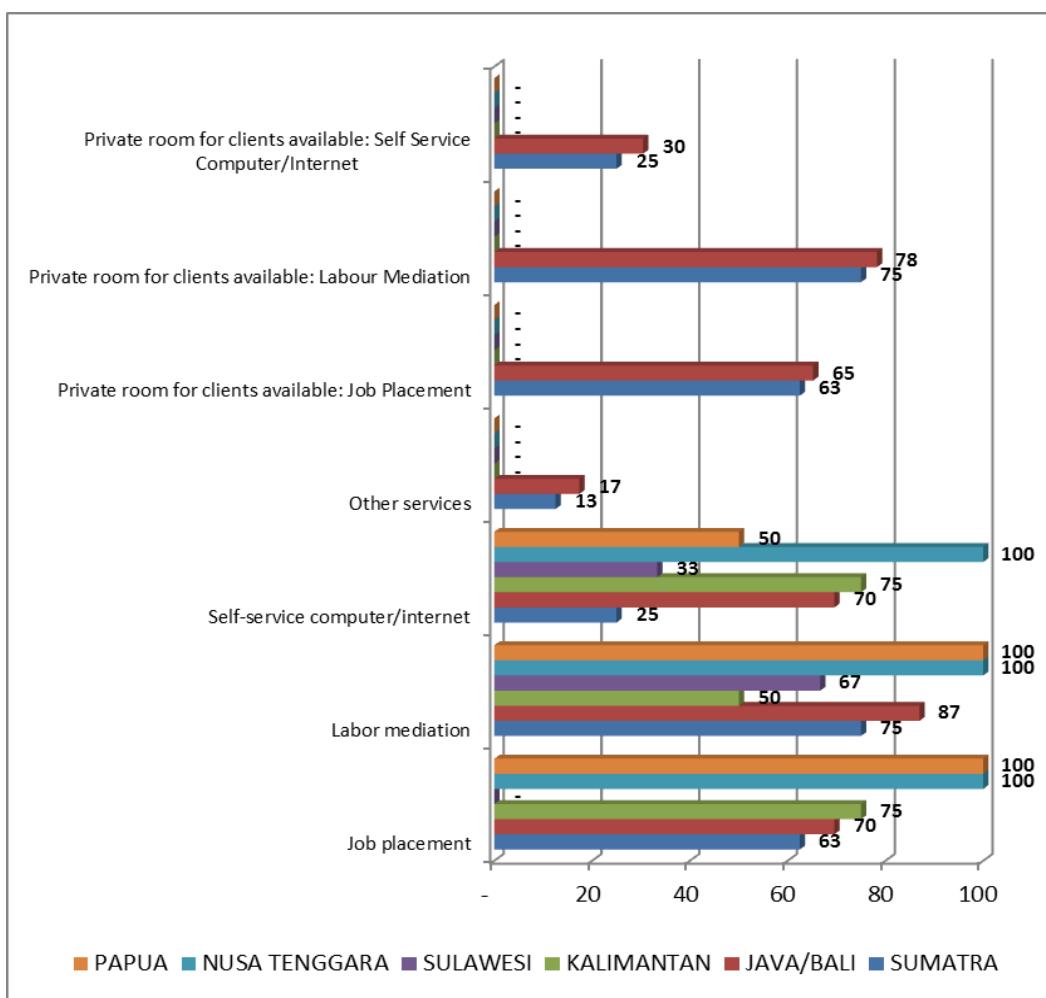
Only 7 of the 42 (17%) offices reporting provide LMI reports on a monthly basis. Another 7(17%) reported every three months, 2 offices (5%) report every 6 months and 4 offices (10%) yearly. Some 16 (38%) of the offices provided no reports on a regular basis at all.

All 42 of the local labour offices provided administrative reports to the central labour office in Jakarta. Twenty-one of the offices provide reports to the local central provincial government office. Only 10 of the offices were able to provide reports via the internet, the remainder either used post or courier.

7.2.7. Services provided to job seekers

One would assume that a critical function of the labour office is to provide counselling and placement services to job seekers, yet only 28 of the 42 offices surveyed did so. Twenty-five of the offices that did provide placement services also provided clients with the opportunity to use a desktop computer with access to the internet. All but one of the offices that were able to provide a computer also gave the client a private room.

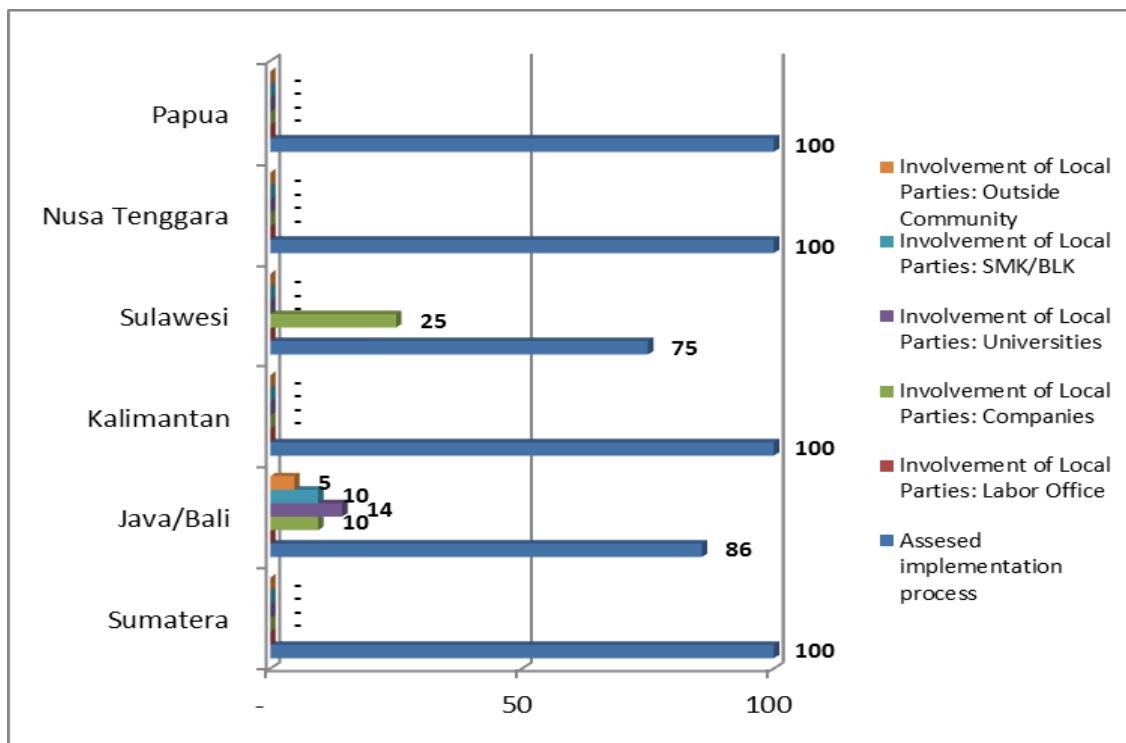
Figure 7.4 Services provided by local labour offices to job seekers



7.2.8. Regional government offices (BAPPEDA)

Forty one regional government offices or BAPPEDA were visited during the survey with over half of the offices in the Java/ Bali region. The BAPPEDA offices are largely administrative in nature and are responsible for funding much of the programming in each region.

Figure 7.5 BAPPEDA: Involvement of local agencies in preparation of regional development plan



The main responsibility of the BAPPEDA office is the development of a regional development plan. As far as the LMI area is concerned the offices develop a skills development plan which helps to fund the programs of the local agencies such as the labour offices. Survey results show that in terms of the development and distribution of LMI the BAPPEDA offices have little direct involvement.

7.2.9. Conclusion

Our analysis indicates that the use of LMI is very limited. The Indonesian labour market information system is particularly weak at the district/local level. In general the collection, analysis and dissemination of labour market information is very fragmented in the country. There is a pressing need to better coordinate these functions to ensure that the primary users of LMI including policy makers and planners, employment services, training institutions, employers; students and job seekers receive timely and accurate data and information. The collection of information from employers on the demand for workers and their skill requirements is particularly weak as opposed to supply information on job seekers and graduates from training institutions which is fairly readily available.

7.3. Recommendations

In this section of the chapter recommendations are proposed to strengthen the LMI system in Indonesia. Based on our knowledge of the present arrangements, survey results and our discussions with government agencies and employers it is apparent there needs to be a stronger coordination of LMI activities. The importance of having a coordinating mechanism at the regional levels to deal with labour market matters in particular is clearly evident.

Under the third National Medium Terms Development Plan (RPJMN) of 2015-2019, the Strategic Plan of the Ministry of Manpower addresses the need for a more effective LMIS. In particular, the

Ministry Plan proposes to facilitate labour mobility and functioning of the labour market by: (a) Improving the effectiveness and efficiency of the labour market as well as maintaining the balance between supply and labor requirements; (b) Integrating the labour market information system (LMIS) to respond to the information needs of companies, training providers and job seekers as well as policy makers to work together with the private sector job market; (c) increasing industry involvement in the design and implementation of employment services, as well as the development of a standard system that uses a feedback mechanism from stakeholders; (d) ensuring that job placement and counselling are implemented correctly; (e) improving outreach/cooperation between educational institutions, and employers to develop an ongoing collaboration.

7.3.1. Development of a Labour Market Information System

We recommend that as a strategic priority the government should ensure the development of a labour market information system and provide incentives and structures to implement this.

At the central level, the Coordinating Ministry on Economic Affairs, Coordinating Ministry of Education and Culture, and Ministry of National Development Planning/ BAPPENAS are the three main institutions that could become champions to lead on LMIS improvement in Indonesia. They have the authority and capacity to coordinate several related technical ministries such as the Ministry of Manpower (MoM), the Ministry of Education and Culture the Ministry of Finance. The Ministry of Manpower (MoM) is responsible to monitor the implementation of the Minimum Wage and Social Security on Labour (Jaminan Sosial Ketenagakerjaan). The coordinating Ministry of Education and Culture, the Ministry of National Development Planning /BAPPENAS, Ministry of Education and Culture, and the Ministry of Finance are the four ministries to plan the Human Resource Investment Policies.

At local level, the Bupati/Mayor would be able to consistently improve the welfare of citizens at a district level. Therefore, the number of workers and their wages are key indicators for their job creation programs if the Bupati/Mayor wants to measure the performance of economics and labour policies, and their effectiveness. Government at central and district levels could provide incentives to establish an effective Labour market Information System: central government could, for example, provide incentives or rewards for districts with a good performance on LMIS and district governments could provide incentives for firms which report regularly on their workers and their wages, and impose disincentives for firms which are bad performers.

7.3.2. Establishment of Labour Market Information Coordinating Committees

We recommend that a Labour Market Information Coordinating Committee should be established in each region of the country to coordinate and advise on all matters related to the labour market.

During the course of this consultancy we met with senior officials with the Coordinating Ministry for Economic Affairs. That ministry has established a National Labour Market Coordinating Committee to address labour market issues but the Director admitted there was no linkages with offices at the regional level.

The Canadian model which uses an extensive distribution of LMI throughout its provinces and territories could prove a model for Indonesia as the regional jurisdictions operate their own LMIS and coordinate activities with the national government departments and agencies. Indonesia could look at a similar system to address issues related to the functioning of the labour market in

the provinces and regions and recommend the most appropriate means of resolving current and emerging labour market problems.

The regional LMI coordinating committees could have the following functions:

- To address major issues related to the functioning of the labour market in the region and recommend the most appropriate means of resolving current and emerging labour market problems,
- To facilitate inter-agency cooperation and coordination in the collection of labour market information and arrangements for the dissemination of data,
- To serve as the focal point on all labour market information matters,
- To identify specific economic and employment-related development opportunities facing the region,
- To prepare a labour market action plan (LMAP) to address the short to medium term labour market needs facing the region, new skills and training required, new or special initiatives to promote innovation in the labour market,
- To develop proposals and budgets for funding support from regional and national levels of government,
- To report issues to central government agencies and participate with other regional LMI committees on a national committee.

Examples of some of the issues that the committees could address might include:

- Development of a comprehensive labour market information and reporting system
- Identifying skills demand in the regional growing sectors, new investment projects identified, foreign employment etc.
- Measures to address the problem of youth employment
- Measures to strengthen linkages between the training institutions and private sector
- Requirement that all TVET programs include an internship for students
- Develop a culture and sustainable support mechanisms for TVET in both family and youth populations

As a first step it is recommended that one region is selected and a committee is established that would serve as a model for the other regions. Membership of the committee as a minimum should include BAPPEDA, local labour office, economic development department, education ministry, a number of employers, statistics office and investment department.

7.3.3. Conduct of Regular Establishment Surveys

We recommend that the Ministry of Manpower (MoM) and the regional labour offices should conduct regular establishment surveys to obtain demand data and statistics

The lack of demand information from employers on their skill requirements being collected by government offices in general was noted in the survey results. Employer surveys at the national and regional levels would add more in-depth information on qualitative changes in existing or emerging working tasks within occupations and economic sectors, and the skills needed to carry out these tasks. These surveys can address such questions as:

- Which skills do employers consider important when hiring new employees?
- How satisfied are employers with the skills of employees?
- In which important skills are the job entrants falling short?

Information from these surveys would help to support policy planning and decision-making that address these problems.

Singapore is a good example of a country that has developed a comprehensive system to collect demand data from employers as part of the development of its Future 21 sectoral development plans. They have developed a questionnaire and data collection system using the internet which proves to be very cost effective and eliminates the need for extensive employer visits. Indonesia should explore the conduct of establishment surveys using such methods.

7.3.4. Need for Counseling and Placement Services at Labour Offices

We recommend that each local labour office should be mandated to provide placement and counselling services to its clients

Only 28 of the 42 local labour offices included in the survey provided counselling and placement services to clients. This is clearly unacceptable and measures should be taken to ensure that all offices are capable of providing basic employment services. There should also be a counsellor and private office available at each office.

7.3.5. Need for Capacity Building at Government Offices Responsible for LMIS

We recommend that the Ministry of Manpower (MoM), as part of the operational policy to implement an effective Labour Market Information System, should plan and implement a wide-ranging program of capacity building covering all levels of government and others with responsibility for implementation.

With a government commitment to systematically and consistently improve LMIS, there will be a need to build capacity from district to central levels in order to establish and to implement this effectively. Not only hard infrastructure such as computer and internet are needed, but the most important aspects are establishing the soft infrastructure such as an effective management structure, a reliable plan and its implementation from district to central levels, and further monitoring and evaluating the program regularly.

8. BIBLIOGRAPHY

Almeida, Rita, Jere Behrman and David Robalino (eds) (2012). The Right Skills for the Right Jobs. World Bank;

Asian Development Bank (2004). Improving Technical Education and Vocational Training. Strategies for Asia. Manila

Asian Development Bank (2008). Skilling the Pacific. Manila.

Asian Development Bank and International Labour Organization (2015). ASEAN COMMUNITY Managing integration for better jobs and shared prosperity. Manila.

Atchaoren, David (ed) (2000). The Transition of Youth from School to Work: Issues and Policies. UNESCO/International Institute for Education Planning. Paris.

Bergeron, L., K. Dunn, M. Lapointe, W. Roth and N. Tremblay-Côté, "Look Ahead: A Ten-Year Outlook for the Canadian Labour Market Policy Research and Coordination Directorate and Human Resource and Skills Development Canada, 2009

Benveniste, L. *Indonesia's Higher Education System and Its Responsiveness to the Labour Market*, AusAid. World Bank, June 2014

di Groppelo, Emanuela with Aurelien Kruse and Prateek Tandon (2011). Skills for the Labor Market in Indonesia. Trends in Demand, Gaps, and Supply. World Bank. Washington, D.C

European Centre for the Development of Vocational Training (CDEFOP).) Norway VET in Europe. <http://www.cedefop.europa.eu/en/publications-and-resources/country-reports/norway-vet-europe-country-report-2012>

Euler, Dieter (2013) Germany's Dual Vocational System: A Model for Developing Countries. Bertelsmann Stiftung.

Field, Simon, Kathrin Hoeckel, Viktória Kis and Małgorzata Kuczera (2009) Learning for Jobs. Paris: OECD.

Gill, Indermit S. Fred Fluitman and Amit Dar (Eds) (2000). Vocational Education and Training Reform: Matching Skills to Training and Budgets. Washington, D.C. and Geneva: World Bank and International Labor Organization

Goldfarb, Robert, and Arvil Van Adams. 1993. *Designing a System of Labour Market Statistics and Information*. Washington, DC: The World Bank.

Government of Indonesia (2015) National Regional Development Direction 2015-2019

Handel, Michael J. (2012). Trends in Job Skills in OECD Countries. OECD Social, Employment and Migration Working Papers No. 143. Paris

Hanushek, Eric A. "Alternative school policies and the benefitsof general cognitive skills." Economics of Education Review 25 (2006) 447-462

Hazelkorn (2nd edition 2015) "Rankings and the Reshaping of Higher Education. The Battle for World-Class Excellence", Basingstoke, Palgrave MacMillan.

Lizzi Feiler "Anticipating and Matching Skills Demand and Supply" European Training Foundation 2012

Hoeckel, Kathrin and Robert Schwartz (2006). Learning for Jobs: Germany. Paris: OECD

Hoeckel, Kathrin, Simon Field, Troy R. Justesen and Moonhee Kim (2008) Learning for Jobs Australia. Paris: OECD

Human Resources Development Canada LMI Task Force. 2002. *Literature Review, Best Practices and lessons learned in governance, policies and strategies for LMI and public employment services, Canada and internationally*

Human Resources and Skills Development Canada (HRSDC). 2005. *Summative Evaluation of HRSDC Labour Market Information Products and Services*

Human Development Network (2010). Skills Development Strategies to Improve Employability and Productivity: Taking Stock and Looking Ahead. Washington, D.C.: World Bank.

ILO, *Key Indicators of the Labour Market*, ILO, Geneva, May 2009

Johanson, Richard K. and Arvil Vam Adams (2004). Skills Development in Sub-Saharan Africa. Washington, D.C. World Bank

Johanson, Richard (2009). A Study of National Training Funds. Washington, D.C.: World Bank.

Lauglo, Jon and Rupert MacLean (eds) (2005). Vocationalisation of Secondary Education Revisited. Paris: UNESCO.

Levy, Frank and Richard Murnane (2004). The New Division of Labor: How Computers are Creating the Next Job Market. Princeton University Press

Lizzi Feiler "Anticipating and Matching Skills Demand and Supply" European Training Foundation 2012

Middleton, John, Adrian Ziderman and Arvil Van Adams (1993). Skills for Productivity. Vocational and Technical Education in Developing Countries. Oxford University Press and World Bank. New York

Mason 'The mix of Graduate and Intermediate level skills in Britain: What should the balance be?' National Institute of Social and Economic Research 2000

"Masterplan: Acceleration and Expansion of Indonesia Economic Development 2011 – 2025" Republic of Indonesia 2011

McKinsey& Company (2007). How the World's Best Performing School Systems Come Out on Top.

McKinsey & Company (2011), "The Power of Many: Realizing the Socioeconomic Potential of Entrepreneurs in the 21st Century Economy," G20 Young Entrepreneur Summit

McKinsey Global Institute (2012) "The archipelago economy: Unleashing Indonesia's potential", McKinsey Global Institute

Maclean, R.Sarvi, J. *Skills Development for Inclusive and Sustainable Growth in the Asia-Pacific*, ADB, Manila, 2013

Moeliodihardjo, Soemardi, Brodjonegoro and Hatekanaka "Development of Strategies for University-Industry-Government Partnership, ACDP April 2013\

Murnane, Richard and Frank Levy (1996) Teaching the New Basic Skills. New York: Free Press.

OECD (2007) Human Capital: How What You Know Shapes Your Life. Paris

OECD (2008) Learning for Jobs: Norway. Paris

OECD (2012) Better Skills, Better Jobs, Better Lives: a Strategic Approach to Skills Policies Paris

OECD and ADB (2015) Education in Indonesia: Rising to the Challenge Paris

Powell, M. *Economic Restructuring and Human Resource Development,2004* (Aldershot, Ashgate Publishing).

Savard, Reginald, Michaud, Guylaine, Bilodeau, Cynthia, and Arseneau, Sylvie. 2005. *The impact of LMI on the career decision-making process*

Salmi "The Challenge of Establishing World-Class Universities" World Bank 2009

Satryo Soemantri Brodjonegoro and Michael P. Greene "Creating an Indonesian Science Fund " Indonesian Academy of Sciences and World Bank, 2012

Torge Middenorff "Human Capital And Economic Growth In OECD Countries" RWI Essen: discussion paper 30, no date

Thuy P, Hansen E and Price D (2001): *The Public Employment Service in a Changing Labour Market* (ILO, Geneva)

Wolff, Laurence and Claudio de Moura Castro (2000). Secondary Education in Latina Amercia and the Caribbean: The Challenge of Growth and Reform. Washington, D.C.: Inter-American Development Bank

Ziderman, A. 2003. *Financing Vocational Training in Sub-Saharan Africa* (Washington, DC, World Bank).

World Bank (2010). Skills for the Labor Market: Outcomes for Youth in Indonesia. Washington, D.C

World Bank (2012) Putting Higher Education to Work: Skills and Research for Growth in East Asia World Bank. Washington, D.C

World Bank (2013). Knowledge Economy Index (KEI) 2012 Rankings. Washington, D.C

**Appendix 1 - Annex 1 International Best Practice in the Development of
Labour market Information Systems**

Table of Contents

1. INTRODUCTION

- 1.1 Purpose of the report
- 1.2 Report contents
- 1.3 Background

2. NEED FOR AN EFFECTIVE AND EFFICIENT LMIS

- 2.1 LMI defined
- 2.2 Central role of government in LMIS development
- 2.3 Questions labour market information seeks to answer
- 2.4 Generation and flow of labour market information
- 2.5 Benefits of an effective and efficient LMIS

3. BEST PRACTICE IN LMIS DEVELOPMENT AND SKILLS FORECASTING

- 3.1 Canada
- 3.2 Singapore
- 3.3 Hong Kong
- 3.4 Australia

4 FEATURES OF AN OPTIMAL LMIS

- 4.1 Barriers to the development of a fully functioning LMIS
- 4.2 Key elements of an optimal LMIS
- 4.3 Summary of features of an optimal LMIS

5 CONCLUSIONS AND NEXT STEPS

REFERENCES

ANNEXES

TABLES AND FIGURES

Table 1: What Questions Does LMI Seek to Answer

- Figure 1: Model of the Generation and Flow of Labor Market Information
- 2. Figure 2: The Main LMI Sources Provided by the Australian Government
- 3. Figure 3: Labour and Employment Policy Cycle

ABBREVIATIONS

BFITP	Banking and Finance Industry Training Board
CCC	Canada Career Consortium
CCDO	Canadian Classification Dictionary of Occupations
CCIP	Canadian Career Information Partnership
CIC	Citizenship and Immigration Canada
COPS	Canadian Occupational Projection System
CV	Curriculum Vitae
DEST	Department of Education, Training and Youth Affairs
DEWR	Department of Employment and Workplace Relations
ECEF	Enterprise and Career Education Foundation
EMB	Education Manpower Bureau
EMIS	Electronic Management Information System
ERB	Employee Retraining Board
ETF	European Training Foundation
ETP	Enterprise Training Partnership
GCCC	Graduate Career Council of Australia
GDP	Gross Development Product
ILO	International Labour Organization
HDI	Human Development Index
HRDC	Human Resources Development Canada
ICT	Information Communications Technology
IS	Information Services
ITC	Industrial Training Council
LFS	Labour Force Survey
LMAP	Labor Market Action Plan
LMDA	Labour Market Development Agreement
LMI	Labor Market Information
LMIA	Labour Market Information and Analysis
LMICC	Labor Market Information Coordinating Committee
LMIS	Labor Market Information System
MCEETYA	Ministerial Council on Education, Employment, Training and Youth Affairs
MOM	Ministry of Manpower
NCIS	National Career Information Service
NOC	National Occupational Classification System
NVQF	National Vocational Qualifications Framework
OECD	Organization for Economic Co-operation and Development
OZJAC	Australian Courses and Careers Database
SME	Small and Medium Enterprises
TAFE	Technical and Further Education
TFE	Training for Employment
TOR	Terms of Reference
TVET	Technical Vocational Education and Training
WES	Workforce and Employment Services
YEL	Youth Employment Link

1. INTRODUCTION

1.1 PURPOSE OF THE REPORT

This report addresses one of the key activities for the study to 'Link the Master Plan for the Acceleration and Expansion of Economic Development to Programming in the Education Sector'; to review international best practice in the development of labour market information systems (LMIS) in selected countries and the methods they use to identify skills gaps and shortages linked to projections of labour demand and economic development. It is expected that the report will complement the findings from the surveys being conducted as part of the study to identify how government departments, education institutions, and employers in Indonesia are making use of labour market information (LMI). The overall objective is to develop recommendations to improve the current LMIS and skill forecasting system in Indonesia.

This report is based on a review of documents and statistics, background readings, previous studies and work experience in the labour market field by the writer.

1.2 REPORT CONTENTS

2. The report is divided into five Sections and starts with this introduction which includes the purpose of the report and the various approaches that have been taken to determine and predict skill needs in labour markets.
- 3.
4. Section two provides a review of the rationale for labour market information, the concepts of LMI and an LMI system. The role of government as the key player to build and maintain an optimal LMI system is also presented. Some of the questions that labour market information seeks to answer are provided and the generation and flow of LMI is illustrated to show its importance in policy development and programme administration. Finally some of the benefits of a fully operational LMIS are outlined.
- 5.
6. In Section 3 country examples are provided to illustrate how LMIS and labour forecasting operate in a number of countries: Canada, Singapore, Hong Kong and Australia. The writer has chosen Canada as a model because he is more familiar with the system there. The systems in Singapore and Hong Kong were chosen as they are countries in the Asian region and Australia because it is a more advanced model near to Indonesia.
- 7.

In Section 4 features of an optimal LMIS are detailed. What are the barriers which prevent the development of LMIS in many countries, and what the key features required to develop an optimal system?

Finally in the concluding Section a number of recommendations are provided for the strengthening of the LMIS in Indonesia and the next steps that might be taken.

1.3 BACKGROUND⁶³

Determining and predicting skill needs in labour markets has been one of the central tasks facing manpower planners and labour market analysts over the past four to five decades. In the 1960s and 1970s policy-makers attempted to identify the precise nature of their human resource requirements using complex, econometric manpower planning models which were initially developed by the OECD and subsequently used, at least to a certain extent, in many developing economies. This approach was in accordance with a development model which allowed for strong involvement of the government in the economy, and a focus on the "formal" part of the labour market. It was an exponent of the belief that economic growth and development could be planned, and that development would soon result in benefits for the population as a whole.

A number of factors have contributed to the gradual demise of detailed manpower planning. In methodological terms, the most significant limitation of the original manpower requirements approach is the assumption that a fixed relationship exists between labour and the quantity of goods and services produced, as well as between labour productivity and education or skills.⁶ However, after decades of experience it is recognized that labour markets are more complex and labour market actors are more unpredictable than these econometric models assume. In reality the relationship between economic output, as measured by gross domestic product (GDP), and employment levels is more dynamic, affected by changes in technology, new forms of work organization, migration and, in many developing countries, widespread disease as malaria and aids. Perhaps just as important as methodological shortcomings, economic planning had become increasingly controversial during the 1980s in political as well as policy terms. Economic policies became focused on the role of markets and the management of crises, leaving less scope for detailed interventions such as those suggested by manpower requirements forecasting.

The demise of traditional manpower planning, nor the blessings of the market, have fully resolved labour and manpower issues in developing economies, and the question has remained how to ensure that education and training policies are in accordance with economic development and labour market needs. Successive waves of economic as well as education and training reforms during the 1980s and 1990s have left many developing economies struggling with the issue of how to inform market-based or demand-driven skills development, and how to forge effective links between skill formation and economic development.

Skill formation has become more important in the context of the emergence of the knowledge economy. Ironically, some of the factors that make labour markets and skill needs difficult to predict, such as rapid technological change, innovation, and changes in work organization, have also contributed to a dramatic increase in the value of knowledge for economic success. In meeting the needs of the knowledge economy, industrialized as well as developing countries have widely adopted the framework of lifelong learning to shape education and training strategies. Such strategies require skills development policies that allow people to take charge of their own knowledge and skills development in a complex and rapidly changing economic and social environment. Development of these strategies has not reduced the need for information on future skill needs, but does have implications for the type of data and analysis that is involved.

⁶³ ILO working paper 27

Labour market information and analysis (LMIA) is increasingly becoming important in identifying and quantifying current and future skills issues and to provide the information needed by employers, workers, providers of education and training and governments to make choices in education and training investments.

The findings from current literature on the development of labour market information systems reveals three major findings:

1. Basic labour market information and analysis is a necessary precondition for the early identification of skill needs;
2. The early identification of skill needs becomes more complex as economies develop and better integrate into the global economy, and will increasingly rely on various methods based on both quantitative and qualitative information;
3. Apart from the production of information on the early identification of skill needs, it is important that institutional arrangements are in place to translate information into policy action, which should be aligned to broader economic policies, including trade, investment and technology policies.

2. THE NEED FOR AN EFFECTIVE AND EFFICIENT LMIS

2.1 LMI DEFINED

The importance of labor market information (LMI) to the efficient functioning of product and input markets has increased with the expanding globalization of economic activity. Markets transcend national boundaries and operate continuously. High-quality, easily accessible LMI is a fundamental feature of a well-oiled competitive labour market, and LMI can improve both short- and long-term matches of labour supply and demand to ensure that individuals build and renew the skill sets required in the dynamic marketplace. Nowhere is the availability of timely and accurate LMI more important than to a rapidly developing economy like Indonesia.

The ILO defines LMI as “any information concerning the size and composition of the labour market or any part of the labour market, the way it or any part of it functions, its problems, the opportunities which may be available to it, and the employment-related intentions or aspirations of those who are part of it.”⁶⁴

Work Futures British Columbia in Canada adds additional perspective to a possible definition. As LMI is becoming more essential to career development, its definition has expanded. LMI now refers to any information that is used for labour market-related planning and decision making. This is an important change because it recognizes that LMI is part of the career planning process. As work and life become more intertwined, information about how the labour market works should be part of every stage of career planning.

In the United States, the Workforce Information Council uses the term workforce information to encompass both labour market and workforce information and provides the following general definition: The workforce information system “provides information on labour market trends and conditions, job outlook and wages, skill requirements of jobs, and a wide variety of other information that helps customers make decisions about their businesses, careers, training, and job search.”

Based on these varied, but related views of LMI, a working definition can be as follows:

Labour market information includes any quantitative or qualitative information and intelligence on the labour market that can assist labour market agents in making informed plans, choices, and decisions related to business requirements, career planning and preparation, education and training offerings, job search, hiring, and governmental policy and workforce investment strategies.

2.2 CENTRAL ROLE OF GOVERNMENT IN LMIS DEVELOPMENT

A governmental role in LMI has been accepted and pursued in most developed industrialized countries. Public provision of LMI can be rationalized since it has characteristics of a public good, and a type of market failure can result in its under production. Use of LMI by one economic agent does not diminish its value for another. This feature of non-exclusion in consumption reduces incentives for private production and leads to an undersupply of LMI. Therefore, public

⁶⁴ Thuy, Phan, Ellen Hansen, and David Price. The Public Employment Service in a Changing Labour Market. Geneva: International Labour Office.

investment in LMI could improve labour market performance through a better matching of skills and employment opportunities. Improved matches can yield spillover benefits, namely economic growth. With an increase in the speed and quality of job matches, output increases, the economy expands, and additional job opportunities emerge.

Governments have adopted many different approaches to LMI development and delivery ranging from highly structured centralized approaches to looser decentralized systems. Some systems feature formal interagency governmental partnerships, and formal public-private sector partnerships. LMI collection and delivery in Canada and the United States have characteristics of both centralized and decentralized systems with information developed and disseminated at the national, province, and local levels.

The reasons for government intervention in operating an LMI system can be itemized as follows:

- LMI has positive effects on labour market adjustments for business and individuals and equal access to LMI should be a fundamental aspect of a well-functioning labour market and viewed in large part as a public good.
- Nearly all industrialized countries recognize the need for government intervention in developing and disseminating LMI. The governmental role arises from theory, social policy, and the benefits of efficient market operations and transactions.
- The complexities of the labour market necessarily require large-scale activities and partnerships to develop and operate an optimal LMI system. Collaboration among government ministries, agencies, and private sector entities is probably necessary to building a robust LMIS.
- The cost of developing and maintaining a national LMI system that includes, national, regional, and local information is large and once collected it would be difficult for any private company to keep control of the information and receive compensation/profit.
- The range of potential users of LMI is large and encompasses nearly all individuals, businesses, and educational institutions. Government intervention can maximize the value of the data relative to costs by ensuring that the use of the information is optimized, and thus optimizing the positive impact on labour market flows.
- Another case for governmental intervention is the importance of LMI at the macro level. There are many labour market measures that have major impacts on national policy decisions, allocation of funding, legislative acts, government interventions in marketplace, and immigration policy and operation, etc. The government has a vested interest in developing and producing such information.

2.3 QUESTIONS LABOR MARKET INFORMATION SEEKS TO ANSWER

It is important to note that the usefulness of LMI depends on the ability of the concerned institutions and agencies to differentiate between accumulation of information and its effective use in policy planning and decision-making processes. Why information is collected, and the usefulness to which it is put, is very important. The starting point is to define the policy gaps that LMI is supposed to fill, and this is where labour market analysis plays a vital role. Labour market analysis is supposed to convert raw data into information that addresses specific policy questions.

Table 1: What Questions Does LMI Seek to Answer?⁶⁵

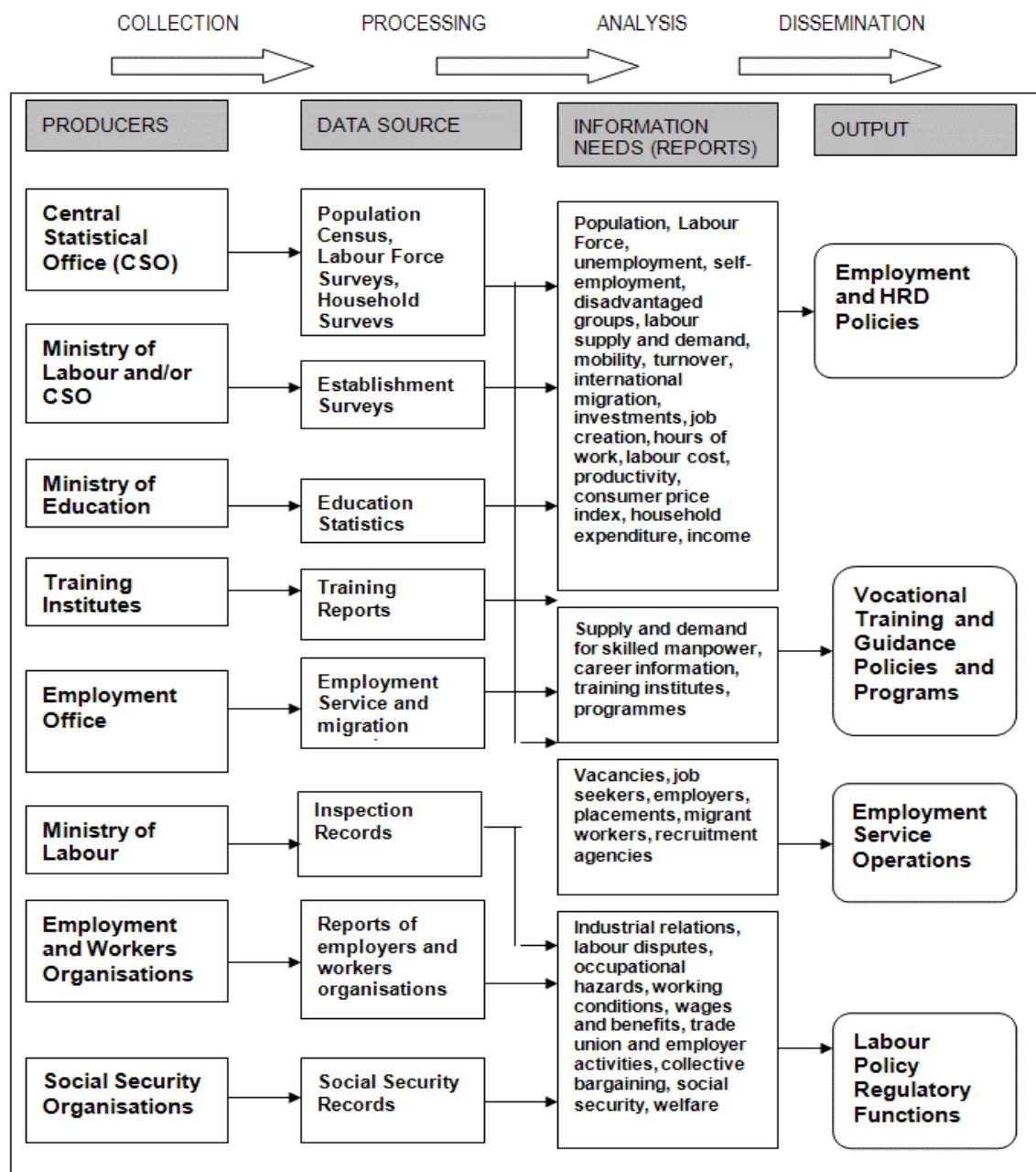
What Do Policy Makers and Program Administrators Want To Know?	Usefulness of Information
1. How have occupational patterns and skill structures changed in response to shifts in the industrial composition, technological advances and other changes?	<ul style="list-style-type: none"> ▪ Information can assist in the formulation of broad employment and HRD policies at national levels. ▪ Information helps to shape companies' recruitment and promotion policies.
2. What are likely to be the skill areas to experience an increase or decrease in importance and what are the implications for the design and content of training and retraining programs?	<ul style="list-style-type: none"> ▪ Makes it possible to reform the education and training systems so that they respond positively and swiftly to the changing needs of the economy. ▪ The Information is important for shaping career policy.
3. How have past trainees fared in the labour market and what is the implication of their experiences for future programming of training courses?	<ul style="list-style-type: none"> ▪ Tracing the career patterns of new entrants in the labour market is a legitimate, highly instructive and informative source of evidence on general receptiveness of employers to educational programs. ▪ Information can be used to design curriculum that is reflective of the needs of the labour market.
4. What is the likely impact of proposed policy measures on job creation, enterprise restructuring and job destruction on training and training policies and programmes?	<ul style="list-style-type: none"> ▪ Information can assist in the formulation of broad employment and HRD policies at national levels. ▪ Makes it possible to assess national progress in terms of skills development and formation.
5. What is the likely impact of these changes on specific target groups, i.e.; women, youth and the disabled?	<ul style="list-style-type: none"> ▪ Information assists in designing targeted interventions
6. How can education and training systems be fine-tuned or reformed to produce a workforce flexible enough to meet the demands of an increasingly dynamic work environment?	<ul style="list-style-type: none"> ▪ Such information serves as a basis for developing new education and (continuing) training provision at sectional and regional levels for entire vocational training systems or areas thereof, and its objective is to adapt them to meet changing technical, social and cultural challenges.
7. Who should benefit from training and what are the likely employment opportunities for which these target groups will be trained?	<ul style="list-style-type: none"> ▪ This is targeted intervention, which reduces targeting errors and also makes evaluation of the impact of education and training programs possible.

⁶⁵ Adapted from ILO Technical Report

2.4 GENERATION AND FLOW OF LABOR MARKET INFORMATION

The LMI needed for policy development and programme administration comes from various sources and different organisations are involved in the collection and dissemination of this information. The generation and flow of LMI from producers to users is illustrated in Figure 1 below. Though the figure is clear and explicit in format and style, it should be noted that challenges exist at each stage of the information flow, and most countries are at different stages in dealing with these challenges.

Figure 1: Model of the Generation and Flow of Labor Market Information⁶⁶



⁶⁶ ILO Technical Report

2.5 BENEFITS OF AN EFFECTIVE AND EFFICIENT LMIS

A fully functioning LMIS can have significant benefits to a country's development and economic growth. These include:

1. A well-organized LMIS can reduce job search costs for firms and workers and help workers reallocate among different employers and industry. By facilitating the reallocation of labour in the direction of basic market forces, LMI can enhance productivity, competitiveness, and economic growth, while also reducing social inequality.
2. LMI is crucial in managing transitions from one level of education to another and transitions between education and working life. It plays a vital role in assisting individuals in career preparation and advancement. It is consistent with the principle of lifelong learning, building and enhancing an individual's skill set to keep pace with changing skills and evolving employer requirements in the job market.
3. Education institutions must have good information on the current and anticipated demand requirements of business establishments if an appropriate mix of programs and courses with relevant curriculum are to be developed. If education and training institutions do not address marketplace skills, market inefficiencies may be compounded as individuals invest time and money in skills that do not provide necessary or relevant training, and their employment choices may be suboptimal as a result. On the demand side, employer needs may go unmet, or be inadequately met, creating inefficiencies and unnecessary costs in the provision of products and services. Ultimately, such inefficiencies can create significant imbalances that can impact on the competitiveness of firms in a global economy and on immigration needs and policy.

3. BEST PRACTICE IN LMIS DEVELOPMENT AND SKILLS FORECASTING

In general what distinguishes the development of LMIS in more advanced countries from less developed countries is the capacity to generate, analyse and disseminate LMI from a variety of sources to benefit a broad spectrum of users. In this section country examples are provided for Canada, Ireland, Singapore, Hong Kong and Australia.

3.1 CANADA⁶⁷

LMI is clearly recognized in Canada as a public good which should be freely accessible to all. The Government of Canada has placed a high priority on LMI over the last two decades. Public investment in such information was considerable, and the products were impressive. This effort resulted in a highly developed LMI system, enabling Canadians, including public policy makers, employers, workers, job seekers and educational institutions, to make informed labour market decisions.

Complex, decentralized, and involving many players, the LMI system in Canada is structured to reflect the constitutional and legislative divisions of responsibilities between federal and provincial/territorial governments in education, training, and labour market matters. It is also designed to adapt to cultural and ethnic diversity and to reflect economic developments in Canada's labour market.

3.1.1 LMI providers and key LMI sources

The Government of Canada plays a significant role in the production of LMI. Increasingly, this role is shared with provinces/territories as many have requested the transfer of federal funding and responsibilities through Labour Market Development Agreements (LMDAs). At the federal level, four departments and agencies are key LMI providers: Human Resources Development Canada (HRDC), Industry Canada, Citizenship and Immigration Canada (CIC), and Statistics Canada.

Human Resources and Development Canada (HRDC)

HRDC is the main department responsible for Labour Market Information. Its activities include producing labour market data and providing key LMI resources at the national, regional and local levels; participating collaboratively with other departments such as CIC, and developing strategic plans to continually improve the efficacy of the LMI system; and enhancing quality and access of LMI through directly funding organizations.

The following are three important organizations or initiatives supported by HRDC that provide LMI.

- Canada Career Consortium (CCC) is a national forum devoted to developing and coordinating career and labour market information that enables all Canadians to make labour market decisions. Its members include industry sector councils and council-like organizations, education and training organizations, career development organizations, not for profit career resource developers and providers, aboriginal peoples, persons with disabilities, visible minorities,

⁶⁷ www.hrdc-drhc.gc.ca,

<http://workinfonet.bc.ca/lmisi/Making/chapter5/NATLMI1.HTM>

women, communities of interest and end users, francophone career development communities, federal departments or agencies, and provincial/territorial government agencies. The CCC develops and co-ordinates career and labour market information to enable all Canadians to make labour market transitions.

4.

- Canadian Career Information Partnerships (CCIP) serves as a national forum for career development organizations from both national and provincial levels to promote a culture of career development. Its goals are to "identify career information needs of young people and adults, to pool together information, research and knowledge on career development and labour markets across the country, and to explore and develop electronic access to career information.
- Sector Councils bring together representatives from business, labour, education, and other professional groups at the industry sector level in a neutral forum in order to comprehensively and cooperatively analyze and address sector-wide human resource issues.

HRDC provides sophisticated and complex labour market data and information. At the core are the National Occupational Classification (NOC), Job Futures, the Labour Market Information website, and the Job Bank. Employment counsellors and career development practitioners in Canada widely use these HRDC LMI sources. Exhibit 2-1 shows how these sources are established or developed and what type of information they provide to users.

Industry Canada

Industry Canada works in all parts of the country to foster a growing, competitive, knowledge-based Canadian economy, and to build a fair and efficient marketplace. The LMI provided by Industry Canada mainly addresses the needs of specific groups such as youth, aboriginal people, and immigrants, helping them make effective labour market decisions. Moreover, Industry Canada develops important programs and initiatives to produce and disseminate LMI. These include the Post-Secondary Co-operative Education and Internship program (providing information on co-op opportunities in the federal government), the Community Access Program (providing youth with information on work opportunities in local communities), Canadian Information Centre for International Credentials (providing information on assessment and recognition of foreign credentials), CAREER PLACE (providing information on education, training and career opportunities for aboriginal people) and SkillNet (providing online one-stop labour market information for employers and job seekers). Two initiatives, Skill Net and CAREER PLACE, are addressed in detail in Figure 2.

Citizenship and Immigration Canada (CIC)

Citizenship and Immigration Canada (CIC) was established in 1994 to link immigration services with citizenship registration. The department provides labour market information for potential immigrants, new arrivals, foreign students, temporary workers and refugees in order to help newcomers adapt to Canadian society. As part of settlement and adaptation programs, the special information and services that CIC offers to new immigrants are impressive. They include employment counselling services, job-search programs, assistance with recognition of foreign credentials, and prior learning assessment.

Statistics Canada

Statistics Canada is the national central statistical agency that collects and produces data related to LMI. It conducts a Census every five years and hosts many surveys such as the Labour Force Survey (LFS), Workplace and Employee Survey (WES), Survey of Employment, Payrolls and Hours (SEPH), and the National Graduate Survey (NGS), which provide policy makers with a solid foundation for analysis. Details of the five most important LMI sources provided by Statistics Canada are detailed in Figure 2.

Provincial governments

In addition to the federal government, the provincial and territorial governments also have the responsibility to produce LMI and make it available to the public. Through the Labour Market Development Agreements (LMDAs), the provincial and territorial governments have transferred labour market services from the federal government (Alberta, Manitoba, New Brunswick, North West Territories, Nunavut, Quebec and Saskatchewan) or co-manage labour market services with the federal government (British Columbia, Newfoundland and Labrador, Nova Scotia, Prince Edward Island and Yukon). Ontario is the only province which still receives labour market programs directly through HRDC. Federal and provincial co-ordination in relation to labour market matters is managed through the Forum of Labour Market Ministers (FLMM), which established a Labour Market Information Working Group to co-ordinate federal, provincial and territorial governments' work for more accurate and relevant LMI.

Most provinces and territories (except Quebec) have established a one-stop information platform that produces and disseminates LMI for their own residents through the initiative Canada WorkInfoNet (WIN), which provides three types of information: career planning, learning and employment. Usually, the LMI users targeted are job seekers and employers, with a particular emphasis on youth, recent immigrants, aboriginal people, and persons with a disability.

Details on the labour market activities in Canada's ten provinces and two territories can be found in Annex 1 to the report.

Other Providers

Non-government organizations (NGO's) also have an important role in the provision of LMI in Canada. A large number of companies research, develop and deliver LMI, particularly career information products (print and Internet-based). They either deliver these products through the market, or do so under contract to HRDC or a provincial/territorial government department. This occurs due to reductions in the size of governments, and the desire of governments to increase private sector involvement in the provision of labour market services. In addition, a number of academics at Canadian universities frequently work under contract to provide a range of services and products related to LMI.

LMI collection mechanisms

Canada's LMI collection mechanisms are among the best in the world (OECD 2002c: 84). There are several reasons for this. First, an elaborate network consisting of a number of information experts, methodologists, statisticians, economists, researchers and analysts is brought together.

Second, due to a good relationship between LMI collection agencies at the national level (i.e. Statistics Canada) and the provincial or territorial level, ensures that information can be gathered in a timely manner. For example, Statistics Canada gathers data through such vehicles as the National Census, Labour Force Survey, WES and other specially-designed surveys at the national level, and provincial LMI collection agencies also conduct numerous surveys as Statistics Canada's liaisons. Third, the Forum of Labour Market Ministers plays a key role in coordinating the different provincial governments and building a wide range of national and local LMI networks.

A computerised National Labour Market Information System exists in Canada which provides general and detailed information on local labour markets across the country. Human Resources Development Canada (HRDC), under the Ministry of Human Resources Development is at the helm of the LMIS in Canada. It has a network of 10 Provincial/Regional Offices and more than 320 local offices across the country from where its services can be accessed. Local Offices are referred to as Human Resources Development Centres. These centres are one stop shops which offer a wide assortment of on line self-services to employers, job seekers, students, potential entrepreneurs, the retrenched and the retired, etc. These offices are closely networked and computers with Internet access are available for use freely by different users. The National HRDC Labour Market Information Site provides information on occupation, job seekers, industry sectors, and the changing nature of the world of work and current labour market trends. Each Provincial/Regional Office generates information on:

Occupational Profiles: These contain information on educational requirements, terms and conditions of employment, training availability, wages, potential employers, etc. The main sources of this information include: the National Occupational Classification (NOC) System (Occupational Descriptions and Career Handbook), Census Data, Employer Surveys, government departments and training Institutions.

Labour Market Reviews: These are annual reports that provide a year-to-date analysis and interpretation of influences on the local labour market. They contain information on employment legislation, projected layoffs, employment trends, major economic activities, skill shortage areas and major employment projects.

Labour Market Bulletins: These are monthly or quarterly updates on labour market activities in the HRDC Districts. There are three key LMI sources in Canada:

(a) The Labour Force Survey: This is Statistics Canada's monthly snapshot of the labour market across Canada.

(b) The National Occupational Classification (NOC): The NOC replaced the Canadian Classification and Dictionary of Occupations (CCDO) in 1992. It is a systematic taxonomy of occupations, which contains over 500 groups of occupations and over 25,000 job titles. The NOC is intended for use in compiling, analysing and communicating information about occupations.

Occupational Information serves a number of purposes such as in measuring employment equity, human resources planning, occupational safety and demand analysis, the provision of career information and many other programs related to employment services.

(c) Job Futures: This report is published by Human Resources Development Canada. It combines data from the Labour Force Survey, the census, and other sources, on the most common occupations. For many occupations, it shows average full- year earnings, earnings of the highest paid 10 percent of workers, the lowest 10 percent, and the percentage of the workforce that is employed part time. The National Job Futures volumes are available both in print and electronic format.

Job Futures Volume 1

Compiles information for about 200 occupational groups, including statistical data and descriptive and analytical text. It also provides information on the current and future labour market situations for specific occupations. An attempt is made to include the views of employers about the projections, whether negative or positive. The Canadian Occupational Projections System (COPS) and other forecasting tools are used by HRDC specialists in making manpower decisions.

Job Futures Volume 2

Focuses on the link between the educational system and the labour market through analysis of the labour market outcomes for graduates from some 100 fields of study at the post-secondary level. This is crucial information to use in the career planning process.

To complement its efforts to generate specific information to guide the decision-making processes on HRD policies and programmes, HRDC established an Applied Research Branch in 1994. This branch is responsible for generating policy-relevant research to guide HRDC's development of creative solutions to labour market, employment, human capital development, income security, social development, labour adjustment and workplace innovation issues and problems.

Major National Labour Market Research Outcomes

(i) Essential Skills Research Project (ESRP): launched by HRDC with the main objective to examine how essential skills were used in various jobs. The information generated is useful in areas such as: Counselling and Career Services planning and provision, Professional Development for Teachers, Skills Assessment and Recording/Portfolio Development, and Planning of School to Work Transition Programmes. This information is also used in occupational profiles.

(ii) National Occupational and Skills Standards: describes the skills and knowledge needed to perform competently in the workplace. Occupational skills standards are used in educational planning, they also help in the design of structure and content of education and training programmes and assist educators and trainers to give learners the skills and abilities that an industry requires as well as helping workers and employers determine their unique training needs.

(iii) Sector and occupational studies: In these studies, investigations are done on the current and future human resources development needs, issues and challenges facing a particular industry or

occupation, such as the supply and demand of skilled labour, the impact of changing technology, the need for skills upgrading and the adequacy of existing training.

(iv) Industry Profiles: The profiles examine how the changing economic environment, general trends in research and development and technology, affect the labour force employed in an industry. Some major human resource issues covered in past sector studies include the identification of the gaps between current skills and emerging skill requirements, career progression and mobility, workforce profile/characteristics and changes in workplace organization, training and professional development requirements, technology innovation/adoption, and human resource management practices.

For manpower and employment planners, industry profiles serve the following purposes:

- A better understanding of the industry and its needs.
- Improved linkages and communications with industry clients.
- Greater relevance of education and training programmes to industry needs.
- Improved standardization of programs and program accreditation.
- More efficient use of resources with less duplication of effort.
- Recognition of innovative training initiatives.

Standards for Electronic Labour Market Information

The Canadian Labour Force Development Board, through its National Advisory Panel on Labour Market Information developed standards for Electronic Labour Market Information (ELMI). These are key performance indicators or measures of the success of information delivered electronically. The standards are specific measures that can be used to determine the extent to which LMI distributed meets adopted guidelines. These guidelines include the following; type and level of detail of information, when certain information is required, sources of information, end users of information, and costs of gathering, processing and distributing the information. It is largely because of the existence of these standards that Canada is able to make an assessment and evaluation of the usefulness of its Labour Market Information System.

Lessons learned

Canada has a comprehensive LMIS in place.. The main characteristics of Canada's system are as follows:

- Central government through the HRDC has had a significant role in all LMI areas, by delivering, initiating and funding LMI products. Industry Canada, Citizenship and Immigration Canada, Statistics Canada and provincial governments are also major players in the production and distribution of LMI.
5.
- Canada has extensive provincial and regional input into the collection and dissemination of LMI. The LMI is exchanged at all levels and results in effective labour forecasting and skills development.
- The LMI delivery mechanism combines various delivery channels with various distribution formats. Internet and CD-ROM based LMI is growing rapidly in Canada. Traditional delivery channels, such as class-based activities and printed publications, are also widely used to ensure

accessibility. There is very good co-ordination of LMI data-collection and delivery between the national and provincial/territorial levels. These arrangements are rightly claimed to be among the best in the world according to the OECD.

- The LMI system makes extensive use of information and communication technologies (ICT) tools. Canada makes significant use of ICT in its provision of LMI products. The web-based LMI has been well organized through both the public and the private sectors. This arrangement maximizes access to labour market information and reduces the costs in the provision of LMI.

3.2 SINGAPORE

The Ministry of Manpower (MOM), formerly the Ministry of Labour is responsible for co-ordinating the LMIS in Singapore. It is also responsible for the overall co-ordination of manpower planning, development and management activities in Singapore. Its Manpower Planning Department (MPD) is tasked with the manpower planning function. It performs three main roles:

- Manpower forecasting and analysis of employment trends
- Formulation of policies
- Collection and dissemination of LMI

Singapore's manpower planning strategy is strongly built on the principle of tri-partism, which means that the social partners are jointly responsible for the successes and failures to be derived from manpower policies and programmes. The government mainly plays a coordinative and facilitative role through the provision of timely and accessible labour market information and analysis.

Singapore is one country that is now addressing the development of sectoral plans to address the skill requirements within industry sectors up to the year 2020. Through the SkillsFuture programme sectoral manpower plans will comprise three components: the economic outlook in each sector, how they will develop in the coming years and the manpower and skills that will be required. The sectoral plan will spell out how companies can attract, retain and develop a deep pool of talent in their sector. The intention is to ensure that all Singapore citizens at different stages of their career development can obtain relevant skills that will advance their careers. The sectoral growth clusters identified so far include advanced manufacturing, health sciences, logistics and aerospace and global financial services. A key component of the SkillsFuture programme will be developing the workforce in small and medium enterprises and involving them in the process of skills development.

In 2000 Singapore launched 'The Manpower 21', which is a strategic blueprint policy framework to guide the process of manpower development. This was a result of joint effort between the MOM, the NTCU, educational institutions, as well as representatives of industries and community groups. This strategic manpower vision has received full support from the government and the total commitment of all the stakeholders who have agreed to uphold the objectives of Manpower 21 and work towards their attainment. The Manpower 21 has in total 41 recommendations, and each of them clearly specifies the partner agencies responsible for the execution of each recommendation. Of particular interest are the first two recommendations. In the first recommendation:

'Singapore seeks to establish an enhanced Manpower Information System to provide relevant labour market information to policy makers, employers, training providers and individuals to enhance manpower planning and policy formulation and to facilitate an efficient labour market'

And in the second recommendation:

'To establish a National Manpower Council (NMC), chaired by the Minister of Manpower to set strategic directions and oversee national manpower planning, development and augmentation strategies and targets'.

Thus, at the helm of the manpower planning framework is this tripartite body, whose other members include the Minister of Trade and Industry, Minister of Education, and Communication and Information Technology, Singapore National Employment Federation, National Trade Union Congress and representatives from economic agencies and government ministries. The Manpower Planning Department is the secretariat to the NMC.

Major Producers of LMI

The production and analysis of LMI in Singapore is aimed at satisfying the LMI needs of policy makers, industrial users, education and training institutions, public agencies like Employment Services concerned with labour market issues, as well as the general public. The major producers of LMI are the MOM, through its Manpower Research and Statistics Department (MRSD) and the Ministry of Trade and Industry, through its Department of Statistics. Other producers include, universities, research institutions, employers and employee organisations.

The MRSD generates labour statistics from a variety of surveys, i.e.; labour force surveys, establishment surveys, administrative records and research studies. Quantitative statistics collected from surveys and administrative records is complemented by qualitative information collected from interviews with industrialists through the industry visits programme.

The Employment Trends and Outlook: This is a major publication produced by the Manpower Planning Department (MPD) and its partners. It pulls manpower information from various sources into a single publication, serving as a one-stop reference guide on manpower statistics, issues, trends and outlook pertaining to each industry. It can also be downloaded free of charge from the Internet. This report serves as a useful reference for individuals, companies, training institutions and planners when devising manpower strategies and programmes. The main sources of information from which this publication draws are also provided in the publications, these include:

- Manpower Demand and Skills Needs Survey (MOM and its partners),
- Economic Survey Series (Singapore Department of Statistics),
- Yearbook of Statistics (Singapore Department of Statistics),
- Mid-Year Labour Force Survey (MOM),
- Occupational Wages Survey (MOM),
- Labour Market Survey (MOM).

The MRSD also produces a 'Manpower Statistics Brief, a pocket sized booklet which provides easy reference of key manpower statistics in Singapore; and the Profile of the Labour Force of

Singapore, which outlines the labour force changes and trends over a ten year period. Various other occasional papers, such as "Manpower News" are also published.

Manpower Planning Group: It organises bi- monthly meetings with MOM and the relevant Economic Agencies and representatives of specific sectors. Discussions focus on manpower trends, problems and prospects in specific sectors, and these are complemented by industry visits.

Employment Review Committee: Meets 2-4 times a year, to review position papers affecting employment in selected sectors, as well as industry sector manpower and training needs among other issues.

Computerised Time Series Database: This is a Public Access Time Series (PATS) set up by the Department Of Statistics (DOS) to enhance the accessibility of LMI to the general public. Subscribers can retrieve up-to-date statistics from various sources without having to search in different locations. Data can easily be downloaded and kept on individual PCs.

Evaluation of LMI: This is done by the DOS, which is the national statistical coordinator. It conducts regular surveys of public sector organisations and monitors their statistical activities.

Information Dissemination Practices

Information collected from various surveys is analysed and published in various publications. Hard copies are available at cost to members of the public and free of charge to organisations actively involved in manpower planning and development. Soft copies can be downloaded free from the Internet site of the MOM.

Lessons learned

The multi-agency collaborative approach to manpower planning adopted by Singapore shows its commitment to developing a highly competitive workforce to support its knowledge driven industries as well as provide a strategic fit between demand for and supply of labour, which is paramount to sustained economic growth. In this integrated approach to manpower planning, the MOM, seeks to ensure that the vision and goals of its partners (private sector, unions, other government agencies as well as its international partners) are aligned to a national manpower vision. Manpower planning issues are thus examined from a totally national perspective, with an integrated and comprehensive strategy for meeting the national manpower needs in numbers and quality.

The greatest challenge for Singapore's MOM is to facilitate an efficient labour market through the provision of timely and reliable labour market information, which makes it possible for policy makers, employers, training institutions, students and other labour market participants to make informed and timely labour market decisions.

Greater efforts and resources are being committed to improving data availability through the publication of easy to read material as well as free downloads of information publications/statistics over the Internet.

The MOM seeks to continuously improve the monitoring of the impact of structural transitions on workers, data collection on the extent of adult training and adoption of new non-standard work arrangements.

3.3 HONG KONG

The Hong Kong Special Administrative Region (SAR) is part of the People's Republic of China, but retains a separate political governance structure and economic system. Hong Kong, has a highly successful economic record as it achieved growth rates of over 5 per cent during a period of 25 years or more. A number of factors have resulted in Hong Kong's reputation as a leading manufacturing and service centre in Asia. Perhaps the most important amongst these are: free enterprise and free trade; the rule of law and a well-educated workforce.

Despite having a very hands-off policy towards the economy, the government plays a significant role in supporting the development of pre-vocational skills. Perhaps the most significant organization influencing skill formation is the Education and Manpower Bureau, whose responsibility is to: (a) provide a well-trained workforce equipped to meet the demands of a dynamic economy; and (b) to contribute to the overall economic competitiveness of Hong Kong, China.

Under the Education and Manpower Bureau is the Vocational Training Council (VTC), the largest provider of skills in Hong Kong, China. The VTC is a tripartite body representing the interests of employers, employees and academics. A total of 22 people sit on this board and together they determine overall policy and strategy for the sector. Emphasis is on pre-employment training and programmes of study leading to a diploma or higher diploma-level qualification, and on developing practical competencies. Around 70 per cent of the time in many programmes is spent on practical activities and the remaining 30 per cent on theory. An estimated 160,000 young people graduate from the VTC each year.

Evolution of skills planning

Planning for Vocational Education and Training (VET) and skills has been going on for just over ten years. Given the emphasis towards free trade and laissez-faire, the Government's support for skills development is primarily concerned with support for pre-employment education and training. However, in view of the continual restructuring of the economy and the move away from manufacturing, there is also a government-sponsored retraining programme that provides displaced workers with the necessary skills to re-enter the labour market. In response to demographic trends, courses are being developed for older people in employment.

The Education and Manpower Bureau is responsible for the following programme areas: kindergarten education, primary education, secondary education, special education, tertiary education, vocational training and employees retraining, construction industry training, employment services, labour relations, employee's rights and benefits and occupational safety and health. The first programme for these different areas was developed in 1997, covering a ten-year period. The Government is now in the process of developing a second programme. Within each of these programmes emphasis is on broad aims, as opposed to specific outcomes or targets.

With regard to skills and VET the mandate of the Education and Manpower Bureau is to advise the Government on the coordination, regulation and promotion of vocational post-secondary and continuing education sectors. In addition, the Bureau advises on future skill needs and on the

disbursement of funds to training providers. As specified previously, under the Bureau is the Vocational Training Council, the largest provider of skills in Hong Kong, China (see figure 9). Under the VTC are 21 vocational training boards (VTBs) covering all sectors of the economy, the composition of which are tripartite. These boards meet every six months to review their sector and to provide feed-back to the VTC on any important trends within their sector.

A number of other bodies report to the VTC including the Employees Retraining Board (ERB), the Apprenticeship unit, the Clothing Industry Training Authority (CLITA) and the Construction Industry Training Authority (CITA). The ERB is a statutory body set up in 1997 to enable displaced workers to re-enter the labour market, particularly domestic workers and security guards. The unemployed person receives training and three months work experience. The employer also receives a subsidy and around 1 million retraining places have been offered since inception. The CITA and the CLITA are also statutory bodies. They were established in 1975 to provide young people with training. Funding for these two bodies is provided from a levy on companies operating in this sector. Recently, the CITA and CLITA have begun to offer in-service courses for older workers in response to the demographic changes. The CITA also carries out trade tests in sectors that have important health and safety considerations.

The country's Apprenticeship Scheme was launched in 1997 to provide on-the-job training for young people in 77 specified trades. Under this scheme employers have to enter into a contract and register with the Apprenticeship Board if they wish to employ a young person. The training lasts for four years. Unfortunately, demand for this type of training has fallen from around 10,000 people in the 1980s, to around 3,000 in 2007. A number of factors can account for this decline, ranging from the length of service to the fact that some skills are no longer in demand.

The final scheme, the Skills Upgrading Scheme (SUS) was launched in 2001 to enhance the employability of low-skilled workers by providing them with industry-specific skills. However, in order to claim a grant, the training has to occur in an expanding industry and one that employs a significant amount of local people. A total of 24 industries have been identified for skills upgrading. The purpose of this scheme is to enable low-skill workers to become more employable in sectors that are expanding.

More recently, in 2004, the Government has endorsed the country's qualification framework, consisting of a hierarchy of seven levels, each of which contains generic descriptions. The development of the different competencies are the responsibility of the Industry Training Advisory Committees, consisting of employer associations, trade unions, professional bodies and other bodies. The Education and Manpower Bureau is responsible for helping to establish these committees and so far nine have been established in the following areas: watchmaking and clock manufacturers, printing and publishing, Chinese catering, hairdressing, property management, electrical and mechanical services, jewelry manufacture, information and communications technology and automotive.

Organizations involved in the LMI process

The Education and Manpower Bureau (EMB), in combination with the VTC, is responsible for tracking skills that are in high demand, and has a particular focus on the demand and supply of skills in sectors that are strategic to the development of Hong Kong. At present the following sectors have been defined as strategic by the Economic Development and Labour Bureau: financial services, trading and logistics, tourism, professional services, creative industries,

information technology and information services. Within each of these sectors the EMB identifies broad macro requirements for the medium term (three to five years). The intention is to provide a general reference or signal to planners, but not specific details on the numbers or type of occupations. The methodology involves a two-pronged approach, consisting of a number of quantitative projections and a series of qualitative studies. The quantitative projections identify demand for broad occupational groups in specific sectors and how they change over time. This is supplemented by a series of establishment surveys, mostly undertaken by the VTBs, as well as qualitative information. Each of these Boards undertakes a survey of skill requirements in their sector every two years.

The EMB determines the manpower requirements for a period of five to six years, allowing them to understand which sectors are most likely to expand and contract. For the period 2002-07 the EMB found that, in line with the continual structural shift towards services in the local economy, future manpower requirements are projected to increase in the financing, insurance, real estate and business services, transport, storage and communications and community, social and personal sectors. As a consequence their combined share amongst the overall manpower requirement will increase from 47.7 per cent of total employment in 2001, to a figure of 51.5 per cent of total employment in 2007. In contrast, employment levels in the manufacturing sector are expected to decline by 61,300 over the same period (see table 4).

Besides changes to the employment levels, the EMB predicts manpower requirements by major occupational categories. Once again the predictions suggest that as the economy shifts towards knowledge-based activities, future manpower requirements are expected to shift towards higher educated and skilled workers at the upper segment of the occupational hierarchy. Over the 2002-07 period demand for professionals was expected to increase by around 3.4 per cent per annum and those for managers by a smaller 1.7 per cent over the same period. In contrast, the numbers in lower level occupations, including clerks and plant and machine operators, are expected to fall annually by 0.8 per cent and 0.7 per cent respectively (see table 5).

Having documented anticipated changes in employment levels within different sectors and the corresponding impact on the occupational structure of the labour force, the EMB anticipates the educational attainment over the same time period. Unsurprisingly, this shows that manpower requirements at the upper secondary level and below are expected to decline, but demand for levels above will increase. In specific terms the demand for workers at the degree level and above will increase at around 6.8 per cent per annum. In other words the demand for workers with higher education qualifications will rise from 19 per cent in 2001 to 27 per cent in 2007.

The second component for understanding demand involves the 22 Vocational Training Boards, each of whom undertakes an annual manpower survey. A look at one of the surveys will highlight the country's sector approach to determining skill needs. The Banking and Finance Industry Training Board (BFITB) is responsible for assessing the sector's training needs and making recommendations to the Vocational Training Council on how these can be met. Within the Banking and Finance sector there are a total of 6,197 establishments and the BFITB implements a stratified sampling method to survey around 7,000 establishments on an annual basis.

One of the first issues to be investigated by each of the Industry Training Board's surveys is the structure and characteristics of their sector. Within the Banking and Finance sector the survey documents how employment levels had changed in the different sub-sectors over the

past two years, as well as current vacancies. Interestingly, the survey found that 1,430 vacancies existed in the sector, the vast majority of which were to be found at the managerial and supervisory levels. Similarly, employers are asked how many new people will be employed over the next 12 months and in what occupational areas. Again, the highest growth levels are expected to occur in managerial and supervisory positions. Another important issue investigated by the survey are the minimal educational qualifications for those working in different occupations within the industry. This has important implications for helping to predict future supply (see below).

How LMI is used to inform and influence policy

Most of the labour market information produced by the EMB and the Vocational Training Boards is used to guide future policies. In response the VTC will review this information and where necessary influence the supply coming onto the labour market through the appropriate vocational training institution. In turn the activities of the VTC are guided by a strategic plan covering a period of eight years, but this is fluid and updated annually in response to new demands outlined by the VTBs. Attempts are also made to influence student choice through career campaigns and career guidance. Within the existing strategic plan the government proposes that 60 per cent of all school leavers should access post secondary education by the academic year 2010-11. This represents an ambitious task, but it is difficult to see how this figure was derived or how it will be implemented.

The way in which courses are funded also has an impact on student supply. For instance, where there is high economic demand for a particular programme of study, and one that requires high capital investment, tuition fees will be paid by the State. However, in subject areas where demand is high and there is no capital investment, such as accounting or business studies, the State will not pay tuition fees. This strategy ensures that state investment occurs in strategic skill areas that the private sector would not support.

The provision of work visas is also used as a mechanism for obtaining skills not available locally. Under this process a firm has to advertise locally, and if they are unable to recruit an appropriately skilled person, they will have to approach the immigration board for a work permit. In turn, the immigration board will approach the VTC to find out whether this skill is in short supply. If the application is approved the employer will be required to pay a levy. This levy will be subsequently used to support the upgrading of local skills through the employees retraining scheme.

There are also two other bodies that respond to employment and skill needs, namely the University sector and the country's Employment Services. The University sector has no direct relationship with the VTC and reports directly to the Ministry. As a consequence the Universities are responsible for making their own decisions about the labour market, with the result that the majority identify what are the most appropriate courses for the market place.

With regard to the Employment Services, they offer a free recruitment service to employers and jobseekers. There are a total of 12 job-based centres and each is linked by an interactive employment website. This website enables employers to register their vacancies and jobseekers to register their CV. In order to support this process of matching vacancies to employee, there is a telephone employment service centre and a processing centre. The employment service centre

handles over 600 calls a day and the processing centre receives around half a million vacancies from employers each year.

The country's Employment Services also provide the following active employment measures for the unemployed: (a) an employment programme for the middle-aged; (b) a work trial scheme; and (c) a youth pre-employment training programme. The first of these, the employment programme for the middle-aged, provides employers with USD1,500 if they employ a jobseeker who is aged 40 and above for three months. This provides a means by which an employer can screen potential workers. The work trial is similar and lasts for around a month, providing the unemployed person with exposure to the workplace. The final scheme provides school leavers with work-based training for a period of eight months. The employers receive an incentive of USD2,000 per month for employing a young trainee.

Lessons learned

Hong Kong provides an example of how labour market information and analysis can be used to develop a coherent framework for future policies, including an identification of future occupations and the number of people needed at different skill levels. This country example illustrates that despite the criticism of manpower planning, it still has a useful role to play in the planning process. However, the evidence also confirms that manpower planning is being used as a tool to signal broad changes in future demand, as opposed to providing a prescriptive blueprint.

The valuable lessons from Hong Kong relate to how the analysis of LMI is used to directly influence the output of graduates from the country's TVET system. The close synergy between the country's 22 Vocational Training Councils and the Vocational Training Board help ensure that labour market information has a direct impact on future supply. In this system there is also a deliberate attempt to understand future demand in a strategic manner and to carefully monitor how this changes over time for occupations in different economic sectors. The experience of Hong Kong also illustrates the importance of having the appropriate institutional structures in place to collect, analyse and utilize information. Moreover, within this approach there is a very short lead time between the identification of skills in high demand and changes in supply, ensuring that the TVET system is responsive to changing labour market demand.

3.4 AUSTRALIA

In Australia, major labour market and education related governmental responsibilities are divided between the Commonwealth and the six states and two territories. The Commonwealth is responsible for public employment services, which have been largely contracted out to private providers. The states are responsible for providing schooling. The Commonwealth provides additional funding to the states for education. The provision of university education is primarily a Commonwealth responsibility. In addition, through the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), the Commonwealth works with states to identify national standards and priorities in the labour market and in the education system.

Generally, the public sector is the primary producer of LMI. In some cases, the public sector provides LMI directly; in other cases, it contracts out production to private LMI providers. In Australia, there is a larger private sector in the LMI field than in many other countries. The private sector works well under public management, providing comprehensive information to the general

public. This can be viewed as one of the strengths of the Australian LMI system. Other features include:

- Efforts are made to offer students LMI in school in order to help youth understand the labour market and succeed in the initial transition from school to work. Recently, the Australian LMI system has become strongly influenced by two key policy issues. The first is to promote Vocational Education and Training (VET) pathways in schools. The second is the growing concern for school drop-outs. As a consequence the LMI system has concentrated more on forging partnerships across the traditional boundaries between educational institutions and employers.

6.

- An increased focus on local labour market information through national initiatives such as the National Career Information System. There is a growing recognition of the need for coordination between national and state governments in order to address the changing needs of information users in the labour market. The LMI produced at the national level is mainly regionalized at the state level, and the LMI produced by the states is more likely to have sub-state regional information. This makes it easier for the Australian LMI system to reflect labour market trends.

All of these strengths in the Australian LMI system help to ensure that LMI provides opportunities for Australians, in particular youth, to develop the skills that will enable them to manage their careers in the changing labour market.

Public sector LMI providers

The Commonwealth Department of Education, Training and Youth Affairs (DEST) and the Commonwealth Department of Employment and Workplace Relations (DEWR) are the key agencies that provide LMI to the public. State education/training authorities and ministries or sub-ministries responsible for employment provide local LMI across the country.

At the Commonwealth government level, DEST provides funding to national and local projects in order to encourage other public and private sector organizations to play a role in the provision of LMI in their sector or region. In addition, it promotes innovation and creativity in the field by funding organizations such as the Enterprise and Career Education Foundation (ECEF) which produces LMI related to local regions and supports local education-industry partnerships.

The main LMI sources produced or supported by DEST include the Job Guide, the Australian Courses and Careers Database (OZJAC) and the National Career Information System (NCIS).

As a national coordinator, DEWR also produces complementary LMI for all Australians. However, compared to DEST's LMI, DEWR's LMI focuses more on statistical information concerning occupations, employment by industry, job prospects and the availability of relevant training. The LMI products supported by DEWR include the Job Outlook, Vacancy Reports and National Skills Shortage List. All of them are located within the Australian Workplace portal website (www.workplace.gov.au). These products are not only presented online, but also distributed through hard copy publication.

Fig 2: The Main LMI Sources Provided by the Australian Government

Provider	LMI Source	Details
Department of Education, Training and Youth Affairs (DEST)	Job Guide	Provides an in-depth look at a range of occupations, and their education and training pathways. It also gives useful information on how to determine what occupations suit job seeker best, based on interests and abilities.
	Australian Courses and Careers Database (OZJAC)	An easy-to-use computer program that can help young people and adults find answers to job, course and career questions. It provides official Higher Education and Vocational Education and Training (VET) courses offered by universities, institutes of TAFE and registered private providers
	National Career Information System (NCIS)	The NCIS delivers a career exploration service, primarily targeted at school drop-outs and used by career counsellors. It is also available to others seeking direction for career options.
Department of Employment and Workplace Relations (DEWR)	Job Outlook	Provides detailed and forward-looking information for around 400 occupations, as well as links to vacancies by region (Australian JobSearch), local education and training opportunities (Australian Training) and information (Job Explorer) for each occupation.
	Job Vacancy Reports	A monthly online report containing the Skilled Vacancies Index; the Information and Communication Technology (ICT) Vacancy Index; and Australian JobSearch vacancies by occupation.

Source: Australia DEST

At the state government level, there is considerable unevenness in the production and provision of LMI. For example, the state of Victoria has a Youth Employment Link (YEL) site, which includes localized occupational profiles and course information. Western Australia's GetAccess websites contain over 300 occupational profiles with a local labour market flavor. Some states have also developed LMI for specific clients. For instance, New South Wales has produced a range of resource materials for its aboriginal population.

LMI delivered through the educational system

State education authorities are involved in the production of career information through the development of curriculum materials, which increasingly have employment related content built in. However, state policies regarding the provision of LMI in schools vary considerably. For example, New South Wales has a full-time career adviser in each secondary school, complemented by school counsellors. The two roles are combined in the form of guidance officers in Queensland. In Western Australia, there is no state policy regarding the structure of career guidance provision and schools make their own decisions. In addition, the location of LMI in state curriculum frameworks varies. In some cases, it is located within personal development, health and physical education syllabuses. In others, it is located within social studies.

The provision of LMI is supposed to start in Year 7 or earlier. The main materials provided in school are the Job Guide and the OZJAC. These are usually supported by a variety of other activities, including careers exhibitions, careers visits, university open days, guest speakers, information seminars, careers libraries and the like. The Real Game, a Canadian career and life skills program, was imported in some schools in order to improve the quality of LMI provided.

Technical and further education (TAFE) institutes are the largest provider of vocational education and training (VET) in Australia. Responsibility for the management and delivery of LMI regarding VET resides with state training authorities. State VET systems produce course handbooks, brochures and fact sheets which sometimes contain information on job prospects and career pathways related to courses provided. Students can obtain the LMI directly. They can also receive LMI from the TAFE career counsellors.

Some universities produce LMI through their career service centres and relationships with industry and professional associations. The material contains career pathway opportunities for special courses, stories of alumni, as well as detailed information on courses. In universities, LMI is provided in all formats: handbooks, fact sheets, brochures and electronic-based media.

The universities in Australia also support the Graduate Career Council of Australia (GCCA), which conducts graduate destination surveys and provides comprehensive analysis of the trends in the graduate labour market for all Australians.

Private LMI providers

In recent years the Australian government has tended to contract out the production of LMI to the private sector. The government also encourages partnerships between the public and private sectors in the provision of LMI. The research and production of much of the LMI provided by DEST is contracted to private companies.

7.

With respect to Job Outlook, officers within DEWR have undertaken most of the research and data manipulation. However, some information such as job turnover estimates and economic employment-modelling forecasts is privately provided.

The private sector in the LMI field is strong in Australia. Most of these private companies are publishing companies or research organizations with an interest in labour market issues. It is estimated that there are more than 250 outplacement agencies and 600 individuals or organizations offering career counselling to the general public.

In effect, many of these providers have participated successfully in a number of the government programs. However, the operation in this sector is less transparent, compared to the public sector. Australia is conducting surveys to evaluate the effectiveness of the private sector in the provision of LMI and its potential for expansion.

Lessons learned

The public/ private arrangement in Australia has proven effective in the provision of LMI by the private sector on a competitive basis. Much of the LMI is based on partnerships between government and the private sector. However, this arrangement also includes some risk. The government will likely have to continue taking actions to improve the LMI quality provided by the private sector.

Addressing young people's LMI needs in the educational system and addressing the needs of high school drop-outs are very important for the LMI system in Australia, since the specialized skill needs of the future labour market can only be met through shaping the skills of all labour force participants, in particular young people. Programs in Australia such as Vocational Education and

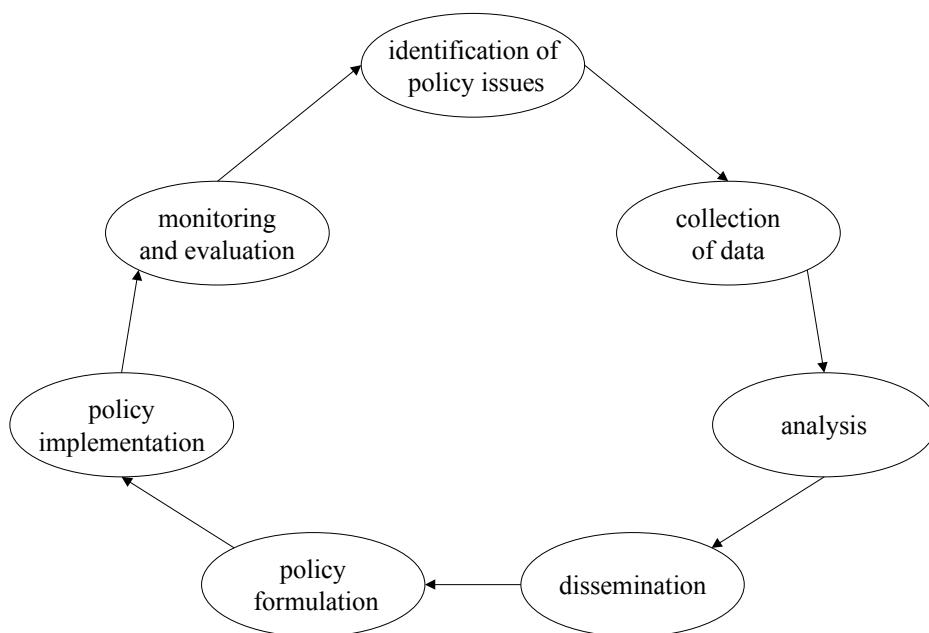
Training (VET) effectively satisfy the youth LMI needs.

In order to describe the changing needs of LMI users in the labour market, local market information should be provided, which can only be done through the coordination between different level of governments or agencies.

4. FEATURES OF AN OPTIMAL LMIS

From our review of best practice in the development of LMIS in a number of countries it is possible to identify some common trends and activities in the development of appropriate mechanisms that handle LMI and ensure that it is made available to policy planners in a timely fashion. These are discussed in this Section. What seems evident from the cases reviewed is that, while the majority of the developed countries have made remarkable progress in establishing and developing institutions that handle LMI, many of the developing countries and transition economies such as Indonesia are still struggling to achieve the same fit.

Figure 3: Labour and Employment Policy Cycle⁶⁸



4.1 BARRIERS TO THE DEVELOPMENT OF A FULLY FUNCTIONING LMIS

While there is increasing recognition of the importance of LMI as a basis for policy formulation and decision-making, progress in the development and use of LMI has been uneven and the majority of developing and transition economies have lagged behind. A capacity gap still exists between, on the one hand, labour market data collection and on the other hand, information analysis and policy formulation. The ILO in its review of LMI in a number of countries made the following statement:⁶⁹

In the area of LMI, as with most other areas, which rely on the production of statistics, there has been a great increase of available data but no great improvement in the ability to understand data and turn it into information.

⁶⁸ ILO working paper 2002, Theo Sparaboom

⁶⁹ ILO, "Employment and Human Resources Development: Information Base on National Policies and Experiences" (ILO, Nov 2001).

While this capacity gap differs in extent and magnitude, it is characterised by a combination of the following factors:

- Limited capacity and instruments to effectively, regularly and in a timely way collect, process, analyse and disseminate relevant and reliable LMI,
- Inability to combine information from various sources and particularly the failure to incorporate data collection exercises on the informal economy into the national framework,
- Inadequate resources for statistical programmes and other activities aimed at generating LMI,
- Inability of producers to co-ordinate efforts or share information,
- Inability of users to specify needs and to translate these needs to producers of LMI,
- Information collected is not further analysed to make it relevant to the needs of policy makers,
- Inflexibility of labour market information systems, that is; inability to respond swiftly to emergency situations,
- Weak structural mechanisms to link policy practice with movements in the labour market,
- Lack of a clear mandate on who should do what,
- Lack of a culture of information use,
- Inadequate balance between qualitative and quantitative LMI,
- Lack of assessment of the relevance and usefulness of information to various users, particularly those outside government ministries and agencies.

Although the identification of these constraints has been relatively easy, the solutions have not. it is possible however to learn from the experiences of those countries that have managed to set up well co-ordinated LMIS. The approach is not to suggest the transfer of systems from one country to another, but to provide lessons from good practices and to transfer these into concrete actions.

4.2 KEY ELEMENTS OF AN OPTIMAL LABOR MARKET INFORMATION SYSTEM

The following key aspects have emerged from the review of successful LMIS in various countries and are detailed here.

4.2.1 Establish an appropriate National Institutional Mechanism to coordinate LMI

Two strategies have been identified that several countries have adopted to establish efficient mechanisms of assessing the usefulness of LMI and to achieve a coherent, comprehensive and systematic flow of information from producers to users. The first and most popular strategy has been to adopt a co-ordinated data collection and dissemination system within the national government. At the helm of the LMIS would be a Labour Market Information Committee, or a Labour Market Advisory and Co-ordinating Committee. The major functions of such a committee are: to co-ordinate activities in the LMIS; undertake the formulation of labour market policies; and to monitor and supervise the implementation of labour market programmes.

In countries with a federal form of government it has been found necessary to involve provincial or state government ministries responsible for education, higher education, training, labour and human resources development. These departments often establish interdepartmental co-ordinating committees to deal with human resource development and training issues and sometimes establish sub-committees that obtain, analyse, interpret and share labour market information. The ministries that play the lead role on these committees then represent provinces

or states on intergovernmental committees co-chaired by a federal and a lead provincial representative. These committees can provide valuable feedback to agencies that collect labour market information because they represent ministries who use such information on a regular basis to develop and implement human resource development and training policies and programs.

The second strategy has been to set up National Employment and Training Observatories. Observatories have been set up across Central and Eastern Europe, the West Balkans and the New Independent States, Mongolia and French speaking Africa. These can be found at sector (industry), local, national, regional or international levels. They often comprise of Employment Services, education planners, training providers, career counsellors, small to medium scale enterprises (SME's), employer and employee organisations, non-governmental organisations and civil society groups involved in human resources development, skill formation and employment issues. Observatories work hand in hand with national training organisations and vocational training centres. They are often closely connected with universities and research centres. They mainly handle qualitative information and they meet from time to time to discuss skill and training needs and other wider labour market issues such as social dialogue, current and anticipated changes in work organisation and collective bargaining. Observatories try to raise awareness and levels of understanding on the state of the labour market, as well as future likely labour market trends. They also advise the government and other policy-makers on labour market policy.

Whichever strategy a country has decided to adopt what is ultimately important is to give the responsibility of co-ordinating the collection, analysis and dissemination of LMI to a specific institution or government ministry. While effective governance is important to any large-scale governmental activity, it is particularly crucial for a nationwide labour market information system. Such an authority should be responsible for, among other functions, assessing policy implications of LMI and disseminating the results at appropriate forums at national as well as regional or local levels.

4.2.2 A systematic approach to a nationwide LMIS should be a fundamental strategy

The Canadian model of LMIS development provides a good example of the key steps that have been followed:

- Conceptualize and plan a “complete” LMI system with shared responsibilities and funding; ministries, other government agencies and private sector partners working together can develop a more comprehensive approach to LMI than each department or agency going on its own;
- Standardization—consistency and standardization of data elements, classification systems, and methodologies is necessary to provide comparable information among different regions and districts;
- Minimize duplication—without a proactive partnership, there is great potential for duplication of effort in development, analysis, and dissemination of information. Not only is this cost-ineffective, it can lead to confusion among users of information;
- Provide optimal coverage—the converse of duplication; a joint effort in planning an LMI system can help develop a comprehensive framework for an LMI system and set priorities for those features that can be funded and developed;
- Effectively use limited resources and funding for LMI—this follows from the above factors; minimizing duplicative efforts and optimizing the range of the system by directly

- involving interested ministries can lead to more effective use of funds and help in justifying funding for LMI;
- Promote the importance of LMI to:
 - i) government policy makers to effectively use LMI in policy and program design; and make the case to politicians and the administration for appropriate funding of the LMI system,
 - ii) the public, businesses, education, and intermediaries as a resource for more effective job, education, workplace, and economic development planning and decision making;
- Effectively disseminate information to all citizens, businesses, education, governmental officials and other users. This is the level at which users may be overwhelmed or unable to easily navigate through LMI resources if each ministry “goes it alone.” Thinking through dissemination in a decentralized system allows for flexibility and innovation across agencies and regions, while at the same time providing a means for individuals to easily move within or across different sites;
- Efficiently use intermediaries, including labour market analysts, counsellors, career facilitators to support clients use of labour market information. Many users will require some degree of support from counsellors and career facilitators. A coordinated approach to the LMI system will assist such intermediaries to better use resources in supporting their customer needs.

4.2.3 Accurate and reliable data is the key to an optimal LMIS

The data sets included in the LMIS are the heart of the system. They define the types of and degree to which labour market related planning, questions, and issues can be addressed. While adequate data alone are not sufficient to ensure an optimal LMIS they are necessary for an optimal system. The data contents of the system define both the breadth and constraints of issues and information that can be analyzed and delivered to various customer communities. There are a number of significant issues and features common to nearly all of the data that comprise the heart of an LMI system.

The most critical issues that must be considered in collecting and compiling labour market data are:

- time period coverage,
- geographical coverage and detail,
- measurement criteria and methods,
- classification of data, and other data-related issues,
- in addition to the above primary factors that relate to every data element in the LMI system there are additional considerations, including timeliness, accuracy, links/crosswalks, establishment of data standards; and the employment of multiple data development approaches in building LMI data bases, including the use of qualitative data.

Without getting into excessive technical detail the important point here is that in building an optimal LMI system it is important that these issues must be considered for each and every data element in the system, or in some instances across data sets. It is not possible to have perfect information for many reasons, not the least of which is the cost of collecting and compiling data,

so in determining the appropriate and feasible level for which a measure can be developed, each of these factors must come into play.

4.2.4 Data should be Interpreted and Analyzed According to Various Customer Needs

An important feature of any LMI system is quality, reliable analysis of the information. The analysis can take on many forms depending on the particular application or there may be generic analyses of trends and comparisons. Examples of types of analyses include the following:

- Narrative analyses of trends over time
- Narrative comparisons between geographies, industries, occupations
- Narrative analysis tailored to different applications
- Graphical presentations of information

These are only a few broad-based examples of analyses and interpretation. There are a variety of different levels of aggregation for examining LMI data. Information can be grouped geographically such as by local, regional, or national areas, or by industry sector. Analyses based on different aggregations can be used to support public and private labour market policies. Intelligence based on LMI can also support strategies for learning and education policies. The key point is that LMI products and services must include analyses that have been undertaken by experienced analysts for the information to be useful to consumers, and that such analyses need to be undertaken at different levels and from different perspectives to serve different needs. For example, simply looking at national unemployment trends would say little about unemployment in a district or at the city/urban level. This leads to our next fundamental component of an LMI system, experienced and well trained analysts at different geographical levels.

4.2.5 Skilled and Informed Labor Market Analysts are Critical to a LMIS

Often overlooked in an LMIS is the value of labour market analysts because so much of the focus is on the data and delivery components of the system. Analysts are key to an optimal LMI system and are critical players in the system for a number of reasons, including:

- supporting data development and compilation,
- interpreting and analyzing the data,
- serving as a source of qualitative information and part of an intelligence gathering system, and
- Providing user support.

Labour market analysts are important to provide interpretations and synthesis of information for policy determination, input to legislation, and information analyses that can impact on major business and stock investment decisions. Analysts may be responsible for surveys or compilation of administrative data, or the development of projections that are part of the core LMI system. They are key to the interpretation of labour market events and trends and can help provide context in which to use the formal statistics for decision making. Most importantly labour market analysts can prepare narrative analysis and presentations that are used on Web sites and other LMI products that provide meaning to the numbers which is more useful to users than raw numbers.

4.2.6 Flexible and Accessible Delivery Systems are Essential

An optimal LMIS must provide easily accessible and useful products and resources to a wide range of clients and build awareness of these resources. It is important that the LMIS be marketed as a resource to assist business, education, job seekers, youth, and others in planning and making labour market related decisions. Clearly the Internet has become an essential means of disseminating LMI, but it is important that other products be available for clients that may not have routine access to the Internet. An optimal system must consider different means of providing access to LMI, such as encouraging community-based organizations, libraries, and other sites to provide Internet access to LMI Web sites.

Generally an optimal LMI system should provide products and resources through both computerized systems and hard-copy publications. However, the emphasis should not be on the number of products but on how an integrated set of LMI products and services can most effectively and efficiently be offered to clients.

4.2.7 Career Development Practitioners and Counselors are an Essential Component of an LMIS

The Internet has provided a powerful tool to disseminate LMI to a wider range of users, providing for many clients easier access and applications tailored to their needs. Not surprisingly, given the cost-effectiveness of Internet delivery, greater emphasis has been placed on self-service systems. A review of the literature on the career decision-making process concludes that all of the studies reviewed show computer-assisted career systems have a positive effect on career planning⁷⁰. However, this finding does not diminish the need for facilitators and intermediaries. The very complexity of the labour market and the increased pace of changes in labour market skill requirements suggests an increased need for counsellors, career facilitators, and the integration of career development into the educational process. Other studies have demonstrated a significant increase in the impact of LMI when it was combined with advice from a counselor, and that the use of a computerized system.

Counsellors, local workforce staff, and career facilitators should be viewed as a fundamental part of an optimal LMI system assisting in career planning, immediate job search, and career transition. Well-designed computer-based information delivery system combined with assisted service can be important to many clients seeking labour market services. In fact, optimal LMI systems may help counsellors serve more individuals by providing easily accessible and tailored information and allowing intermediaries to help clients better use information in their career planning and job search.

4.2.8 Clients and Users of LMI Need to be Educated in its Application to Meet Their Needs

An optimal LMI system needs to market and provide tools to help clients better utilize information, with or without assistance from counselors or career practitioners. One long-term approach is to integrate career planning into the educational system. Just as lifelong learning is quickly becoming the norm for many participants in the labour market, career planning and decision making are lifelong processes and teaching career decision-making skills may help

⁷⁰ Savard, Reginald, Michaud, Guylaine, Bilodeau, Cynthia, and Arseneau, Sylvie. 2005. The impact of LMI on the career decision-making process

individuals throughout their lifetimes as they make major decisions on education, training, and job choices. In Canada public and private organizations have undertaken several initiatives to educate the public on career planning, including:

- The Real Game Series, which introduces career planning through a game approach with various versions designed for population from the third grade through high school.⁷¹
- The Job Futures site operated by Services Canada provides easy access to key information for career planning as well as a simple "Know yourself quiz."
- The development of Web "online coaches." The online coaches allow a user to respond to a series of questions or options that then move the user through the system.⁷²

Providing assistance and educating customers on how to best use labour market information is an important feature of an optimal LMIS. The key is that users not only receive assistance for their immediate needs but learn to use the information in the context of their particular needs that will help them in the future as well.

4.3 SUMMARY OF FEATURES OF AN OPTIMAL LMIS

There are seven fundamental features of an optimal LMI system:

1. good governance and cost-effectiveness;
2. timely, accurate and relevant data
3. effective analysis and interpretation of data;
4. competent labour market analysts;
5. information that is easily accessible to users through a variety of outlets;
6. knowledgeable intermediaries; and
7. Development of education and guides for effectively using LMI.

The importance of effective governance cannot be overstated—many different public and private organizations are likely to be involved formally and informally in developing and delivering LMI. Governance is instrumental to a systematic approach to LMI and must be a fundamental strategy and not an afterthought.

Data sets included in the system must be considered against several dimensions, most significantly: time period, geographical detail, measurement criteria and methods, classification of data, timeliness, accuracy, interrelationships of data sets, and establishment of data standards. Multiple data development approaches need to be considered in an optimal system, including the use of informal data.

Human expertise in LMI is often overlooked. Informed labour market analysts are the core of an optimal system and are important in developing LMI, interpreting and analyzing information, providing qualitative information and serving as intelligence "agents," providing user support.

Flexible, easily accessible delivery systems should focus not on the number of products but on how an integrated set of LMI products and services can most effectively be offered to users.

⁷¹ <http://www.realgame.com>

⁷² <http://www.onestopcoach.org>

An optimal LMI system can help intermediaries to better serve more individuals by providing tailored, easily useable products and services for counselors and other intermediaries.

Use of LMI should be part of a lifelong learning process, particularly as individuals, businesses, and schools operate in a dynamic global economy. It is important for consumers to build their knowledge and skills in how to use LMI to help more effectively participate in the labour market.

5. CONCLUSION AND NEXT STEPS

As stated at the start of this report, the examples of best practice in LMI development and labor forecasting presented in other countries are expected to complement the findings from the surveys of employers, education institutions and government agencies which are currently being completed as part of this project. The results from the surveys will provide a better understanding of how LMI is accessed and used by different stakeholders, the linkages between government agencies at the national and regional levels and the linkages between the education institutions and employers in determining the demand for new skills and the impact on training programmes. Based on the findings we will be in a position to make recommendations to strengthen the LMIS in Indonesia and provide suggestions on how the best model to collect and disseminate LMI can be developed.

The Canadian model which uses an extensive distribution of LMI throughout its provinces and territories could prove a model for Indonesia as the regional jurisdictions operate their own LMIS and coordinate activities with the national government departments and agencies. Indonesia could look at a similar system to address major issues related to the functioning of the labour market in the provinces and regions and recommend the most appropriate means of resolving current and emerging labour market problems. A proposed TOR for Regional Labour Market Coordinating Committees is included in annex 2 to this report. We know from a meeting with the Assistant Deputy Minister, Coordinating Ministry for Economic Affairs that a National Labour Market Coordinating Committee is being established and this could serve as the umbrella agency for the regional committees.

We look forward to assessing the results from the surveys being conducted under the study and to developing a strategy and model to improve the LMIS in Indonesia at both central and regional levels.

REFERENCES

1. Bergeron, L., K. Dunn, M. Lapointe, W. Roth and N. Tremblay-Côté, " *Look Ahead: A Ten-Year Outlook for the Canadian Labour Market* Policy Research and Coordination Directorate and Human Resource and Skills Development Canada, 2009
2. Goldfarb, Robert, and Arvil Van Adams. 1993. *Designing a System of Labour Market Statistics and Information*. Washington, DC: The World Bank.
3. Human Resources and Skills Development Canada (HRSDC). 2005. *Summative Evaluation of HRSDC Labour Market Information Products and Services*
4. Human Resources Development Canada LMI Task Force. 2002. *Literature Review, Best Practices and lessons learned in governance, policies and strategies for LMI and public employment services, Canada and internationally*
5. ILO, *Key Indicators of the Labour Market*, ILO, Geneva, May 2009
6. Powell, M. *Economic Restructuring and Human Resource Development*,2004 (Aldershot, Ashgate Publishing).
7. Savard, Reginald, Michaud, Guylaine, Bilodeau, Cynthia, and Arseneau, Sylvie. 2005. *The impact of LMI on the career decision-making process*
8. Thuy P, Hansen E and Price D (2001): *The Public Employment Service in a Changing Labour Market* (ILO, Geneva)
9. Ziderman, A. 2003. *Financing Vocational Training in Sub-Saharan Africa* (Washington, DC, World Bank).

ANNEXES

ANNEX 1. LMI INITIATIVES AND ACTIVITIES IN CANADIAN PROVINCES

Newfoundland and Labrador

- **NLWIN** (www.gov.nf.ca/nlwin) is a government funded website that provides access to quality, up-to-date, provincial information on Career and Employment planning for residents of Newfoundland and Labrador. Through NLWIN, users may also gain access to national and international information on these subjects via the national resource workinfonet.ca.
- The province has leading two initiatives in the labour market—**Strengthening Partnerships** and **Identifying Skills Gaps**—in partnership with business, labour, and different levels of government to improve access to LMI. The first involves developing regional labour market profiles, workshops and a web portal that better share data and tools. The second focuses on developing data on skills gaps and shortages.

Prince Edward Island

- **PEI Job Futures** (www.pei.jobfutures.org) provides detailed information on employment requirements and skills up to 2009 for 265 occupational groups on P.E.I. The estimates of future employment prospects are based on research, analysis, and the best judgement of the PEI Job Futures team. PEI Job Futures also provides up to date information specific to the P.E.I. labour market. As a supplement to PEI Job Futures, the **PEI Job Chart** was produced as a user-friendly vehicle for delivering LMI to clients. It provides a summary of job descriptions, income information, and employment levels and outlook up to 2009 for 120 occupational groups in P.E.I., all organized by skill type and skill level.
- **PEI Commuting Patterns** examines the relationship between an individual's place of residence in P.E.I. and his/her place of work. It provides information to help people make labour market decisions.

New Brunswick

- **New Brunswick Job Futures** (<http://nb.jobfutures.org>) provides detailed information on 154 occupations that are important to the New Brunswick labour market, including wages and salaries, employment requirements, skills, education and training course availability, future employment outlook, and more.

Nova Scotia

- **Career Options website** (www.careeroptions.ednet.ns.ca) is a web resource for students who need to make career plans, and their parents. It helps students explore their interests through online quizzes. It also explains to students why they should stay in school and how to map out their future.
- The Federal-Provincial Nova Scotia LMI Committee is preparing a set of guidelines and standards for use by sector councils, industry associations and other non-government organizations that are seeking funding to undertake labour market research. This will be circulated with a bilingual copy of the **Guide to Labour Market Research for Sectors and Occupations**, a publication prepared by PEI Business Development Inc. and available for use in Nova Scotia.

Quebec

- **Job Future Quebec** (<http://www150.hrdc-drhc.gc.ca/job-futures>) is an online and printed source that provides information on occupational trends in Quebec. It provides information on statistics, job descriptions, the most up-to-date job titles and the main industries that are hiring for each of the 520 occupations listed in the National Occupational Classification. It also provides a detailed analysis of over 200 occupations with prospects, required training, useful addresses and important pointers.
- **Emploi-Quebec** (<http://emploiquebec.net/anglais/index.htm>) has published a number of analyses of the labour market in Quebec and its regions, with most products available on its website. It provides key statistical information related to the labour market in Quebec, and also develops tools to assist students in Quebec form career plans using labour market information.

Ontario

- **Job Future Ontario** (www1.on.hrdc-drhc.gc.ca) is a publication which provides information on the current trends and future outlook for 163 occupations which are common in Ontario. It is a joint effort by the Province of Ontario and the Government of Canada.
- **Ontario WorkInfoNet** (<http://onwin.ca>) provides employment and career information over the Internet and specializes in providing links to work and career related Web sites in Ontario.
- **Ontario Colleges Application Centre** (www.ontariocolleges.ca) and **Ontario Universities Application Centre** (www.ouac.on.ca) provides administrative systems and application processing services for Ontario's 25 Colleges of Applied Arts and Technology, 3 Agricultural Colleges and The Michener Institute for Applied Health Sciences and 17 universities.

Manitoba

- **Manitoba's Aboriginal Population: A Statistical Profile and Compendium** is a report that provides labour market and education information relating to aboriginal peoples in Manitoba, as well as comparisons of trends between aboriginal and non-aboriginal groups.
- The LMI Unit of Manitoba Advanced Education and Training releases **Weekly E-Report on LMI**, which includes LMI related news, reports and releases from a variety of sources.
- **Manitoba Job Future** (<http://mb.jobfutures.org>) currently consists of 183 occupational profiles. These provide detailed information on employment prospects, wages and salaries, skills, working conditions, and education/training routes. The profiles address current and anticipated conditions in the Manitoba labour market and are developed for students, guidance counsellors, parents, or anyone choosing or changing a career.

Saskatchewan

- **Saskatchewan Job Futures** (<http://saskjobfutures.ca>) provides important information about hundreds of Saskatchewan occupations, researching particular occupations in depth, and includes comparisons of wage rates, education and training requirements, and employment potential for several occupations at once. Saskatchewan Job Charts is complementary to Job Futures and it provides quick summaries for each of the occupations profiled on Job Futures.
- **Saskatchewan Learning** (www.sasked.gov.sk.ca) provides students and parents with

information related to learning in Saskatchewan. It includes information on school boards, teachers, subjects or programs in each school, college and university. Its online learning centres offer learners e-learning opportunities based on partnerships with most institutions in Saskatchewan.

Alberta:

- Alberta opened the “**Alberta Career Information Hotline**” to help workers find appropriate LMI. Career consultants are made available by telephone, e-mail or fax to provide information on career planning, job searching skills, occupation descriptions, education options and education funding. This initiative increases the range of delivery of LMI in Alberta.
- Over the past several years, Alberta Human Resource and Employment focused on working with employers and industry. It has developed new **LMI products for employers**, including publications on workplace rights and responsibilities, work-life balance, recruitment and retention strategies etc. These products are available online at www.alis.gov.ab.ca/careershop.
- Alberta Human Resource and Employment has also developed a labour supply and demand **Dashboard**, which looks at the unemployment rate, vacancy rate, and hiring difficulty rate for a number of occupations, serving as a “red-yellow-green traffic light system” to identify labour market concerns.
- **Labour Market Information** website (www.gov.ab.ca/hre/lmi) is a collection of online LMI products in Alberta, which includes information on labour force statistics, labour market outlook, labour force profiles for special groups, and a regional occupational forecast.

British Columbia:

- **The Work Future**, the British Columbia occupational Outlook provides a comprehensive description of close to 200 occupations which relate directly to the B.C. labour market. B.C.’s Ministry of Advanced Education and Service Canada recently released *Hands On! Work Futures for Trade and Technical Occupations* (<http://handson.workfutures.bc.ca>), which provides information on trades and technical occupations in B.C. for potential trades and technical studies, career counsellors, youth, parents and the public.
- **WorkInfoNet** Website (www.workinfnet.bc.ca) offers useful LMI on the B.C. labour market. One of its effective features is that information is well-organized according to target user groups such as adults in transition, educators, newcomers, employers, etc. This makes it easy for users to navigate the website.
- **What’s Key** website (www.whatskey.org) is a catalogue of selected information resources for British Columbia’s career practitioners, young people and adult job-seekers. This website and the companion brochure were designed to steer users toward an array of selected LMI sources and tools, handpicked by knowledgeable practitioners.

Source: FLMM-LMI Working Group (2005) *LMI Research and Best Practices Newsletters*, Fall 2005- Issue 3.

ANNEX 2: TOR FOR REGIONAL LABOUR MARKET COORDINATING COMMITTEES

The Regional Labour Market Coordinating Committee should be established to coordinate and advise on all matters related to the collection and dissemination of labour market information. The committee would have the following responsibilities:

- to address major issues related to the functioning of the labour market in the region and recommend the most appropriate means of resolving current and emerging labour market problems,
- to facilitate inter-agency cooperation and coordination in the collection of labour market information and arrangements for the dissemination of data,
- to serve as the focal point on all labour market information matters,
- to identify specific economic and employment-related development opportunities facing the region,
- to prepare a labour market action plan (LMAP) to address the short to medium term labour market needs facing the region, new skills and training required, new or special initiatives to promote innovation in the labour market,
- to develop proposals and budgets for funding support from regional and national levels of government,
- to report issues to central government agencies and participate with other regional LMI committees on a national committee.

Suggested issues that could be addressed by the Regional LMI Coordinating Committee

1. Development of a comprehensive labour market information and reporting system
2. Identifying skills demand in the regional growing sectors, new investment projects identified, foreign employment etc.
3. Measures to address the problem of youth employment
4. Measures to strengthen linkages between the training institutions and private sector
5. Requirement that all TVET programs include an internship for students
6. Develop a culture and sustainable support mechanisms for TVET in both family and youth populations

**Appendix 1 - Annex 2 Improving Technical and Vocational
Education and Training in Indonesia**

REVIEW OF INTERNATIONAL EXPERIENCE

Indonesia aims to become a high growth economy. This paper assesses the experience of high growth economies in developing and improving technical and vocational education and training (TVET) in search of ideas for the further development of TVET in Indonesia. It has been prepared as part of the ACDP 016 study on Linking the Master Plan for Acceleration and Expansion of Economic Development to Programming in the Education Sector. The study is guided by the goals, objectives and strategies of Indonesia's new Five Year Plan.

Surveys of the capacity of vocational secondary schools (SMK) and skills training centers (BLK) to acquire and use labor market information are being conducted. Data from these surveys will be essential to using lessons from international experience.⁷³

OVERVIEW

Improving technical and vocational education and training (TVET) has always been an important part of Indonesia's development strategies. A large and generally effective system of vocational secondary schools (SMK) and skills training centers (BLK) has been created. Academic secondary schools (SMA) have also made important contributions by preparing youth not only for advanced study in post-secondary education and universities but also for productive employment, primarily in the services sector for those that enter the labor market after graduation.

Indonesia's new goal is to become a high-income country, moving from reliance on commodity exports to a broader economy of high productivity, high wage employment across the sectors. The core strategy of the new Five Year Plan is Regional Development to move toward this goal through investment in seven economic zones, each with its own comparative advantage for growth but all sharing a commitment to developing Indonesia's maritime assets and opportunities as a means to reduce regional disparities. The objectives are to increase the capacity of human resources, improve productivity, strengthen the capacity of science and technology, invest in integrated infrastructure (roads, ports, connectivity) and make best use of Sea Lane of Communication (SLOC). Good governance will be an important factor in implementation.⁷⁴

Clearly, Indonesia's TVET system, and indeed all of education, will need to change and improve for this ambitious goal to be achieved. Just as the economy aims toward higher productivity, so must the education and training system

The TVET systems of high-income OECD countries have made important contributions to equitable economic growth and they have had to change and evolve as their economies have changed. Relevant experience from OECD countries will be reviewed here. Selected international studies of skills change and TVET will also be consulted.

Germany's Dual Apprenticeship system will serve as a benchmark example of TVET that is directly connected, through apprenticeships, to employment and economic change. In Germany, students are tracked to the Dual System or to secondary education leading to post-secondary and university education by a test administered when they finish primary school at age 13.

Only Switzerland and the Netherlands have been able to fully adopt the German system because of its central reliance on effective and sustained collaboration of Federal and Lander (State) governments, enterprises and employer associations, and labor unions. Many developing countries have tried to this, but have been unsuccessful.

⁷³ Survey data were not available when this report was prepared.

⁷⁴ Government of Indonesia (2015) National Regional Development Direction 1015-2019

Most relevant to Indonesia are the experiences of large, decentralized countries that have relied on schools to provide most TVET and on student choice in the education market place. In this paper we will look at the United States, Australia and Norway, all of which meet this criterion,

Germany, Switzerland and the Netherlands have TVET systems that more or less adapt on their own to changes in the economy, in employment and in skills demand. This is because employers do much of the training in their own facilities, with the latest management and technology. Today's apprentices at Volkswagen have a different learning experience than those of twenty, or even five, years ago. In addition, the number of apprenticeships that employers offer each year depends on the number of skilled jobs they expect have when the apprenticeships end three to four years later. Data on these offers provide a reliable indicator of future employer demand for skills.

Moreover, employers, labor unions and Federal and State governments govern and manage the dual system together. Representatives of unions, and also workers, vote on company boards of directors. When the 2007-8 recession hit Germany, the tripartite partners decided on an employment strategy in about a week after consulting with workers. The agreement was that German workers would give up one or more days of work each week to enable all workers to stay employed.

USA, Australia and Norway do not have self-adapting systems like that of Germany. With manpower planning proven not to be effective in guiding education decisions, these countries have developed systems that are more or less balanced in combining student choice with use of labor market information that seem to work, not as precisely as in Germany, but in a way that empowers students.

These seem to be relevant systems for Indonesia to consider.⁷⁵

The paper is structured in five parts:

Part I will summarize the current state of skills development in Indonesia using available recent empirical research.

In Part II we will briefly look at the question of TVET modes, using the experience high growth economies. The question is: Does Indonesia have the right TVET modes?

Part III will look broadly at economic development and skills demand, in part based on the Asian Development Bank's framework that links different stages of development to TVET policy and systems, suggesting where Indonesia is and where it might go in general terms. Also reviewed will be how skill demand has been changing in high growth economies, including as well research that demonstrates the economic value of good quality general education.

Part IV will benchmark the German experience and then review the USA, Australian and Norwegian TVET systems. The focus will be on how these decentralized system function to link TVET to economies and employment. Modes and models of instruction are not of central interest here except when they illustrate how a given country seeks to improve links between TVT and

⁷⁵ It may well be that Indonesia used the Norwegian model in reforming the SMK to career curricula instead of occupational skills.

employment, because as we well see, all modes can be effective if well-managed, responsive to labor markets and skill demand, and well financed.⁷⁶

Part V will draw on the previous discussions to make suggestions that may be useful in improving the capacity Indonesia's current TVET system to meet the challenges of regional development set out in the Five Year Plan.

I. MAIN CHARACTERISTICS OF CURRENT SKILLS IN INDONESIA

The First Progress Report of ACDP 016 provided a data based overview of the current skill status in Indonesia.⁷⁷ Here will simply highlight elements that help guide the search for international experience.

- Overall, there is a quantitative balance in demand and supply for tertiary and secondary graduates'
- All employers expect demand for skills to increase over the next 10 years
- Employers have the most difficulty in filling vacancies for directors and managers
- Employers consider basic skills (math and literacy), thinking skills, computer skills and behavioral skills to be most important.

But there are reasons to suspect that employers see little difference between SMA and SMK graduates.

SMK and SMA graduates have similar labor market experience

- Unemployment rates of SMA and SMK graduates are about the same
- In 2004 SMK graduates earned 5 percent more than SMA graduates; by 2007 that difference had narrowed to about 2 percent
- SMA and SMK graduates each take about five months to find a job

SMK education is more costly than that of SMA.

Indonesian firms find that SMK and SMA graduates need the most training. In most countries, employers provide the most training to managers and professionals, but in Indonesia employers provide the most training to skilled workers, even though vacancies for professional and directors are most difficult to fill (see Table 1).

Employers clearly have to train to make up for deficiencies in the entry level skills of SMK and BK graduates.

Finally, employers see little difference between the quality of SMA and SMK graduates (Figure 1)

⁷⁶ This was a main finding of the first global student of technical and vocational education in developing countries. See Middleton, John, Adrian Ziderman and Arvil Van Adams (1993). *Skills for Productivity*. Technical and Vocational Education and Training in Developing Countries. New York: Oxford University Press and World Bank.

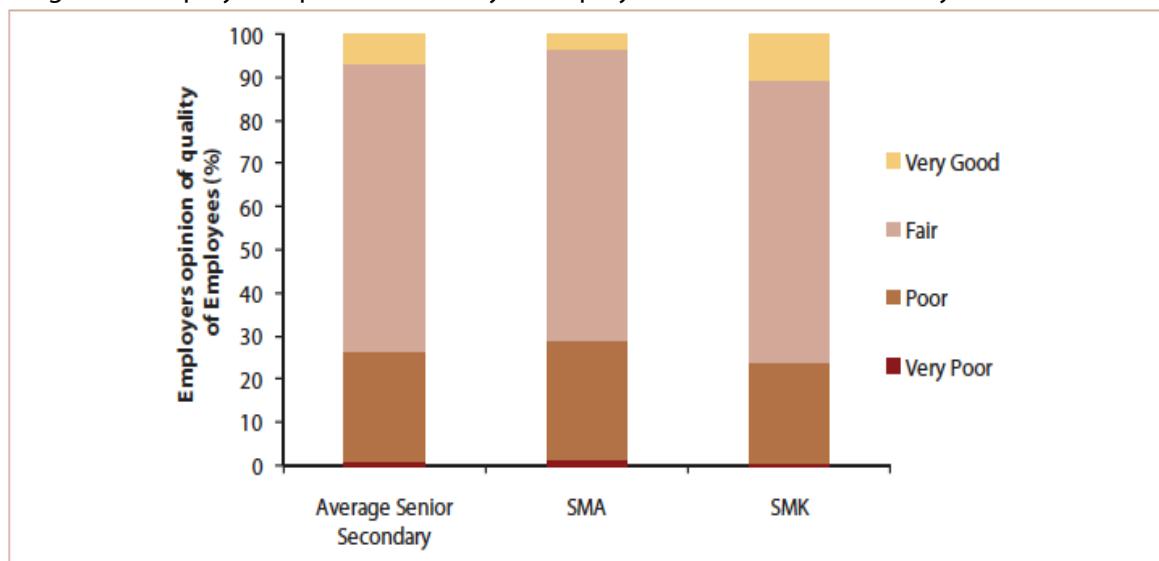
⁷⁷ Linking the National Plans for Acceleration and Expansion of Economic Development to Programming in the Education Sector. PT Trans Asia Intra Asia Indonesia.

Table 1: Indonesia: Share of Staff in Need of Training, by Schooling Level⁷⁸

<i>Schooling level</i>	<i>Share of staff identified by firms as in need of training (%)</i>
Primary (incomplete)	5.36
Primary (complete)	18.47
Lower secondary	22.17
General upper secondary	32.22
Vocational upper secondary	28.90
University	21.37
Diploma program	25.85
Postgraduate	5.90

Source: Indonesia Employer/Employee Survey of Skills/Labor Demand and Job Vacancies 2008, Employer Module.

Figure 1: Employers Opinion of Quality of Employees with Senior Secondary Education



Source: Indonesia Skills Report, World Bank (2010)

⁷⁸ Emanuela di Gropello, with Surlien Kruse and Pratoneek Tandon (2011). Skills for the Labor Market in Indonesia. Trends I Demand, Gaps and Supply. Washington, D.C.: World Bank. p.135

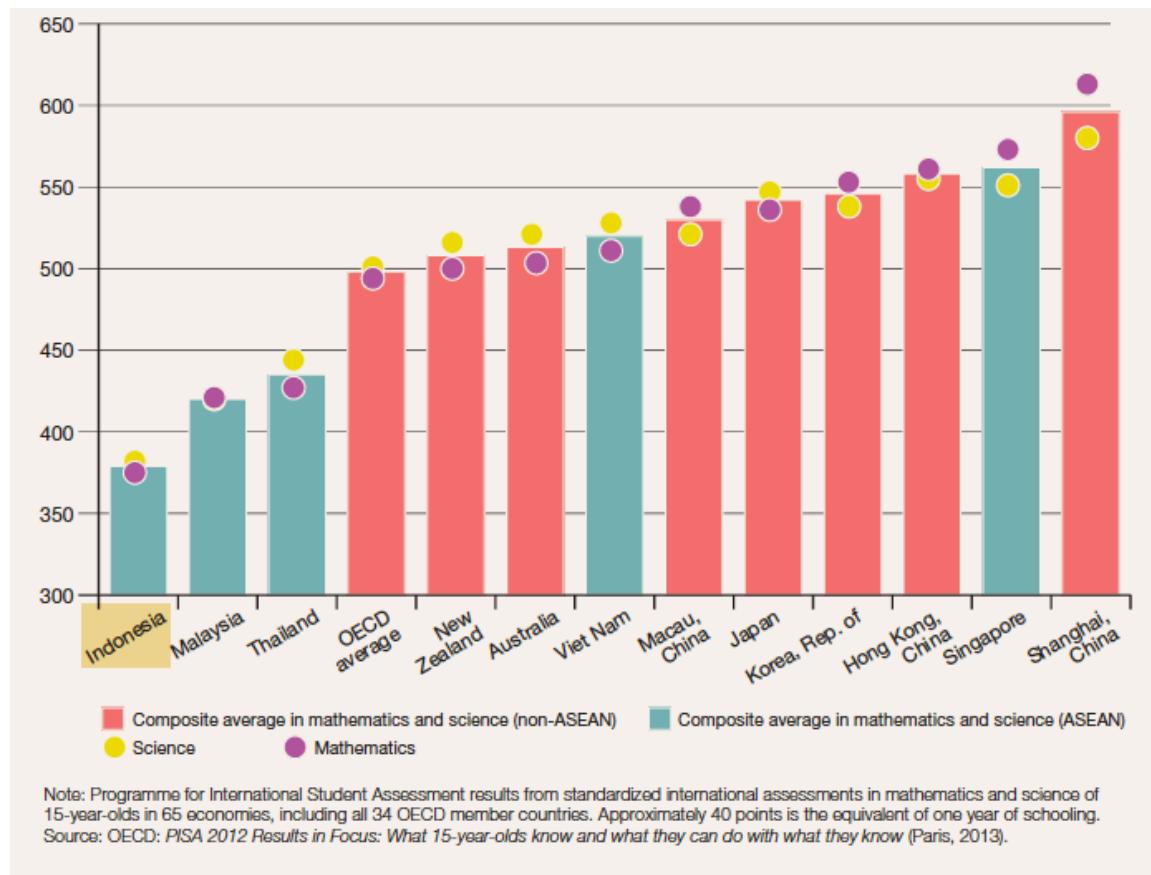
Indonesia's employers give most importance to cognitive and behavioral skills and devote more training resources to SMA and SMK graduates than to professionals and directors.

If there is a skill mismatch between jobs and education it is not in vocational skills, but in the cognitive and behavioral skills that employers most value, so much so that they spend the largest share of their training budget on skilled workers to compensate for skills not learned in school.

Indonesia has a regional competitive disadvantage in developing cognitive skills as measured by the OECD's PISA examination program. (Figure 2 below).⁷⁹

Figure 2: Mean score in mathematics and science, PISA, 2012

All of this explains why virtually all recent international studies of employment, skills and



education give priority for medium and long-term development to improving the quality of primary and secondary education, not only for employment after school, but also to raise the quality of post-secondary and tertiary education.⁸⁰

⁷⁹ ILO and Asian Development Bank (2014). *ASEAN COMMUNITY 2015*. P.57.

⁸⁰ Di Gropello et. al. (2011) op cit. (2010). *Education, Training and labor Market Outcomes for Youth in Indonesia*. Washington, D.C.: OECD and Asian Development Bank (2015). *Education in Indonesia. Rising to the Challenge*.

II. INDONESIA'S SCHOOL-BASED TVET IN GLOBAL CONTEXT

There is no single best mode of delivering secondary technical and vocational education. Across the economically advanced countries there are varying combinations of school and work-based programs (almost exclusively variations of The German dual apprenticeship system) and school-based vocational and technical education (Figure 3).

TVET in Australia, Canada, Sweden, the United Kingdom, Korea, Italy and Japan is almost entirely school-based. This is also true of pre-employment TVET in the USA (not shown on the chart) where it is offered in comprehensive secondary schools where virtually all students take a few vocational courses, and in a variety of secondary technical and vocational schools and programs.

Apprenticeship systems modeled on Germany's dual system that combines classroom training with learning on the job in formal apprenticeship are dominant in Switzerland, Germany, Denmark, Hungary and Ireland.

The remaining 16 countries have a more or less balanced mix of school and apprenticeship approaches.

In 12 countries 50 percent or more of the secondary students are enrolled in vocational schools or apprenticeship systems. In eight the share is 30 percent or less. Adding the United States where secondary vocational education is too small to be counted in the OECD chart brings the total to 9 countries.

With the exception of Hungary and Turkey, all of these are high-income countries measured by GDP per capita.

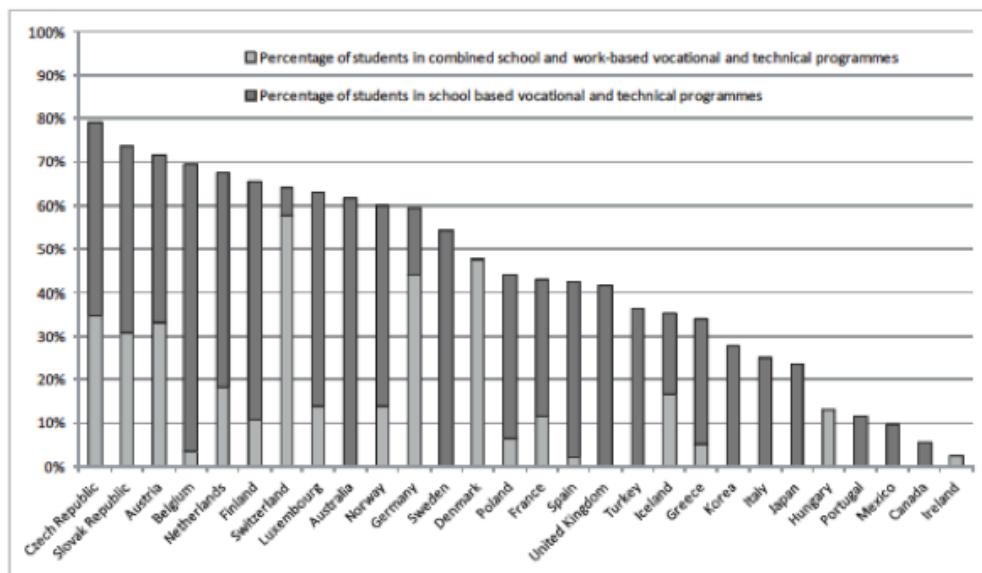
Obviously national wealth and income is not determined by the mode of TVET. And it is safe to say that a variety of approaches have worked in the rich countries.

The share of secondary students enrolled in TVET varies widely, from 4 percent in Iceland to 80 percent in the Czech Republic.

The first comprehensive study of TVET in developing countries found that any mode of TVET could be effective if it was well managed and financed.⁸¹ The challenge to middle-income countries with established TVET systems is not to alter the established mode (i.e., replace school-based TVET with apprenticeship) but to invest in improving the mode (or modes) that are in place.

⁸¹ Middleton, John, Adrian Ziderman and Arvil Van Adams (1993). *Skills for Productivity. Technical and Vocational Education and Training in Developing Countries*, Washington, D.C.: World Bank and Oxford University Press.

Figure 3: Vocational education and training as a share of the upper secondary sector (ISCED 3), 2006



Source: OECD (2008), *Education at a Glance 2008: OECD Indicators, Table C1.1*, OECD, Paris.

Indonesia's current school based TVET system is similar to that of many high income countries, and improving this system is likely to be the most feasible and economic of any policy options.

III. SKILLS CHANGE IN THE ECONOMY

As economies change education and training must change as well.⁸² Education systems take considerable time to change and there can be an intellectually and politically challenging decision about what to change, when and how.

Forty years ago the (too) simple idea was to project the number and type of skilled workers that would be needed in different sectors by calculating the shares of different occupations – managers, engineers, technicians, production workers, craft persons, unskilled workers – in the current economy and multiplying these by the expected rate of growth in the economy.⁸³

With hindsight, we now know that the structure of economies, employment, production and skills demand can change quickly and in unexpected ways making longer-term projections unreliable. But it is still important to link education and training policy and strategy to medium-term economic strategies and plans. It is also important that students in secondary schools learn about the world of work through counseling and also through some short experience in the work place in order to make better plans for their post-school futures. Because TVET students are being prepared for jobs in specific industries or occupations, work experience in appropriate enterprises helps them develop the teamwork and communication skills that improve their productivity in their first job. This is good for employers and students both.

Over the last decade there has been an animated debate, fortunately supported by good economic research, regarding the impact of globalization and technological change on the skills required for competitiveness in the very rapidly evolving global economy. The research has been greatly aided by much better measurement of learning achievement through international testing. And instead of equating skill demand with occupational categories, education certificates and projected employment growth we are now measuring changes at the level of skills.

The research is concentrated in high income, high technology economies but the findings are instructive for economies, such as Indonesia, that aspire to high-income status. And while it is common to talk about rapid economic and skills change, the research suggests that this happens over decades, not years.

For strategic thinking about TVET in changing economies like Indonesia it is useful to take three kinds of analysis into account. Perhaps most fundamental is research that shows that investments in school quality that lead to higher cognitive skills contribute substantially to higher earnings and economic growth. The second important body of research analyzes the impact of computer technology on work and skills.⁸⁴ The third kind

⁸² For analyses of linking education to economic change see Rita Almieda, Jere Behrman and David Robalino (eds) (2012). The Right Skills for the Right Jobs. World Bank; Atchaoren, David (ed) (2000). The Transition of Youth from School to Work: Issues and Policies. UNESCO/International Institute for Education Planning. Paris.; Gill, Indermit S., Fred Fluitman and Amit Dar (Eds) (2000). Vocational Education and Training Reform: Matching Skills to Training and Budgets. Washington, D.C. and Geneva: World Bank and International Labor Organization

⁸³ This explanation of fixed coefficient manpower planning is much too simple but reasonably accurate for the purposes of this discussion,

⁸⁴ These economic findings have had an important place in public and political debate on the future of the US economy after the 2007 recession. See McKinsey Global Institute (2009). Changing the Future of America's Workforce: A Human Capital Challenge. Boston

of research analyzes the stages of development in across Asia countries to identify the most appropriate models of education and training at each stage.

Cognitive skills and economic growth. Using the results of international achievement tests that measure cognitive learning in secondary schools, Eric Hanushek found that a one-half standard deviation improvement in the test scores of US students would increase America's GDP by two percent twenty years later through higher earnings in work. This would be worth an estimated US\$ 250 billion, more than enough for substantial investments in school quality. The research also shows that similar impact occurred as part high growth in East Asian economies that rapidly expanded and improved secondary and tertiary education.⁸⁵

Investments in the quality of basic and secondary education have a significant economic payoff in high growth economies and in those countries aspiring to high growth status as well.

Technology change and jobs. We also know more about the impact of technological changes on workforce skills and the implications for education and training strategies.

Economists now have measures of actual skills used in employment in the US and other high-income OECD economies, replacing the long-standing use of occupational categories and levels of education in the economic analysis of education investments. Rather than compare the earnings of factory workers and electrical engineers, we can now also look at the differences in kinds of skills that are used in work.

These measures have made it possible to measure the impact of computers on skills demand. Research has made it clear that computers (and other uses of digital technology) substitute for workers in some cases and complement an increase their productivity in others. The question for research was for which kinds of work tasks do computers substitute for and which kind is they complements.

As can be seen in Box 1, tasks are classified on two dimensions. One discriminates between jobs with analytic and interactive tasks that require thinking, information processing and interactions with others, and tasks that are manual. The other dimension compares routine tasks and non-routine tasks – the latter requiring flexibility, creativity, problem solving and complex communication, and the former tasks that a computer can easily be programmed to do.⁸⁶

Box 2 shows changes over forty years in shares of the labor force employed in occupations with intensive use of skills of each kind. The shares of the labor force in jobs using non-routine thinking and non-routine interactive skills, where computers are complementary, increased substantially, while the share of jobs using routine skills fell sharply. In sum, more jobs required more and higher cognitive analytical and interpersonal skills while the share of jobs using of routine manual skills declined.

This research gives us insight into how digitization (often called "technological change) impacts skill demand and help explain why the US and other advanced economy are seeing middle skilled jobs and salaries decline while jobs and wages for the top 10 percent

⁸⁵ Hanushek, Eric A. Alternative school policies and the benefits of general cognitive skills. *Economics of Education Review* 25 (2006) 447-462

⁸⁶ Autor, Levy and Murnane (2003)

increase quite sharply.⁸⁷ There are clear implications for education and training policies and investment. Importantly, demand and salaries have increased for workers with the better cognitive skills (language, math, science) that are learned in good secondary schools and colleges.

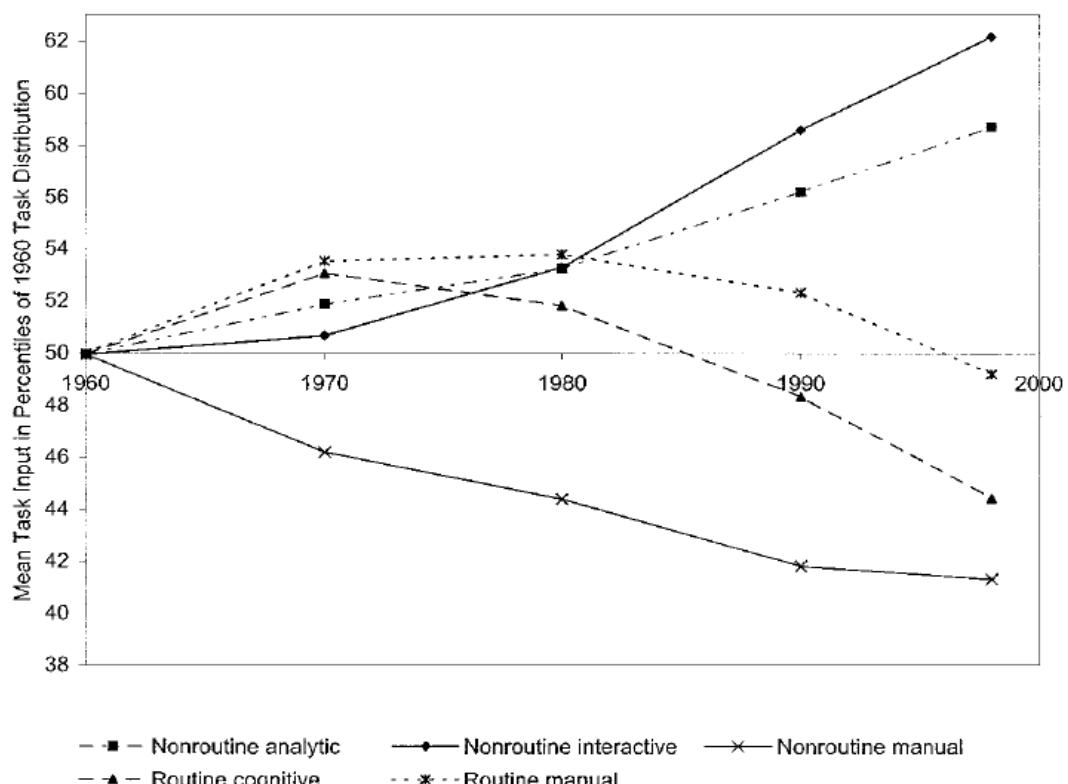
Box : Impact of Computers on Work Tasks

(Source; David Autor, Frank Levey Richard J Murnane 2003).

TABLE I
PREDICTIONS OF TASK MODEL FOR THE IMPACT OF COMPUTERIZATION ON FOUR CATEGORIES OF WORKPLACE TASKS

	Routine tasks	Nonroutine tasks
Analytic and interactive tasks		
Examples	<ul style="list-style-type: none"> • Record-keeping • Calculation • Repetitive customer service (e.g., bank teller) 	<ul style="list-style-type: none"> • Forming/testing hypotheses • Medical diagnosis • Legal writing • Persuading/selling • Managing others
Manual tasks		
Examples	<ul style="list-style-type: none"> • Picking or sorting • Repetitive assembly 	<ul style="list-style-type: none"> • Janitorial services • Truck driving
Computer impact	<ul style="list-style-type: none"> • Substantial substitution 	<ul style="list-style-type: none"> • Strong complementarities
Computer impact		
		<ul style="list-style-type: none"> • Limited opportunities for substitution or complementarity

Box 2: Trends in Routine and Non Routine Task Input 1960 to 1998



Recent research on the pace of technological change and changes in employment by occupation over the past two decades suggest that, across the OECD, that this has been a general and steady process.⁸⁸ Data that shows changes in skills confirm that the demand for cognitive and interpersonal skills is rising while the demand for craft skill and manual labor has declined (see Table 2). The study recommended that students have access to guidance manuals that provide a “full understanding” of jobs and wages available in the labor market, their entry requirements, working conditions and wages,

Table 2: Trends in Occupation Shares of the Workforce in our OECD Countries
1990 to 2009

	Occupational distribution		Decadal change in percentage points							
	1960	2009			50-60	60-70	70-80	80-90	90-00	00-10
			Professional	Managers	Professional	Managers	Clerks	Sales	Services	Agriculture
USA	Professional	10.5	21.9	Professional	1.6	2.8	1.5	1.8	2.0	2.7
	Managers	9.6	15.4	Managers	0.6	0.0	0.8	1.4	1.3	1.2
	Clerks	13.4	13.0	Clerks	0.9	2.6	0.7	-0.2	-1.2	-2.2
	Sales	10.1	11.2	Sales	3.0	-0.2	1.1	0.8	-0.1	-0.3
	Services	11.8	17.6	Services	1.5	0.3	1.0	-0.1	-0.2	2.7
	Agriculture	9.7	0.7	Agriculture	-2.9	-4.7	-1.3	-0.1	-0.1	-0.2
JAPAN	Production	34.9	20.3	Production	-4.7	-0.7	-3.7	-3.6	-1.8	-3.8
	Professional	5.0	15.6	Professional	0.7	0.8	2.1	3.2	2.3	2.4
	Managers	2.1	2.7	Managers	-0.5	0.6	1.3	-0.1	-0.6	-0.6
	Clerks	11.2	20.8	Clerks	2.8	3.6	1.9	1.9	1.5	0.8
	Sales	13.4	13.8	Sales	1.4	-0.4	1.4	0.7	-0.9	-0.5
	Services	6.1	12.9	Services	3.5	0.9	1.3	0.2	2.0	2.6
GERMANY	Agriculture	29.8	4.1	Agriculture	-13.3	-12.5	-7.0	-3.1	-2.2	-1.0
	Production	32.4	30.1	Production	5.4	6.9	-1.1	-2.7	-2.0	-3.8
	Professional	7.9	25.6	Professional	-	3.1	3.3	3.1	2.0	3.8
	Managers	3.3	5.1	Managers	-	-0.9	0.6	0.4	1.9	0.0
	Clerks	12.4	20.4	Clerks	-	7.4	1.2	1.2	0.2	-1.1
	Sales	7.8	8.5	Sales	-	2.1	-0.9	0.5	-2.5	0.3
Other OECD	Services	7.9	12.7	Services	-	2.7	0.8	0.4	-3.1	1.9
	Agriculture	14.1	2.9	Agriculture	-	-6.0	-3.2	-1.6	0.7	-0.4
	Production	46.6	24.8	Production	-	-8.3	-1.8	-4.0	0.7	-4.4
	Professional	6.9	23.9	Professional	1.9	3.1	3.8	3.0	3.7	3.5
	Managers	2.8	7.2	Managers	-1.9	0.6	0.2	1.6	2.0	0.0
	Clerks	8.9	15.5	Clerks	-1.0	3.1	1.9	1.1	0.7	-0.4
	Sales	8.0	10.0	Sales	2.4	0.3	0.6	0.9	-0.3	0.5
	Services	8.7	14.2	Services	1.1	-0.1	1.8	0.5	1.7	1.5
	Agriculture	28.3	6.4	Agriculture	-7.5	-7.2	-5.8	-3.6	-3.6	-1.7
	Production	36.6	22.9	Production	2.6	0.9	-3.0	-3.9	-4.4	-3.3

Education and Training at Different Stages of Development. A TVET policy study published by the Asian Development Bank in 2004 developed a broadly useful model that suggests the type of education and training that best serves economies at different stages of development (Box 3).

While all such models are approximate they are helpful in thinking about directions for change and development in education and training both to manage well the economy as it is and, at the same time, take steps to adapt the current system for the future economy.

By the ADB scale Indonesia would appear to be well into the stage of investment-driven growth while aspiring to the level of Innovation Driven Growth. Reaching this goal will require more work develop its education training systems at all level.⁸⁹

⁸⁸ Michael J. Handel (2012). Trends in Job Skills in OECD Countries. OECD Social, Employment and Migration Working Papers No. 143. Paris

⁸⁹ Recent evaluations of education and training in Indonesia all point to the priority of improving the quality of outcomes of primary and all forms of secondary education, academic and vocational. See DiGroppello (2010) op. cit. OECD

Box 3: The Role of Education and Training in Different Stages of Development

"A. FACTOR-DRIVEN GROWTH

In countries at this stage of economic development, such as the People's Republic of China (PRC), India, and Sri Lanka, the primary sector is often predominant, with the focus on extraction of natural

Resources. The main economic challenges are to get factor markets functioning properly so as to utilize land, labor, and capital properly. Full employment is a principal objective as employment in the agriculture sector declines. Manufacturing is characterized by labor intensive activities leading to low value-added production. Competitiveness derives from the low cost of production, of which low wages are a key factor, and the ease of access to external markets. Policy efforts aim in particular to keep labor costs in check.

Development at this stage does not require massive investment in TEVT. "High levels of education and training are not required for the production of low value-added goods and services (Ashton and Green 1996, 32)." Priorities for education and training are universal basic education, low-level vocational skills development, and inculcation of disciplined work habits. A small but strong capacity in basic training also is an important priority. Establishment of a training authority, with employer participation, would be appropriate to respond effectively to the different markets for training (Middleton et al. 1993, 266)

B. INVESTMENT-DRIVEN GROWTH

The secondary sector is predominant in countries at this stage of economic development, such as Malaysia and the Republic of Korea. The chief economic challenges are to (i) attract foreign direct investment (FDI) and imported technology to exploit land, labor, and capital resources; (ii) develop flexible labor markets (easy entry-easy exit); and (iii) link the national economy with the global economy. The economy is characterized by export manufacturing and outsourced service exports. Production concentrates on high value added goods and services. Competitiveness is based mainly on high quality, technologically advanced, flexible production using imported technology. "High performing" companies burgeon.

The importance of education and training in the current era of international competition applies mainly to goods with high value added. "To compete in these markets...the evidence for the importance of high levels of education and training is overwhelming (Ashton and Green 1996, 32)." Economic growth at this stage witnesses an acceleration of demand for skills—particularly at the higher levels—and a corresponding decline in demand for unskilled or low-skilled production workers and craftsman.

IV. INTERNATIONAL EXPERIENCE

International experience with TVET is very wide geographically, and occasionally relatively deep in terms of documentation and evaluation.⁹⁰ To be relevant to changing policy or practice in any country this experience must fit reasonably well with that country's economy, governance, and social norms and the present structure of technical and vocational education and training.

Germany as a Benchmark

A thorough analysis of the universal failures in developing economies to sustainably adopt Germany's Dual Vocational System, widely considered to be the best, clearly makes this point.⁹¹ (Box4)

⁹⁰ The first substantial international policy of TVET focused on the economic and employment context of TVET and examples of good practice in developing countries. See Middleton, John, Adrian Ziderman and Arvil Van Adams (1993).

Skills for Productivity. Technical and Vocational Education in Developing Countries. New York and Washington D.C: Oxford University Press and the World Bank.

⁹¹ Prof. Dr. Dieter Euler. (2013) Germany's Dual Vocational System: A Model for Developing Countries. Bertelsmann Stiftung.

Box 4: Germany's Dual System

The Eleven Elements of Germany's Dual System

From Turkey to Thailand, many developing countries have tried to adopt and sustain German's Dual Vocational and Training System. So far none has succeeded. A recent evaluation of this experience finds that this is because in the German system, eleven elements must interact effectively and sustainably:

- Broad objective: vocational training as a means of achieving economic, social and individual goals
- Main objective of vocational training: to produce skilled workers with flexible qualifications who are mobile and capable of working in their chosen fields
- Alternating learning situations in accordance with dual principle
- Vocational train as task to be carried in partnership between the government and the business community
- Joint funding of vocational training
- Complementary programs run by schools of non-business entities
- Codifying quality standards
- Qualifications of teachers and training personnel
- Balance between standardization and flexibility
- Create solid basis for decisions and design
- Solid acceptance of vocational training

Prof. Dr. Dieter Euler. (2013) Germany's Dual Vocational System: A Model for Developing Countries. Bertelsmann Stiftung.

Prof. Euler identifies ways in which *elements* of the German model can be exported, including apprenticeships financed by companies and apprentices with lower wages and other ways of linking learning in schools with work experience.

And indeed, supervised work experience as part of vocational education and training is an international norm.

Other essential aspects of Germany's Dual system need to be considered by those considering adopting elements. First, students are tracked by tests and academic performance at the end of primary school. Those scoring most highly are put on the track to higher education and others into apprenticeships. The high quality of basic education in Germany, the strong economy, the full faith of the public in the dual system, very high quality teachers and trainers (Meisters) in enterprises – and especially the independence and impartiality of the selection examination – must also be present in countries that seek to adopt the whole model.

Importantly, the willingness of employers to create apprenticeships for the dual system provides continuous feedback on skill demand in the labor market.

Dr. Euler's findings apply as well to the apprenticeship systems of Switzerland and the Netherlands.

Experience from the USA Case

University education for as many as possible is the goal of education authorities in the USA. While enrollments get some attention, the Federal and State governments primarily monitor student cognitive test scores at the primary, junior secondary and senior secondary level as indicator of education quality. States loosely accredit secondary schools. Vocational education outcomes are not routinely monitored at the national level and unevenly by State Education Departments.

Periodically, the Federal government commissions empirical evaluations of the innovations in vocational education that it funds. But other than these, vocational education (known as Career and Technical Education – CTE) is not monitored for employment outcomes at State or Federal levels. Local school boards do oversee vocational schools of all kinds, but evaluate them primarily relying on levels of enrollment as an indicator of success and cognitive achievement test scores.

Beginning in the 1990s, the response of US industry to global competition has been off-shoring low-skilled work to China and other developing countries. Digitization of production has eliminated a very large number middle and low skill jobs. Wages for the top 10 percent of workers have grown substantially, while they have been stagnant for workers with middle level skills.⁹²

The history of the development of vocational education in the USA is helpful in understanding the strengths and limitations of the highly decentralized and locally governed system today and how it might be to TVET in Indonesia.

History. When efforts began its effort to achieve universal secondary education shortly after World War I it was soon recognized that while academic secondary education leading to University was appropriate for some many youth did not have the aspirations for or capacity to succeed in the academic secondary curriculum. It was a time great in migration from Europe and the priority was to get the newly arrived youth through primary and junior secondary education. Vocational education courses in comprehensive secondary schools (the model still used today) were seen as appropriate for youth that were not going apply for the relatively small number of university places.

In that time, and still today, secondary education was primarily funded by property taxes in local schools districts with some support from State governments. The performance of secondary schools was, and is now, monitored by elected district school councils.

University places expanded rapidly, mostly in public State Universities, after World War II to accommodate the flood of veterans that was financed by the Federal government through the GI Bill. General education and vocational courses were to lead to employment after high school, and college preparatory curricula to the university. In the 1970s vocational education became to be seen as appropriate for economically disadvantaged youth and minorities.

⁹² McKinsey Global Institute, op.cit.

Under the Perkins Act of 1984 the Federal Government began a series of funding programs intended to improve vocational education that was focused on equity for disadvantaged students.

TVET in the USA is characterized by student choices among open pathways between secondary, post-secondary and tertiary levels. While students and families do access local labor market information through school counselors and increasingly online, there is no planned streaming of students to any program. This is determined by student choice and achievement.

In short, it is an open education market for vocational education.

A secondary dropout can earn a General Education Diploma (GED) studying part time while working and, if she desires, enroll at a public or (if she can afford it) private community college and complete certified skill curricula, perhaps becoming a fireman, or complete the academic credits required to transfer as a third-year student in a college or university, most likely one of many that have articulation agreements with her community college. Along the way professional counselors at her high school and her community college will inform her choices. Her university will provide counseling for graduate school or for employment, helping with graduate applications, arranging for employer participation in Job Fairs and helping her schedule employment interviews. She can take out federal student loans to use for junior college, university and even graduate school. She can easily use online resources to search for part time employment while in school and for full time employment when she finishes her education.

High school graduates who have successfully completed a college preparatory curriculum can apply for admission to any university in the country. If their SAT scores are very high and their school grades superb, they will be considered by the best universities, although the competition for admission to these schools is fierce. If their family income is low enough and if they are admitted, they will get substantial scholarships from the college or university.⁹³ If they are not admitted to an elite school, they will be admitted to a good state university system or one of thousands of good private colleges. About a third of high school graduates follow this path.⁹⁴

Secondary students who follow the general education curriculum (about sixty percent) will take less-challenging versions of the courses taken by those following the college preparation curriculum and, if they graduate, will be eligible to apply to college. They will be admitted as long as their grades are "good" and their SAT scores are satisfactory. About 90 percent of the graduates from the college prep program enroll in postsecondary education, the majority of them in full time colleges or universities. Sixty percent of those following the general curriculum do so as well.

In the USA, secondary vocational education was established as a set of optional courses for students with less than average academic aspirations and capabilities. It is mainly offered in comprehensive secondary schools that offer three broad curricula: college preparation, general education and vocational. With the help of school counselors, students choose their own courses and graduate when the completing a standard number of courses,

⁹³ Harvard, Stanford and Yale (among others) guarantee needed financing for any admitted student. This is called "needs blind" selection.

⁹⁴ This discussion is about students in public high schools. About 10 percent of secondary students graduate from elite and expensive private schools and their admission to highly ranked colleges and universities is more or less guaranteed.

which in many states require one vocational course. On average 40 percent of students follow the academic curriculum. About 24% of students take at least three vocational courses in the same field, choosing among agriculture, business and office, marketing and distribution, health, home economics and Trade and industry (construction, mechanics and repairs, precision production, and technical and communications). The balance of their credits is earned general education courses that have lower requirements than those in the college preparatory curriculum.

About 40 percent of secondary graduates enroll in post-secondary education and the rest enter the labor market. Many of these complete AA and BA degrees while working.

Sixty percent of all secondary students in US high schools work while going to school. Of these about 40 percent work 1-14 hours a week, 37 percent work 15- 34 hours per week, and 35 percent work 25 hours or more.⁹⁵ This is the US version of the dual system: work experience but no supervised training on the job as part of their course of study.⁹⁶

Public education in the United States is largely financed and managed by local school Districts, with elected School Councils. Similarly, post-secondary public community colleges are financed and managed by community college districts, again with elected boards.

State Education Departments establish certain regulatory requirements- such as standards of learning and state-wide achievement tests and certifications – and, often with Federal funding, finance and oversee special programs, such as the No Child Left Behind program. States also establish guidelines for secondary and post-secondary curricula.

States can apply for funding from Federal government programs that are authorized by the Congress. Most well known, and controversial, is No Child Left Behind which requires that students show progress on standardized tests scores for schools to remain eligible for Federal Funding. Such programs also fund and sustain innovation in vocational education (as discussed below)

Along with Federal funding comes accountability for performance. By law, the States must publicly consult stakeholders, submit proposals for funding, and if these are approved,

Submit annual plans and budgets as well as standard progress reports. The US Department of Education commissions independent evaluations of high quality (see Career Academies below). These reports are published and made available to the public.

Most substantial vocational education is provided in community colleges, which also offer academic programs that enable graduates to transfer to four-year colleges and universities.⁹⁷

There are also private schools and colleges that, because they accept no public funding, are largely free of standard curricula, testing programs and other regulations.

Vocational courses do not lead to any form of certification and are intended to prepare students for entry-level jobs.

⁹⁵ National Center for Education Statistics, 1984 cohort. Later data is not readily available, but since the 2007 recession the numbers are likely to be higher.

⁹⁶ Relatively recent innovations in secondary TVET have changed this (see below).

⁹⁷ Post-secondary TVET is outside of the scope of the present paper.

Currently, three programs are in place to help secondary students prepare for jobs: Career Academies, Magnet High Schools, and Area Vocational Centers. These are in part financed by competitive grants from the US Departments of Education and Labor, by State Education Departments and Local School Districts.

Career Academies. Academies are high school based “schools-within-schools.” This business-driven model incorporates a number of innovative features, including a family-like atmosphere, integration of academic and career-related curriculum and involvement of employers in a number of roles. They have been carefully evaluated and shown to have positive impacts on school performance, including attendance, credits, grades and graduation rates. Academies generally operate in grades 10-12; a few operate in grades 9-12 or 11-12.⁹⁸

Academies include:

- College preparation that is coordinated with a career focus or theme
- Three core academic classes and one career-related class taken within the Academy, and other courses taken in regular classes.
- A student selection process that targets eighth and ninth grade enrollments that reflect the cross section of students in the high school
- A small group of teachers who work as a team to plan and manage the program
- A variety of motivational project-based learning activities, including parental support, a well developed reward structure, speakers, field trips, a mentor program, paid workplace internships, and regular monitoring of progress with feedback to students
- A focus on postsecondary goals, including college, technical training and work
- Free college credit upon earning an articulated industry certification

See Box 5 for an evaluation of Career Academy Outcomes

Magnet High Schools

States finance and oversee vocational and technical secondary schools that offer substantial preparation in technical and business careers. The State of Virginia has 46 of these. Many of these are “magnet schools,” which – unlike comprehensive secondary schools -- allow and encourage students from other school districts to enroll. These institutions offer substantial academic and vocational programs in technical and professional fields. Typically they offer supervised work experience in through a variety of models and work closely with local employers in curriculum design and development. Employers are also involved with these programs.

⁹⁸ A Regional Guide to Career Academies. Career Academies. 2013. www.careeracademies.net

Box 5: Career Academy Outcomes

A random assignment longitudinal evaluation of the outcomes of Career Academies found that:

- The Career Academies produced sustained earnings gains that averaged 11 percent (or \$2,088) more per year for Academy group members than for individuals in the non-Academy group — a
- \$16,704 boost in total earnings over the eight years of follow-up (in 2006 dollars).
- These labor market impacts were concentrated among young men, a group that has experienced a severe decline in real earnings in recent years. Through a combination of increased wages, hours worked, and employment stability,
- Real earnings for young men in the Academy group increased
- by \$3,731 (17 percent) per year — or nearly \$30,000 over eight years.
- Overall, the Career Academies served as viable pathways to a range of postsecondary education opportunities, but they do not appear to have been more effective than options available to the non-Academy group.
- More than 90 percent of both groups graduated from high school or received
- a General Educational Development (GED) certificate, and half completed a post secondary credential.
- The Career Academies produced an increase in the percentage of young people living independently with children and a spouse or partner.
- Young men also experienced positive impacts on marriage and being custodial parents.

Source: MDRC (2008). *Career Academies: Long-Term Impacts on Labor Market Outcomes. Educational Attainment, and Transitions to Adulthood.*

Magnet high schools were first established to serve economically disadvantaged students across school district lines with Federal funding.. This funding has expanded the number of vocational high schools in the states. These schools focus on a wide range of curricula. There are approximately 4000 Magnet schools, about 80 percent of which offer a STEM (Science, Technology, Engineering, Mathematics) curriculum.

Like most secondary vocational schools in the USA Magnet schools are monitored for the academic achievement of their students, not employment outcomes. The expectation is that most graduates will choose to enter post-secondary or university education.⁹⁹

Area Vocational Centers (AVC)

⁹⁹ US Department of Education (2008). Successful Magnet Schools

Area Vocational Centers provide Career and Technical Education courses and programs on demand to secondary students in the school district, including those enrolled in comprehensive and academic secondary schools, as well as adult learners. Courses provided to secondary students are accredited and count toward the secondary diploma.

AVCs are separate public institutions with their own facilities. They offer a broad program of services. Secondary students travel to the AVC campus for accredited vocational courses, which are offered in convenient times – early mornings, late afternoon, evenings and weekends. Working secondary school dropouts often go to AVCs to accumulate courses credits toward a secondary diploma. Adult learners pay fees to enroll in career and technical courses during the day and also on weekends. Financial aid, including loans, is available to adult students from both State and Federal sources. AVCs provide training for small businesses on a contract basis. AVCs also have strong job search services and alliances with local employers.¹⁰⁰

As could be expected in an open training market, the US also has a very large number of private for-profit technical schools and colleges, mostly offering training at the post-secondary level. Many offer accredited online courses as well as traditional classroom and workshop training.

Some are excellent, some are not. There is a national voluntary system for accrediting schools,¹⁰¹ and students can use federal loans to finance training in accredited institutions. But there are frequent complaints from students of poor quality and poor labor market outcomes and difficulty finding jobs to repay their loans. This leads periodically to public calls for reform. The US Department of Education publishes guidance on how prospective students can evaluate these schools.¹⁰²

Experience from the Australian Case

Australia's TVET system falls somewhere in between the simplicity of the superbly organized and managed German Dual System and the student demand-led system of the US system of state and local training markets.¹⁰³ Australia has created a national training system built on a set of national TVET organizations that set common quality standards and use labor market information, including skills projections, to link TVET to the economy. Market mechanisms have been introduced. Non-public (private) providers have been encouraged and employers and their apprentices are able to select a provider and type of program for national funding (Box 6)

¹⁰⁰ See <http://www.metrotech.edu/> for details on an AVC in Oklahoma City, OK

¹⁰¹ accs.org

¹⁰² <http://www2.ed.gov/students/prep/college/consumerinfo/choosing.html>

¹⁰³ This review of Australia draws heavily on Hoeckel, Kathrin, Simon Field, Troy R. Justesen and Moonhee Kim (2008) *Learning for Jobs Australia*. Paris: OECD. Where appropriate the findings and recommendations of this report are cited.

3. TVET AUSTRALIA

Note: On 25 March 2011, the TVET Chairman, John Dawkins, outlined the decision by MCTEE to wind up this ministerial company model for TVET Australia and to transition to alternative arrangements.

Technical and Vocational Education and Training (TVET) Australia is a ministerial company established in 2006 and owned by the Commonwealth, State and Territory Ministers responsible for skills training and is supported in its key responsibilities of providing independent, professional services by the following Councils:

8.1.1. Standards

The **National Quality Council (NQC)** is a Committee of the Ministerial Council for Tertiary Education and Employment (MCTEE), and oversees quality assurance and ensures national consistency in the application of the Australian Quality Training Framework standards for the audit and registration of training providers. It also has specific decision-making powers in relation to the endorsement of Training Packages and other aspects of the quality assurance under the National Skills Framework.

8.1.2. Equity

The **National VET Equity Advisory Council (NVEAC)** has been established to provide high level advice to MCTEE to guide equity reform in the national training system. The NVEAC is a single layer advisory body which considers the issues and barriers that affect all equity groups, including people with a disability and Indigenous Australians. Recognising that many clients in the VET system experience multiple disadvantage, the Council identifies shared priorities for all equity groups.

8.1.3. Innovation

Flexible Learning Advisory Group (FLAG) is an advisory group of the National Senior Officials Committee (NSOC). It was established in 1996 as the key policy advisory group on national directions and priorities for information and communication technologies (ICT) in vocational education and training system (VET) and Adult and Community Education (ACE).

8.1.4. Other Areas

TVET's other core business includes the management of the following responsibilities:

National Audit and Registration Agency (NARA) provides audit and registration services for multi-jurisdictional Registered Training Organisations (RTOs) that operate in more than one Australian State or Territory.

Training Products Australia (TPA) is the custodian of all nationally endorsed Training Packages and quality teaching and learning resources to support delivery of Vocational Education and Training (VET).

AEShareNet Licensing System connects people who require learning materials with those who own them through two options: free Instant Licences or Mediated licences, which are transacted online through the System.

Industry was fully involved in developing the system and is active in system policy, governance and management.

As measured by the formal qualifications of the workforce, the system has contributed to a measurable increase in the qualifications of the workforce.

The Australian Qualification Framework (AQF) provides a comprehensive structure for TVET (Table 3)

Table 3: Australia Qualification Framework

Post-compulsory secondary education accreditation	VET accreditation	Higher education (HE) accreditation	International standard classification of education (ISCED) equivalent (a)
Statement of attainment (for partial completion of a full qualification)			None
Senior secondary certificate	Certificate I		2C
	Certificate II		2C
	Certificate III		3C
	Certificate IV		4B
	VET diploma	HE diploma	5B
	VET advanced diploma	HE advanced diploma or Associate degree	5B
		Bachelor degree	5A
	VET graduate certificate	HE graduate certificate	5A
	VET graduate diploma	HE graduate diploma	5A
		Masters degree	5A
		Doctoral degree	6

Source: NCVER (2007a), Did you know? A Guide to Vocational Education and Training in Australia, NCVER, Adelaide.

National Training Packages¹⁰⁴ have been developed with employers as the basis of most TVET programs. In practice the national qualification framework and the training packages form the dynamic core of the national system, which delivers training: (1) a set of qualified Training Providers that includes Technical and Further Education Colleges (TAFE), and (2) a well developed apprenticeship system and over 4000 public registered training organizations (RTOs) "in schools, universities or other higher education organizations, adult or community education, religious or other bodies providing specific training in language, religion etc.

Most public TVET takes in the TAFE. TVET programmes "...range from a single module or unit of competency, and training is delivered in formal classrooms and workplace training, include flexible and self-paced learning, often delivered online.

An apex body, the National Center for Vocational Education Research (NCVER), and the organizations with which it contracts is the main body for research and monitoring of TVET. NCVER conducts an annual Student Outcomes Survey to collect information one year after students complete training. But the OECD report finds that data are not regularly used in policy making.

In 2007, 11.3 percent of the population between 15 and 64 years participated in some form of TVET; 88 percent of students study part-time and the age spread is wide (NCVER, 2007d).¹⁰⁵

Australia's TVET system works. But as in the USA and elsewhere university graduation remains the goal of a large share of Australian youth. Australia's PISA score are among the

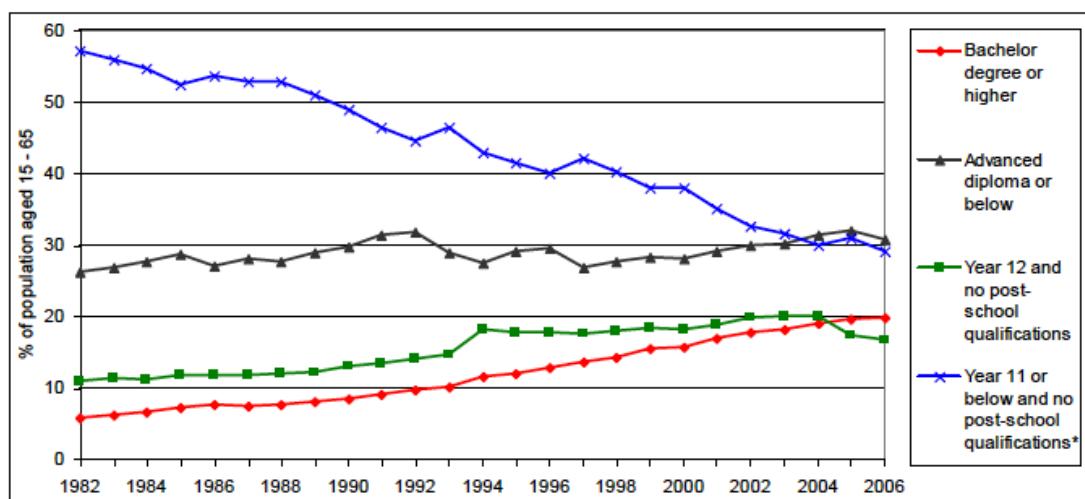
¹⁰⁴ A training package is a complete set of competency-based training materials for students and instructors.

¹⁰⁵ OECD Learning for Jobs: Australia. Op. cit. p. 9

highest globally.¹⁰⁶ While the national TVET system is highly organized and well financed, enrollments in higher education continue to rise.

The share of the population with 11 years of education and no post-school qualifications has fallen by nearly half over 26 years from 60 percent to 30 percent (Figure 4). Assembled over the last 15 years the current system cannot take full credit for this outcome but it has certainly enabled the trend to continue and established a system that has improved the quality of TVET and, importantly, has shown the capacity to change and adapt as new challenges are met.

Figure 4: Highest qualification level of the population aged 15-64 (% of the population)¹⁰⁷



Source: ABS *Education and Work* (Cat No 6227.0)

Challenges to the System¹⁰⁸

The challenges to the system are many and complex, as one would expect for a complicated system with many moving parts. These will be briefly summarized here from the OECD report.¹⁰⁹ (Box 7)

These are challenges of adjustment and improvement that good but complex TVET systems face. Australia's TVET system has the institutions and information systems needed to change in a democratic and decentralized environment.

¹⁰⁶ <http://gpseducation.oecd.org/CountryProfile?primaryCountry=AUS&threshold=10&topic=PI>

¹⁰⁷ OECD: *Learning for Jobs Australia*. op.cit p. 55

¹⁰⁸ The OECD LFJ report on Australia is notable for 11 pages of system description 32 pages on Challenges and Recommendations, no doubt at the request of the Australian Government

¹⁰⁹ OECD: *Learning for Jobs Australia*. op.cit p 5.

Box 7: Challenges to TVET in Australia

- The division of responsibilities between the Commonwealth and state and territory governments is unclear.
- Principles underpinning funding are not apparent and are inconsistent with human capital policies and principles.
- The use of skills forecasting creates some difficulties.
- There are some weaknesses and gaps in the relevant data.
- Apprenticeships are rigid and seem to depend on duration rather than competence.
- Training package development and implementation processes are inefficient.
- The ageing of the teacher labour force is a serious problem.

Experience from the Norwegian Case

Norway is rich and strongly decentralized. Counties (equivalent to States or Provinces) have elected governments and are operationally responsible for financing and managing public upper secondary education and training including curricula and examinations. The Ministry of Education has responsibility for overall policy. The Ministry of Higher Education and Research is responsible for tertiary education.¹¹⁰

Counties receive a lump sum from the National Government covering all expenditure for primary and secondary education, health services (not including hospitals) and culture. Public upper secondary schools provide three years of both general education and TVET. Students choose their course of study and 95 percent of students attend public schools. All education is free.

Enrollment from lower secondary to upper secondary school is nearly universal. Each student chooses a course of study when entering secondary school. Those choosing to prepare for University choose three years of advanced study (I, II and III) before entering university. After two years of study in advanced courses I and II, TVET students enter a two-year paid apprenticeship in a private enterprise or in a public agency.

If after one year of apprenticeship a student decides to leave, he or she can return to complete the a third year practical training in school (Box 8). About a third of apprentices now choose this option.

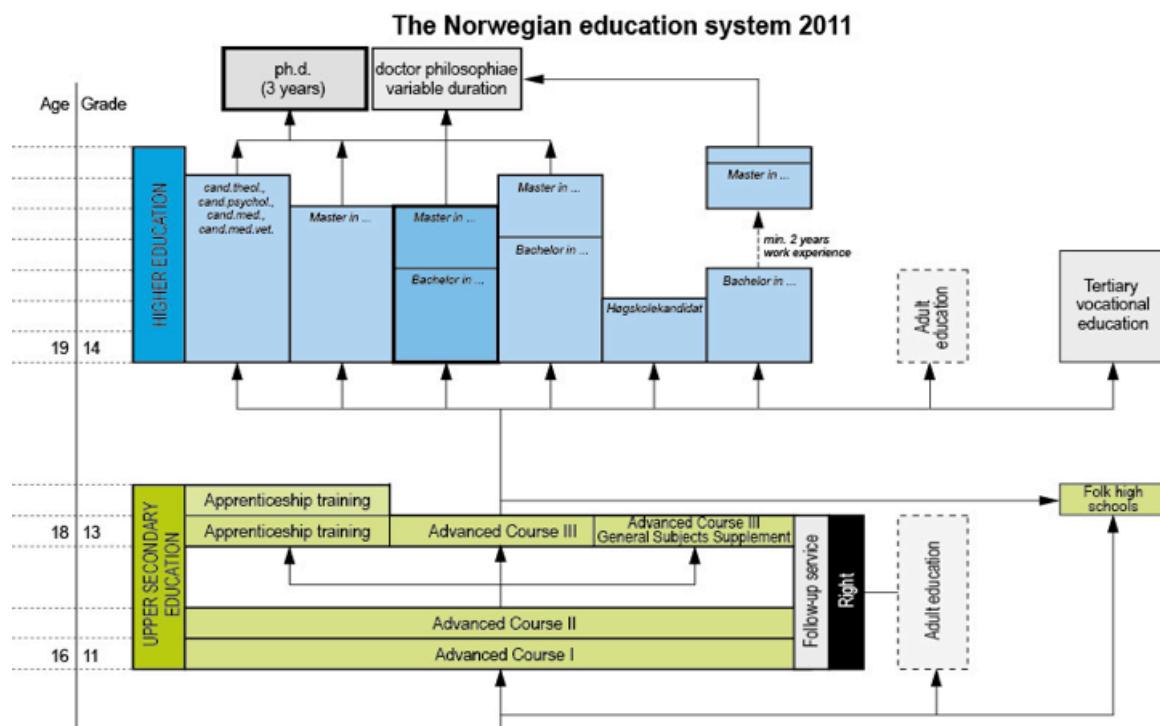
The apprenticeship is subsidized by the government in an amount equivalent to the cost of one year of schooling. Apprenticeship wages are negotiated collectively with industry and range from thirty to eighty percent of a journeyman wage

¹¹⁰ OECD (2008) Learning for Jobs: Norway Paris
Cedefop (2012) Norway VET in Europe. <http://www.cedefop.europa.eu/en/publications-and-resources/country-reports/norway-vet-europe-country-report-2012>

The completed apprenticeship and the three-year in school option lead to the same examination and certification. The examination is prepared and assessed by a trade-specific examination board appointed by the county.

TVET is organized around careers, rather than occupations (Box 9). The social partners (governments, employers, unions) are all active in TVT in Norway. General policy advice to the Ministry of Education is provided by the

Box 8: Norwegian Education Structure



National Council for Vocational Education and Training. Advisory Councils for each career path (Box 6) advise on content and also future skill needs.

Like all complicated systems, the OECD Review finds that TVET in Norway faces challenges. Appropriately, these are the kind questions that should be asked about complex systems in a high-income country:

- The OECD review raises questions about the efficiency of student choice of pathway in matching skill supply with the needs of the economy. The Norwegian government is concerned that student guidance does not do an adequate job with this task and that guidance counselors need more training.
- The Review also recommends that steps be taken to monitor and improve the quality of apprenticeship training.
- A standardized national examination of apprentice skills should replace the county level examination to reduce variation in the quality apprenticeships.
-

- Workplace supervisors and trainers of apprentices should be trained and licensed.
-
- Although the data on TVET is good, the Government should consider establishing a dedicated institution for TVET data and analysis

Box 9: Career Curricula in Norway

VET programmes at upper secondary level, ISCED level 3		
Type of educational programme	Balance between school-based and work-based training	Transfer to other pathways
Technical and Industrial Production	Most of the subjects follow 2 years in school and 2 years of formalised apprenticeship training and productive work in an enterprise. 1 subject follows 3 years in school and 1 year apprenticeship, and 8 subjects follow 1 year in school and 3 years apprenticeship training.	All the programmes can transfer to Post-secondary non-tertiary education (<i>fagskoleutdanning</i>) which is placed at ISCED level 4
Electrical Trades	Most of the subjects follow 2 years in school and 2.5 years of formalised apprenticeship training and productive work in an enterprise. Subject in Aviation follow 2 years in school and 3 years apprenticeship training.	All the programmes can transfer to Post-secondary non-tertiary education which is placed at ISCED level 4 Holders of trade certificates in electrical trades may choose a specialised three year bachelor engineering degree, known as <i>y-veien</i> .
Building and Construction	Most subjects follow 2 years in school and 2 years of formalised apprenticeship training and productive work in an enterprise. 4 subjects follow 1 year in school and 3 years of formalised apprenticeship	All the programmes can transfer to Post-secondary non-tertiary education which is placed at ISCED level 4 Holders of trade certificates in building and construction may choose a specialised three year bachelor engineering degree, known as <i>y-veien</i> .
Restaurant and Food Processing Trades	All subjects follow 2 years in school and 2 years of formalised apprenticeship training and productive work in an enterprise.	All the programmes can transfer to Post-secondary non-tertiary education which is placed at ISCED level 4
Agriculture, Fishing and Forestry	Most subjects follow 2 years in school and 2 years of formalised apprenticeship training and productive work in an enterprise. One of the subjects qualifies the admission criteria to higher education.	All the programmes can transfer to Post-Secondary Non-Tertiary Education which is placed at ISCED level 4 Agriculture, fishing and forestry have an option for the third year which prepares pupils for higher education.
Health and Social Care	4 subjects follow 2 years in school and 2 years of formalised apprenticeship training and productive work in an enterprise. 5 subjects follow 3 years in school.	All the programmes can transfer to Post-Secondary Non-Tertiary Education which is placed at ISCED level 4
Design, Arts and Crafts	Most subjects follow 2 years in school and 2 years of formalised apprenticeship training and productive work in an enterprise. 3 subjects follow 3 years in school. 11 subjects follow 1 year in school and 3 years formalised apprenticeship	All the programmes can transfer to Post-Secondary Non-Tertiary Education which is placed at ISCED level 4

V. RECOMMENDATIONS FOR INDONESIA

A self-adapting TVET system such as Germany, Switzerland and the Netherlands is probably not the right direction for Indonesia at this time.¹¹¹ But elements of that model could certainly be adopted.

ACDP 016 data on the capacity of the SMK and BLK, when available, will help in sorting through the many possible ways in which international TVET could be considered as Indonesia goes forward.

Changes to the country's current system should be considered carefully with substantial participation of key stakeholders both nationally and in the economic zones that will lead in the next stage of Indonesia's development and equitable growth.

Improving Secondary Education

There is considerable consensus across recent studies of education and training in Indonesia that the first priority should be a major commitment to improving the quality and outcomes of basic education. The Asian Development Bank has been supporting this with projects to improve the quality of secondary education.

This would mean not only improving the SA but also the education outcomes in the SMK.

This makes a great deal of economic and social sense. Raising the quality of secondary education will pay forward across tertiary education and TVET as well. It will also improve the productivity of SMA graduates who enter the workforce, certainly in formal employment but also in the informal sector.

Developing TVET Systems

An important issue for consideration is the extent to which TVET coordination mechanisms are needed to link TVET more closely to employers and employment demand in the economic zones. The experience of Norway in devolving management and quality control of TVET to the counties is likely to be useful here. And it may be that some ideas taken from the USA about providing Federal funding for innovation and improvement to the States in market-guided TVET may be relevant for the Economic Zones. Although as discussed the US monitoring systems are not strong and there is not a National Qualification Framework. Australia manages its system through the Qualification Framework and a set of National Organizations and through the approved training packages. Indonesia is developing a national qualification framework and has organizations for accrediting schools. These may need to be strengthened.

In the zones, engaging employers more strongly in TVET could be useful to improving links between education and training and skill change and demand and also developing the private training market. Middle income Namibia has developed a National Training Agency for this purpose that may be of interest to Indonesia Box 10).

¹¹¹ In the USA the German dual system was recommended as an option to increase employment and productivity at the height of the 2008 recession the Harvard Graduate School of Education in *Pathways to Prosperity*. http://dash.harvard.edu/bitstream/handle/1/4740480/Pathways_to_Prosperity_Feb2011-1.pdf?sequence=1. While much praised at the time it has had little effect on policy

Building the capacity of student counselors in all secondary schools and BLK would also have substantial returns. If properly trained and supported, counselors can provide a strong link to local markets. In principal and by law there are counselors in Indonesia's secondary schools.¹¹² More will be learned about the effectiveness of SMK in using labor market information through the ACDP 016 surveys but there are always concerns that counselors focus more on academic outcomes than on career development and job search. This could be changed over the medium term by training and, possibly, better incentives linked to the effectiveness of the school in placing graduates in employment

Improving TVET Delivery

The recommendations below are made with the expectation that TVET reforms and improvements will be made in each economic zone, rather than nationally.

SMK. A first conclusion of this paper is that priority should be given improving the SMK. This approach to TVET is widely found in high-income countries and, overall and overtime, can be as effective as formal apprenticeship. They already have the career education structure found in Norway and substantial part of the SMK curriculum devoted to cognitive education. The SMK would also benefit from investments in the quality of the overall secondary education system

Of high importance would be to develop structured and supervised work experience as a formal part of SMK education. Paid apprenticeships as found not only in central Europe but also in the UK and Canada and, on a small scale, in the USA. They are an integral part of the Australian TVET model.

¹¹² http://www.ilo.org/wcmsp5/groups/public/@asia/@ro-bangkok/@ilo-jakarta/documents/publication/wcms_165907.pdf

Box 10: Namibia's National Training Agency

Namibia, an upper middle-income country located just north of South Africa has developed an effective National Training Agency (NTA) that is working closely with employers to build up and improve the private training market. The population of Namibia is a little more than two million persons and its economy is led by mining and tourism. It has been ranked by Bloomberg as the top emerging economy in Sub-Saharan Africa, ahead of South Africa..

The NTA was established five years ago with a governance board that represent private employers, government and other social partners. The the heart of NTA is a National Training Fund to which employers pay a payroll tax. The funds are administered by NTA to finance private training providers who deliver courses in priority skill areas identified by Industry Skill Committees and also to reimburse employers for approved training. Some employers, for example in the hospitality business, also successfully apply for funding to provide training in priority skill areas to the public

All approved training is done according to the National Qualification Framework and training outcomes are tested and certified.

NTA is notable for its online capacity. Employers register and pay the training levy online, and training providers (employers and also private training providers) submit proposals through the website.

It took about five years to get the NTA legislation and the training levy approved by Namibia's Parliament. This period was marked by extensive consultations with all stakeholders, including employers, education and training organizations, the government and citizens,

The NTA website provides useful information on history, legislation and operations.
<http://www.nta.com.na/>

Paid apprenticeships could be a goal for Indonesia, but they are complex to administer and monitor. This model could be tried, however, in an economic zone with a substantial body of formal enterprises.

Work internships are a comparatively low cost alternative to paid internships. These could become a requirement of SMK graduation. Again, piloting this program in one or more economic zones with good monitoring and evaluation would be useful. US experience with Career Academies could be useful here.

Formal work experience is also a good way to link vocational schools to local skill demand as found in Germany and Norway.

Work internships would have to be formal and governed in the same way that SMKs (and BLKs) establish MOUs with other education institutions.

Ways could also be found for SMK to work effectively with local enterprises to update and improve curricula and teaching. Establishing a TVET Council with substantial representation of firms in each economic zone would be a good first step. As in Norway, a local TVET council could be useful.

Improving the BLK

BLK already have MOUs that strengthen their links with SMK. These MOU may help explain why a large share of SMK students already takes BLK courses. But the BLK could do more to serve adult learners/

Further integration of SMK and BLK is under consideration. That may be a direction to follow, but there is concern for youth who have not entered or dropped out of secondary education. More generally, there is concern for productivity and earnings in Indonesia's large informal sector.

Both equity and productivity should be goals of all TVET systems. Here the experience of the USA, where TVET was invented for equity reasons and is still guided by equity goals, could be useful.

The US Area Vocational Center model could be considered as an option for BLK.

Area Vocational Centers (AVC) serve a wide range of students through classrooms and workshops to build skills for employment. As in Indonesia's BLK, secondary school students take vocational courses, although in the USA these are accredited and become a formal part of the student's secondary program and diploma. AVCs also serve adults that are unemployed as well as also employed adults seeking to upgrade their skills. To serve multiple clienteles, AVCs open early and close late, and are also open on Saturdays.

In the US community colleges also provide these services but focus more on learners who have completed a secondary education.

Implementation of Change

It is well known in Indonesia that reforming education on a national basis is unlikely to be effective. Many education projects have been focused on provinces and much is likely to have been learned from these projects.¹¹³

Improving the quality of secondary is already underway in Indonesia, with support from the Asian Development Bank (ADB) and perhaps others. With the establishment of regional growth zones, more work on secondary school improvement could be organized on a zonal basis.

As of this writing it is not clear if, and if so how, development management and coordination structures will be created in the economic zones. If such structures are on place, or are to be created, it could be useful to establish well-evaluated pilot projects to test out alternatives for TVET improvement.

¹¹³ Learning from project experience is beyond the scope of this paper, but it could be the objective of a separate study,

**Appendix 1 - Annex 3. International Experience with Support
for Innovation and Entrepreneurship**

1 INTRODUCTION

Economically successful countries have well developed research and innovation systems, and there are numerous examples of countries that have wished to develop their economies doing so by developing their research and innovation systems – and their higher education generally – as one of the elements on the way to achieving that.

Causality is difficult to demonstrate, but there is sufficient coincidence and correlation to make it a reasonable supposition that developing an excellent higher education, and in particular an excellent research and innovation system, is a prerequisite to the sort of economic development that this will be a necessary feature in the infrastructure that Indonesia develops. Of course, it is not limited to that – all the other prerequisites – such as a regulatory and financial infrastructure – need to be established in parallel. The establishment and development of a higher education, research and innovation infrastructure appear to be necessary but insufficient conditions.

Although couched in terms of improving the performance of universities more generally, the unspoken – and sometimes explicit – intention is often to improve research and innovation performance, and most of the investment and activity is with this in view. The underlying assumption is that a small number of research and innovation powerhouses will have a catalytic impact on the entire system.

2 THE CURRENT SITUATION IN INDONESIA

This report is written in the context of the study of the alignment of the education system with the needs of the Indonesian labour market and economic development more generally (ACDP 016). In that context it is acknowledged that the development of research and innovation in Indonesia's universities will play an important role in ensuring a successful outcome, and that is the focus of this present report.

The report commissioned by the Indonesian Academy of Sciences and the World Bank into the creation of an Indonesian Science Fund¹¹⁴, which contains a comprehensive and authoritative assessment of the state of the research and innovation infrastructure in Indonesia, observes that "By population, Indonesia, with its over 230 million people, is the fourth-largest country in the world. Illiteracy rates are very low, and the country has several good universities and research institutes. But for the years 1996–2010, Indonesia is in 64th place in the world in numbers of papers published in peer-reviewed journals.", and that there is a similar picture with regard to patents. That report goes on to provide a series of statistics that shows how poorly Indonesia performs in relation to other countries, including the majority of its neighbours. Focusing just on the question of research outputs, as manifested in peer-reviewed publications in international journals, Table 1, taken from that report, is eloquent in demonstrating the low level of research activity.

¹¹⁴ Creating an Indonesian Science Fund by Satryo Soemantri Brodjonegoro and Michael P. Greene

Table 1 Country Rank of Scientific Publications, 1996–2010¹¹⁵

Rank	Country	No. of documents	Citable documents	Citations
1	United States	5,322,590	4,972,679	100,496,612
2	China	1,848,727	1,833,463	7,396,935
3	United Kingdom	1,533,434	1,392,982	24,535,306
4	Japan	1,464,273	1,429,881	16,452,234
10	India	533,006	507,792	3,211,864
11	Australia	520,045	485,249	7,083,995
14	Korea Rep.	430,438	422,745	3,344,131
15	Brazil	328,361	318,294	2,409,214
17	Taiwan	308,498	301,775	2,391,691
21	Turkey	231,178	219,280	1,380,599
31	Iran	120,350	117,469	499,322
32	Singapore	109,346	105,665	1,092,233
33	New Zealand	101,286	95,295	1,309,197
42	Thailand	59,332	57,509	442,250
43	Malaysia	55,211	53,979	218,280
62	Estonia	14,366	14,106	150,084
63	Bangladesh	13,657	13,304	80,533
64	Indonesia	13,047	12,776	105,759
65	Kenya	12,982	12,350	153,702
67	Kuwait	10,981	10,723	69,937
68	Vietnam	10,904	10,676	89,244
70	Philippines	9,717	9,440	103,428

What is striking, however, is that the low volume of publications is nevertheless accompanied by a relatively high rate of citation for the articles that have been published¹¹⁶. That indicates that whereas productivity of the science base may be low, its quality is relatively high. What is wanted of course is high productivity and high quality, but the relatively high quality at least provides something on which to build.

One reason for the relatively high quality of research conducted in Indonesia may be the high proportion that is carried out as international collaborations. Although that is cited in the ISF report as a matter for concern, in fact, there is research evidence¹¹⁷ that research that is carried out a collaboratively across borders is of higher quality and attracts higher citation rates than research that is carried out solo or between collaborators within a single country. This tendency for international collaborations is therefore to be welcomed and is something else on which to build.

¹¹⁵ Idem Table 6

¹¹⁶ See footnote 4 of the ISF report "On April 28, 2012, KOMPAS, the largest newspaper in Indonesia, published an interview with Wong WoeiFuh, managing director of Asia Pacific Intellectual Property and Science at Thomson Reuters. Wong said that research carried out by his company ranked Indonesia third in Southeast Asia in quality of research [judged by research citations], after Singapore and the Philippines Areas of greatest strength were found to be botany, zoology, medicine, environment, geology, and agriculture."

¹¹⁷ See for example Adams, Nature V.497, P 557

The above discussion is in terms of publications in scientific journals – academic output. The same is true of application oriented research, of which the number of patents filed may be a proxy. In this respect too, Indonesia's performance is among the least successful in the region. In 2008, according to the US Patent and Trademark Office a total of 19 patents were granted to Indonesian entities and individuals compared to, say 22 from the Philippines, 40 from Thailand, 168 from Malaysia and 8731 from Korea. A similar picture is provided by the World Intellectual Property Organization, as shown in Table 2 below¹¹⁸.

TABLE 2 World Intellectual Property Organization patent filings by origin and office, 2007

Economy	Patent filings by office			Patent filings by origin
	Total	Resident	Non-resident	Total
Japan	396,291	333,498	62,793	501,270
Singapore	9,951	696	9,255	3,538
Korea, Rep.	172,469	128,701	43,768	174,896
Malaysia	2,372	670	1,702	1,144
Thailand	1,388	877	511	1,049
China	245,161	153,060	92,101	160,523
Indonesia	4,606	282	4,324	308
Philippines	3,265	231	3,034	310
Vietnam	0	0	0	13

Source: WIPO 2009.

Note: Data for Indonesia and the Philippines are for 2006.

The Indonesian Science Fund report, referred to above, points to funding issues and concludes that these are largely the cause of the low level of research activity. The issues that it points to are of two types

- Low levels of funding
- Bureaucratic and administrative issues that complicate and de-incentivise the pursuit of external funding by university researchers

No matter what parameters are studied, the levels of funding for Indonesian research are extremely low. Again, as one example taken from the ISF report, compared with the majority of its competitors, Indonesia has very low levels of funding provided by private industry – 14%¹¹⁹. Also, with 80% of R&D funding coming from the Government, Indonesia is an outlier in this respect as well. Similarly, investment in R&D is less than 0.1% of GDP. There are many ways of looking at the same issue, but it is clear that levels of funding and the sources of that funding are important reason for Indonesia's performance with regard to research activity.

So the conclusion that funding issues impact seriously on Indonesia's research output is almost certainly correct, and the creation of the Indonesian Science Fund is likely to prove to be an important step forward in the development of Indonesia's research capacity.

As will be seen from what follows in the next section, other countries have seen the funding, the expansion and the development of their research infrastructure – and in

¹¹⁸ From "Putting Higher Education to Work: Skills and Research for Growth in East Asia", World Bank, 2012

¹¹⁹ Idem - see Table 1 on page 15,

particular university research – as critical to the development of their societies and economy. Indeed, there is no developed country in the world, and certainly none with the size of economy that Indonesia aspires to achieve, that does not have a highly developed research and innovation system. As was pointed out in the ISF report, the implication is that for Indonesia to achieve an economy the same size as that of Germany it would have to develop an R&D system capable of producing 100,000 peer-reviewed publications per year, compared with the 2,000 or so produced in 2010. That may be overstating the issue – peer-reviewed publications are not the only type of research outcome and may not be the most relevant to Indonesia's needs in all cases – but it provides a measure of the size of effort that will be required.

It is therefore an important and positive step forward that an Indonesian Science Fund has been established. Apart from anything else, that could help to achieve one of the goals of the present project, which is to attract direct inward investment for downstream industries. Without a well-functioning and recognised research infrastructure foreign firms are unlikely to wish to make investments that require highly qualified people and research facilities: without such a research infrastructure it will be impossible to entice companies conducting downstream activity at the cutting edge if they do not believe that the manpower facilities and other infrastructure will be present to enable them to conduct their business.

While the development of the Indonesian Science Fund potentially represents an important step forward and is to be welcomed, how the fund operates, its priorities, parameters and programs will be of the utmost importance to ensure that its benefits are maximised. Among the lessons to be drawn from the international experience discussed below are the following:

- There is a balance to be struck between supporting excellent research and building capacity. Although building capacity is an important consideration, limited research funds mean that in a competitive environment there is an opportunity cost associated with overlooking excellence as the key consideration. The ISF must, for example, resist the temptation to direct the majority of its funds to Government research institutes, where the majority of government research funds go at present, but where the staff are much less well qualified than in universities.
- Nevertheless, the ISF can legitimately – and should – identify research priorities, topics et cetera judged to be in the national interest
- In order to be able to bid for and conduct research projects institutions need to have research capacity and infrastructure – both staff and facilities. Other countries ensure this in different ways – sometimes providing these through core funding of universities, and sometimes by ensuring that project grants carry a sufficient overhead to enable universities to build up their infrastructure and capacity. In the Indonesian environment, where the majority of universities are privately funded and students cannot be expected to provide the research infrastructure through the fees that they pay, it probably makes more sense for project grants to carry a sufficient overhead.
- Collaborative research projects with international collaborators should be encouraged. One way of doing this would be to include within the ISF a program explicitly for projects conducted with international collaborators.

Finally, the size of the need is daunting, and raises the question where all the scientists and researchers that required will come from. The numbers are such that it cannot be just from the small number of existing science-strong institutions though these have to be nurtured and developed. Ways have to be found of broadening the base of excellent research while continuing to focus on areas centres of research strength.

3 NATIONAL EFFORTS TO STRENGTHEN THE HIGHER EDUCATION AND RESEARCH BASE¹²⁰

Almost every model of macroeconomics identifies productivity and innovation as central drivers of economic growth. It is unsurprising therefore that direct investment in R&D by the state and other public policy measures in support of research and scientific (and thus productivity) advancement and innovation are now strong features of state intervention across modern economies. The underlying policy rationale arises from a view that the private sector is unlikely to deliver the socially optimal level of R&D investment, and that the state need to intervene in order to optimise research, development and innovation.

There are a large number of initiatives, most found in Asia, Europe and the Middle East, intended to drive/maintain national competitiveness and attractiveness to mobile investment and talent, as some governments have become concerned that they are/have been under-investing vis-à-vis their competitors. These realizations are leading many countries to restructure their higher education and research systems and prioritize some universities. France, Germany, Russia, Spain, China, South Korea, Taiwan, Malaysia, Finland, India, Japan, Singapore, Sri Lanka and Latvia – among many other countries – have all launched initiatives with the primary objective of ensuring that some of their universities become outstanding in research, and are able to match the best in other countries.

In the USA too, individual states are seeking to build or boost flagship universities to what is known as Tier One status, with the aim of enhancing attractiveness for investment and hence economic growth – as with the aforementioned national strategies. In a quote that could have been about Indonesia Proposition 4 (a constitutional amendment put to the Texan electorate in 2009) said

The most important natural resource Texas has is Texans. Unfortunately, our state suffers from a “brain drain” as many of our best and brightest students leave to further their education. A contributing cause is a lack of “tier one” universities in Texas. Proposition 4 (a [state] constitutional amendment to create a National Research University Fund to help fund certain state universities to become nationally recognized research institutions) would provide funding to Texas universities seeking to attain tier-one status. With more university research, the state hopes for new jobs, increased wages, and more state and local tax revenue.

Jamil Salmi, former head of tertiary education at the World Bank, identifies three different policy approaches: a government may

- seek to upgrade a few existing universities (picking winners)
- encourage several universities to merge and transform themselves (hybrid model)
- Create a new world-class university from scratch (clean-slate approach).

With its plethora of existing universities the last approach seems inappropriate in Indonesia. Elements of all three approaches are evident in the examples below:

¹²⁰ Much of the discussion in this chapter derives from E. Hazelkorn (2nd edition 2015) Rankings and the Reshaping of Higher Education. The Battle for World-Class Excellence, Basingstoke, Palgrave MacMillan.

France

Additional investment

University autonomy

Mergers

Selective funding (picking winners)

France introduced legislation promoting greater institutional autonomy to encourage stronger management and planning in 2007. In 2008, it launched Operation Campus following disappointment with the showing of French universities in the world rankings. The objective was to spend approximately EUR 8 billion establishing ten regional centres of excellence or PRES (poles de recherche et d'enseignement supérieur) joining universities, research organizations and some grandes écoles through mergers and/or regional clustering in order to enhance capacity and hence visibility. In 2009, the Government announced additional funding to ensure that higher education and research would be "the new centrepiece of France's economic policy"; "funds will not be distributed evenly but instead will support the Government's policy of creating bigger, more autonomous universities that focus on excellence, have modernized governance, and are highly productive". In 2010, the Government announced plans to spend EUR 4.4 billion to build the Paris-Saclay super-campus to be in the top ten in the world. In addition, the Government established the EUR 500 million-funded "Giant", the Grenoble Innovation for Advanced New Technologies. "Our aim is quite simple: we want the best universities in the world".

China

Additional investment

Mergers

Highly selective funding

China commenced its Project 211 in 1995 with the aim of building up 100 top level universities to international competitive standards. Originally conceived as the creation of academic elites, "World Class Universities" later became a national policy in China; it was followed in 1998 by Project 985 which had a more focused objective of developing ten to twelve world-class universities able to compete with the best universities in the US and Europe. Min Weifang, the Party Secretary of Peking University, put the objective in context:

'[A]mid today's acute competition on the international scene, universities are a major factor affecting a country's key competitive ability. Thus creating and running world-class universities should be one of the strategic foci of building up a country'.

Actions include: institutional mergers and resource sharing between institutions; cultivating new talent and recruiting world-class academic leaders; building national science and technology innovation platforms and national centres for innovation in humanities and social sciences; and developing competitive academic programs. As of 2007, the 985 project had received a total of CNY 23.8 billion (\$3.1 billion); this represents an average of CNY 700 million (\$91.7 million) for scientific research, with several universities receiving as much as CNY 1.2 billion (\$157 million). The GFC has not dented China's investment strategy; further reforms were made to the gaokao, the national examination for students to attend university and college, in order to

align this test with changes in China's economic growth rate. The aim is to produce more technically skilled graduates, and to move away from over-reliance on manufacturing, which has been the mainstay of Chinese economic growth. The government is set to unveil a two-tier system, with a first mode for more technically-inclined students, and a second mode which will be more traditionally academic. While the more prestigious, elite universities in the second mode may continue to look to US and European models of the research university, for the first mode of gaokao students, other models of HEIs will have to be found, perhaps such as the German technical-professional education. The strategy is paying rewards in terms of generating increased research output and citations, with knock-on impact on rankings.

Malaysia

Additional funding

Selectivity

Increased autonomy

Malaysia presented its Action Plan for Higher Education in 2007 with the aim of establishing one or two Apex Universities, which "will be given the latitude to put in place the necessary ingredients to achieve world-class status". The universities will have greater management autonomy, and be able to introduce more selective criteria and procedures for the recruitment of faculty and students. The action plan specifically identified achieving at least one university in the top 100 ranking by 2010. Universities with Apex status have the "greatest potential among Malaysian universities to be world-class, and as such, would be given additional assistance to compete with top-ranked global institutions" (the then Higher Education Minister). Special status amounts to approximately MYR 153 million (\$38.75 million) each. Universiti Sains Malaysia (USM) which had requested an additional MYR 830 million (£21 million) was expected to "move up the World University Rankings with a target of top 200 in five years and top 100, if not top 50, by 2020". As of 2014, Malaysia still does not have a university in the top 100 of any of the three major rankings, though Malaysia's five oldest universities have all featured in the QS University Rankings: Asia for the third consecutive year.

Taiwan

Highly selective support

Import talent

Taiwan introduced a targeted initiative in 2005 to provide annual funding of TWD 10 billion (\$272.24 million) for five consecutive years to the nation's top universities. The aim was to "help universities improve their global standing" and has seen the bulk of the funding go to National Taiwan University; a second stage of the project began in 2011, lasting to 2016. The aim is to have universities specialize in particular fields where they can excel in order to increase Taiwan's presence in the world's top 100. The first phase (2006-2010) emphasized internationalization, and bringing instructors and international students into universities, while also ensuring equity of access for disadvantaged local students. For the second phase (2011-2016) the priority is to build on phase I, to continue to attract world-class instructors and researchers to Taiwan, with the explicit aim of making its HEIs world class.

Denmark

Additional funding

In 2010, the then Danish education minister declared an intention to have “at least” one university among the top ten in Europe by 2020. Globalization Funds, 2006–2012, equivalent to DKK 39 billion (\$5.8 billion) or 0.5 percent GNP were identified, in addition to the Government dedicating DKK 100 million (\$14.9 million) for Centres of Excellence (annually from 2011), and DKK 100 million (\$14.9 million) in New Matching Fund (annually from 2011).

Finland

Selectivity

Additional funding

Finland’s Aalto University is a merger between the Helsinki School of Economics, Helsinki University of Technology and the University of Art and Design Helsinki, and is part of a wider set of reforms of Finnish higher education. Aalto was singled out for special attention, and given an injection of EUR 500 million plus its normal allocation in order to help create a “world-class university”. The new university has undergone significant restructuring, having also conducted an international research, and teaching and learning assessment. These developments have only increased public pressure to break into the top rankings, which has not yet materialized.

Russia

Increasingly selective

Import talent

Russia established the Council on Global Competitiveness Enhancement of Russian Universities in 2012. This followed a governmental initiative known as the 5/100 initiative, announced by presidential decree in May 2012, dedicated to enabling five universities to enter the top 100 world university rankings by 2020, with specific funding of USD 300 million annually from 2013 to 2015, with a predicted increase from 2016 to 2020. This action followed an initiative in 2009 to provide special funding (USD 400 million) to support development programs at 40 universities across the country. The 5/100 program targets 15 universities on the basis of evaluation of internationalization plans, and alignment with a road-map. Other actions include granting national research university status to some HEIs, establishing academic mobility targeting international scientists, and generating research projects in partnership with industry. Participating universities receive an additional 10-40 percent for their budget; “therefore being expelled from the program would cause severe financial loss”.

Korea

Additional funding

Selectivity

Brain 21 Korea aims to reduce the number of institutions through mergers, reduction in the number of students entering national universities by raising entry standards, and targeting investment, with the objective of establishing 15 “world-class” universities. The South Korean government spent KRW 1.34 trillion (\$1076 million) during the 1st Stage (1999–2005) of BK21, and KRW 2.03 trillion (\$1.62 billion) for the

2nd Stage (2006–2012). In addition, the World Class University Project (2008–2012) which covered personnel fees (annual salaries), direct costs, indirect costs and additional expenses was budgeted at \$756.68. In 2013, the Brain Korea 21 Plus (2013–2019) program was launched combining BK21 and the WCU project. More recently the Government launched Humanity Korea and Social Science Korea projects.

India

Mergers

Rankings

India has gone a step further. Concerned about what being the only BRICS country with no HEIs in the top rankings might say about the country's economic prowess, the Government entered into direct discussions with both THE and QS to improve its national standing. A key person, in each of the designated HEIs, has been identified to work directly with the ranking organizations to develop India-specific indicators to take account of "Indian circumstances". This refers to constitutionally mandated reservation quotas (15 percent for scheduled castes, 7.5 percent for scheduled tribes and 27 percent for other backward classes) and for physically-challenged persons which, it is claimed, disadvantages India. India is also considering merging its elite IITs (India Institutes of Technology) to create stronger critical mass and brand. The issue of rankings, and the extent to which Indian HEIs are included, has become a matter of public interest, leading to consideration of new reforms of the system.

Vietnam

Rankings

Teaching

As part of a wider reform package, Vietnam announced plans to rank its own universities as of 2007–2008 "to encourage schools to improve their performance because a low ranking may hurt a school's reputation". The "Fundamental and Comprehensive Reform of Higher Education in Vietnam 2006–2020", known as the Higher Education Reform Agenda (HERA), "aims to have a higher education system that is advanced by international standard, highly competitive, and appropriate to the socialist-oriented market mechanism" with at least one university in the top 200 by 2020. Objectives include expanding enrolment, developing a hierarchical university structure with the top 20 percent attending selective research universities, increasing qualification level of academic staff, reducing the staff-student ratio, expanding the non-public sector, increasing research revenue, reforming governance and management, restructuring and internationalising curriculum, and increasing internationalization of the system overall.

South Africa

Mergers

Since the ending of Apartheid in the early 1990s, higher education in South Africa has been seen primarily as a way to bring about greater equity, efficiency, democratic participation, and development. Pursuance of this strategy has included active encouragement of mergers between predominantly white universities and black technikons. The National Development Plan: Vision for 2030 (2011) has placed a new emphasis on higher education, recognizing it as a vehicle for economic

development. Using the Academic Ranking of World Universities (ARWU) as a benchmark, the plan states that while South Africa is doing well as a developing country, it is "underperforming in a number of key areas". In this context, the decision to locate the international SKA project (Square Kilometre Array project to build the world's largest radio telescope), jointly in South Africa and Australia, represents a very significant effort on the part of the former to boost its research output and position itself internationally.

Nigeria

Funding

Selectivity

Rankings

Teaching

A national ranking system has been operative in Nigeria since 2001, as part of a wider plan by the Nigeria's Universities Commission (NUC) to identify why the country continued to feature very poorly in global rankings of universities, despite improvements in the development of physical structures, facilities and other parameters as reflected by the commission's program accreditation results. A quality-assurance system is being established to help drive up standards and boost the Nigerian university sector's global standing with the aim of having at least two institutions among the top 200 universities in the world rankings by 2020 – the so-called 2/200/2020 vision. In 2008, the Government announced a new NGN 42 billion (\$209.67 million) Special Intervention Fund, under which six universities, three polytechnics, three colleges of education and the Nigerian Defence Academy will receive funding to improve their infrastructure in addition to World Bank funding.

Ireland

Investment

Integrated industrial and Education Policy

PhD output

Ireland is a good example of a country that some time ago decided to invest in its higher education and research sector (science, technology and innovation policy) explicitly to move its industry from a relatively backward to an advanced state. As a result of the investments made in research and development there have been increased outputs across the economy's innovation system: there are now greater numbers of indigenous companies carrying out R&D than ever before; Ireland's universities' output of PhD students has increased markedly and increasing numbers of patents and spin out companies are emerging from the universities.

In 1998, the establishment of the Programme for research in "third level" (higher education) institutions signalled the state's first large-scale investment in what was termed the knowledge economy. That first cycle of funding subsequently bolstered by the national development plans (2000 – 2006) and (2007 – 2013) and the establishment of the Science Foundation Ireland sought to lay the foundations upon which cutting-edge research would be carried out in Ireland in the ensuing years.

Much of the first phase of investment in the period 2000 – 2006 concentrated on infrastructural deficits and involved the upgrading of existing research facilities and the provision of new ones, primarily in the higher education sector. Since then, science, technology and innovation policy has refined its objectives to focus greater

attention on issues such as building high-quality research teams and commercialising university-based research. For example, two of the most fundamental objectives set out in the Strategy for Science, Technology and Innovation 2006 – 2013 included the building up of research teams across all academic disciplines and doubling the universities' outputs of PhD's.

As a result of this policy, maintained under successive governments of different political parties, expenditure on research, development and related innovation initiatives increased by almost 180% in the period 2001 to 2008, and although, because of the financial crisis that has particularly affected Ireland, it has reduced somewhat in recent years it remains nearly two thirds higher than in 2001 and has begun to increase again. The Irish commitment to such investment is extremely strong and is born of its experience that investment in R and D brings tangible benefits.

Most of the focus of R&D expenditure has been on the higher education sector, and enhancing the scale and quality of research being produced in this sector, together with its exploitation. Unsurprisingly, therefore, among the more tangible outcomes from state investment has been the increase in the number of researchers and PhD's – as has been said above, people and the development of high-level skills are as important as other outputs of higher education, science, technology and innovation policy. Ireland's output of postgraduate students has expanded rapidly since 2004 – by over 100% in the case of PhD students and 70% in the case of masters. Almost half of PhD's are emerging from R and D relevant disciplines.

Much of Ireland's investment in research and innovation is publicly funded – around 70%. What is key is how that research transfers into the economy and society. There is an increasing focus on growing R&D among businesses and on improving the commercialisation and transferability of university-based research. Two bodies have been created - Enterprise Ireland (EI) and the Irish Development Authority (IDA) – whose aim is the better aligning of academic-based research with commercial requirements and improving the access to research for companies, particularly indigenous companies. An initiative called 'Innovation Partnerships', for example, assist businesses in accessing the research personnel and facilities on offer from the universities and the state's other research institutes. This is among the most prominent benefits from firm-public sector collaboration. Similar to the English "Teaching Company Partnerships", described below, the program provides up to 80% of the cost of research work to develop new products and services.

Innovation vouchers also provide access to universities and research institutes. These have a relatively low monetary value (€5000) and are targeted at the economy's small and medium-sized businesses, enabling them to purchase services from universities. The largest initiative in this area is the 15 industry-led technology centres which are jointly run by Enterprise Ireland and the IDA. These centres facilitate collaboration between indigenous and foreign-owned companies on the one hand with public research bodies and researchers within the universities on the other.

Lessons

From this overview, a number of strands are apparent:

- Increased public investment
- Highly selective distribution of that investment - The World Bank study referred to above¹²¹, suggests that Indonesia should limit its ambitions to develop research capacity to a few institutions. That is probably realistic in Indonesia's present circumstances.
- Mergers, in order to achieve universities with critical mass – on the assumption that critical mass is necessary for high-quality.
- Importing talent is a feature that appears in some of the strategies. That is a process that can be extremely difficult, since talented individuals tend to be in demand widely around the world, and therefore command relatively high salaries. It would be difficult for Indonesian universities to compete with other better resourced institutions in other countries, and even if it were possible to offer competitive salaries the distortions and difficulties that that might cause internally within universities may cause more problems than any benefits that such a strategy would bring. However, one strategy might be for the Government to begin a campaign to persuade Indonesian researchers and academics working abroad to return – a strategy that China has successfully implemented

Mergers are the ultimate form of cooperation, but there are stages short of merger that recognise that not all universities can carry out all the functions needed in a higher education system, but which, by encouraging cooperation and mutual support, ensure that all universities in a particular area or region play their part to ensure that all functions are covered. So, for example, it is not necessary for every university to be outstanding in research – indeed that would be impossible to achieve and probably not desirable – but through cooperation it is possible to ensure that different types of research in different subjects are available in every region in the country. Similarly, teaching provision at various levels and in various subjects can be orchestrated to ensure that institution in a region, or even across the country as a whole, can be mutually supportive, and to ensure comprehensive coverage.

Ireland is an example of a country that has actually, because of its economic difficulties, reduced its investment in higher education and research over the last few years, but which has introduced the notion of "clusters" whereby all universities in a region come together to agree on their respective roles and how they will deliver the national strategy for higher education and the economy together. The implementation of that approach is in its early stages and so it is not possible to say how successful it has been, but on paper at least there has been significant progress: all regions are covered by a cluster and all institutions are part of a cluster, with their respective roles agreed.

It is notable that with the exception of Vietnam and to a lesser extent Nigeria improving education is not an explicit strategy or aim of the interventions that have been described. This may be because improvement in research performance is seen as the key to improvement in higher education more generally, leading to improved national economic performance. Or it may be because of the influence of the international rankings, all of which are fundamentally based upon research

¹²¹ "Putting Higher Education to Work: Skills and Research for Growth in East Asia", World Bank, 2012

performance, and so the only way of improving the position of a university in the international rankings is to improve its research.

It is notable also that so many of the countries studied have identified improving the position of their universities in the international league tables as a prime driving force. This is unfortunate. First, it is a zero-sum game – if one improves it is at the expense of another, and so it is a logical impossibility for all to improve, as is apparently their aim. But more worryingly, the very narrow focus of the international rankings, which effectively reflect research performance and outcomes alone, means that there is a serious danger of distorting university activity and government policy in these respects.

So all these various strands need to be considered together.

What is notable in all these approaches is the emphasis on the development of basic and applied research, which provides the cornerstone – the sine qua non – of innovation and applied research.

Innovation and entrepreneurship do not exist independent of basic research, fundamental discoveries, and the availability and development of the staff needed in order to innovate and exploit these discoveries. Innovation and entrepreneurship are concerned with ensuring that a nation obtains the best returns possible from the outputs from its universities and its research infrastructure more widely, and the initiatives discussed above – while ultimately to do with economic improvement – in the main take as their starting point the development and improvement of the nation's basic research infrastructure.

As noted in the World Bank report "Putting Higher Education to Work: Skills and Research for Growth in East Asia¹²²" "research enables universities to produce ideas for the business community, thereby contributing to knowledge and technological innovation through basic and applied research and technology transfer. But international rankings and research output indicate that low- and middle-income East Asian higher education systems are not providing research of adequate quality. Even mere university involvement in technology adaptation and upgrading is limited in lower- and middle-income East Asia, with the possible exception of China". This certainly seems to be the case in Indonesia.

So, from the above analysis, among the pointers suggested for Indonesia include:

- Increased and targeted funding for basic science.
- The identification of strategic topics and the most promising people and institutions in which to invest. This ought to be done as a result of a systematic review of research strengths around the country.
- Nurturing talented individuals to keep them in the country – possibly through salary enhancements but certainly through the provision of facilities that will enable them to pursue their research
- Encouraging small institutions to merge to create institutions of viable size, and beyond that to create structures that will enable independent institutions to engage in increasingly deep collaboration and cooperation to ensure that all regions benefit from the advantages provided by higher education.

¹²² "Putting Higher Education to Work: Skills and Research for Growth in East Asia", World Bank, 2012

4. INNOVATION & ENTREPRENEURSHIP

Analysing more closely the activities of other countries three distinctive elements are apparent:

- The innovation infrastructure
- Developing entrepreneurship
 - In students
 - In faculty
- Fostering relations between university and industry.

There is experience of good and successful practice in all of these respects from other countries, and in what follows a number of these are summarised. It has to be said also that Indonesia has benefited from a number of reports touching on the majority of these questions, and it is to be hoped that this present report will reinforce, and extend, these.

The generic need that all this activity represents is the need to optimise relations between universities and the economic world – businesses in particular. A recent report that looked at education/higher education industry relations in Indonesia – ACDP 25¹²³ – comprehensively considered the matter and the main lessons to be drawn from international experience in this respect. There is nothing in that report with which to disagree, and it comprehensively and accurately sets out the main lessons for Indonesia. Its recommendations should be implemented, with the prospect that that would bring considerable benefit to Indonesia.

In particular, that report concludes that education/industry links are in fact part of a tripod of relationships of which higher education institutions and companies are two pillars, the third being the Government, whose role it should be to stimulate, provide seed finance and to ensure that the regulatory and environmental conditions are in place to encourage developing links between higher education institutions and companies. The experience described in this present report reinforces that message, and tells how in successful and aspiring economies universities are the drivers of discoveries and innovation and exploiters of discoveries, to exploit the knowledge and facilities – and the knowledge and skills of faculty and students. And it tells also of how in many countries governments recognise their role in encouraging and enabling this.

There are numerous and increasing examples of actions that are being taken in other countries to stimulate and encourage increasing links between higher education and industry, and the tripod, whereby government is the third leg of these relations is increasingly recognised, particularly the enabling role the Government plays.

Businesses and industry benefit greatly from university research and innovation. Universities are constantly looking for ways to connect their research and students' education to emerging industry interests. In recent years, universities have put greater emphasis on supporting start-up companies, while continuing to engage established companies that have traditionally been their licensing partners. To facilitate greater collaboration and innovation, universities are opening up their facilities, faculty and students to businesses (small and large) in the hopes of creating greater economic value. Universities are strategically partnering with companies,

¹²³ "Development of Strategies for University-Industry-Government Partnership" by Bagyo Y. Moeliodihardjo, Biemo W. Soemardi, Satryo S. Brodjonegoro, and Sachi Hatakenaka

offering internships and externships, sharing facilities with start-ups, such as accelerators, and creating venture funds and incentive programs funded by industry, all of which drive increased innovation and product development by university students, faculty, and staff. Some of the most effective practices are described in what follows.

INNOVATION

Although logically a different concept from entrepreneurship – innovation refers to the production of new products and services, and their dissemination, putting knowledge and discoveries to the service of industry and society more generally, often on the basis of new research discoveries; entrepreneurship refers to taking these to the market with the risks involved – discussion of the issues involved and the support provided often merge the two.

The aim of innovation support – whether from universities or from Government – is to unlock the capacity of universities and their staff for innovation and bringing to bear their theoretical knowledge into exploitable goods and services. So in order to support innovation it is necessary to provide encouragement and infrastructures. There is widespread recognition of this, and a multitude of ground breaking actions aimed at encouraging innovation activity some of which are described below.

The policy goal for innovation support for universities should remain broad: to enhance the economic and the social impact of universities. Innovation is about people as well as about discoveries and products. It is not just to promote scientific innovations to help develop new technologies or industries; nor is it just to ensure universities are helpful to the existing industries; nor even just to assist specific regions with economic development agenda. The goals – and so the incentives – have to be broad enough to encompass all of these. So support of innovation needs to remain very diverse as each university should respond to external needs in its own way, and it is vital that any support that the Government provides should not lead to straight jacketing or even to narrowing its focus.

The overarching policy objective should be to instil economic and social impact as 'values' within universities, and the first step in this respect must be to internalise economic and social impact as end goals in the institutional, and individual, thinking. Without that, innovation activities risk being seen as no more than income generating opportunities and institutions would simply maximize their own revenues rather than worry about the wider economic and social impacts. In contrast, some of the best US universities have a culture that means they would choose 'openness' over patenting if that was a more effective route for generating public benefits.

On the other hand, many innovation-related activities can also lead to additional income for universities, and it is not obvious how public funding should support such activities – in general, if the outcomes provide public benefit, the fact that the university also benefits should not inhibit public support.

8.1.5. The USA's experience

The USA and its universities are in the vanguard of innovation activities, and historically, local economic development has been an important mission of the USA's large universities. Many of America's leading universities, particularly land-grant universities, have always felt a strong responsibility for the betterment of their

surrounding communities. These days, universities are increasingly focusing on innovation and entrepreneurship as key contributors to the growth and success of local communities. Universities are requesting the federal government to include commercialization and innovation-driven economic development in their grant programs.

In addition, regional economic development planning now often starts with an assessment of a local university's research strengths. In turn, universities are seeking partners to supplement their strengths and overcome their weaknesses through partnerships with community colleges, non-profit economic development agencies, governments, and entrepreneurship groups. Some universities, such as Tulane University, are asking their students and faculty to contribute to local community development through service and projects. Others, such as North Carolina State University, are building innovation-driven campuses that help surrounding cities and communities prosper. Some of the most effective practices from the USA include:

- **Tulane University's Social Innovation and Entrepreneurship Program** – Integrates the university with the surrounding economic ecosystem, thereby contributing to local economic development. Students are required to engage outside the campus with the community, often through entrepreneurial projects.
- **Purdue University's Technical Assistance Projects** – Brings faculty and graduate students together to provide cost-free consulting and assistance to local entrepreneurs on business and technical issues.
- **University of Georgia's Service-Learning Program** – Offers enhanced courses incorporating service learning opportunities into all of the university's schools and colleges to increase student involvement in their local communities.
- **University of Kansas' RedTire's Initiative** – Helps link graduate students and alumni with struggling local small/medium-sized businesses. Through a collaborative effort, these businesses receive support and mentorship.

It is a critical point that these activities reflect values that are part of the fabric of the operations of many US universities, and this is particularly so in prestigious universities such as MIT or Stanford, but it will require a culture change in the approach of many Indonesian universities.

The most important consequence of integrating innovation and entrepreneurial values is that many innovation activities would then be naturally embedded into the activities of teaching and research, and become natural extensions of them. For universities that are concerned about economic and social impact (such as MIT), neither the institution nor its academics consider it good enough for their research results to be academically valued; they care that their research has an impact on society. Similarly for teaching, institutions that embrace the goal of social and economic impact automatically include questions of relevance in their reviews of teaching – and other innovation activities can also provide a critical feedback for teaching.

There are three implications of having such a policy goal at the institutional level:

- **Integration of innovation values.** It is not enough that a small group of academics or administrators are engaged in specific innovation activities. Institutions must internalize the values so that institutional judgements can infuse all activities and influence decisions about what activities to pursue and why.
- **Differentiation.** Institutions should develop a diverse set of innovation activities to reflect not only the diverse needs of their respective environments, but also their core strengths; and
- **Sustaining innovation through diverse funding sources.** Institutions should seek funding from diverse sources to support their innovation activities, such funding being both a key driver for their engagements but also an indicator of the relevance of their activities.

Knowledge Transfer Partnerships

An outstanding example of a long-standing and successful innovation initiative supported by a government is the English government's Knowledge Transfer Partnership (KTP). An indication of the success of this program is that it has been in operation for 40 years – its longevity is testament to the benefits it is believed to have brought. The partnership report for the most recent year (2013 – 2014) reveals that the Government invested more than £85 million into new partnerships, and nearly 300 partnerships were completed in that year. The report estimated the benefits of this investment to amount to £211 million in annual profits for the businesses involved, 450 new jobs and 6000 company staff trained.

A Knowledge Transfer Partnership is a three-way partnership between a business, UK University or college and a recently qualified graduate, known as the associate. It offers a company the chance to collaborate on a business opportunity, idea or innovation. The government part funds the cost of the project, including the associate, who helps the business gain the knowledge and capability it needs to innovate and grow. Partnerships can come from any sector or industry – from satellite technology and the creative industries through to high-value manufacturing and environmental technologies. Partnerships can last from six months to 3 years.

Partners within a partnership can be generally classified in the following way:

- Knowledge-based partners including higher and further education institutions, research and technology organisations, and public sector research institutions
- Associates can be recently qualified university graduates (bachelors, Masters or PhD), people who have completed postdoctoral research or individuals recently qualified.
- Businesses or organisations can be any size, from any sector and from any region of the UK.

The way the policy works is that the business concerned identifies a problem that it wishes to have solved, and a suitably qualified graduate joins the company to work on the project and reach a solution. The government pays up to 60% of the cost of the partnership including the salary of the associate as a recognition to the University of its Commitment of time and facilities.

KTP Winners 2013

Bullivant Taranto Ltd, Queen's University Belfast and Richard Morton

Project aim: to reduce energy costs and environmental impact in the manufacture of pre-cast concrete products by optimizing the design, testing and manufacturing processes.

*I have seen that it's during the most difficult times that it's most important to innovate. We knew we had to do it to maintain competitiveness in a falling price market - **Simon Bullivant – managing director, Bullivant Taranto Ltd***

With the Irish economy in deep recession, Bullivant Taranto needed to find new ways to create a profit margin and stay competitive. The company is an SME in Northern Ireland with more than 20 years' experience in the design and manufacture of specialist pre-cast concrete products for the construction industry. But company director Simon Bullivant knew that they wouldn't survive the downturn on experience alone, nor by simply cutting jobs and overheads. Instead, Bullivant Taranto decided that innovation was the best route to success and embarked on a KTP with Queen's University Belfast.

Achievements:

- reduced the energy and cost of concrete production by ~25%
- total cost savings of £92,000 in 2011 and £100,000 in 2012
- 30% energy reduction and replaced cement with locally sourced waste materials, lowering CO2 emissions
- 10 research projects and seven academic papers around sustainable concrete design and manufacture

UTTOs

University Technology Transfer Offices (TTO) and Technology Licensing Offices (TLO) have traditionally been the hubs within universities where innovators and outside business leaders engage to commercialize inventions. The recent increase in entrepreneurship activity on campuses has greatly expanded the role of the TTOs and TLOs. Instead of merely focusing on the commercialization of individual technologies, these offices now act as a central point where students, faculty, alumni, entrepreneurs, investors, and industry can connect with each other. These offices are now focused on identifying and supporting innovation and entrepreneurship on campus, helping start-ups find the best opportunities and building successful business models, changing the culture of their universities, and creating companies that will be based in the communities around the university. TTOs and TLOs have also expanded support beyond their traditional areas, such as energy and life sciences, into education, social innovation, and agriculture. Some of the most effective practices, again from the USA, include:

Utah State University's Intellectual Property Services – The University's Intellectual Property (IP) Services unit within Commercial Enterprises helps USU faculty and staff manage and protect intellectual property. IP service managers work and assist USU and USURF researchers to identify, disclose, protect, and commercialize USU intellectual property.

IP Services includes two IP attorneys, one registered patent agent, one paralegal and one docket manager.

University of North Carolina Chapel Hill's Technology Transfer Internships

– Offers internship and fellowship opportunities for students within the TTO.

Cornell University's IP&Pizza and IP&Pasta– Is an outreach activity for faculty, research staff, and students to increase appreciation of the importance of making university research results useful to society and provide a basic knowledge and understanding of intellectual property issues and an awareness of capturing and protecting valuable intellectual property and its importance to entice potential industry partners.

California Institute of Technology (CalTech) – Files a provisional patent application for every single disclosure that goes through their TTO and later evaluates the technical and business merits over the first year.

Regional Tech Transfer Centers – Serve the needs of research institutions and non-profits throughout a region and are of particular benefit to institutions without TTOs or TLOs. Examples include the South Texas Technology Management Center, the University of Utah, and the Massachusetts Technology Transfer Center. These have been particularly useful for institutions with innovative faculty but without large TTOs.

University of Delaware's Office of Economic Innovation & Partnership (OEIP) – Has established partnerships with the College of Engineering and the Lerner College of Business to establish a program entitled Spin In. The program works with local entrepreneurs who 'spin in' a technology, patent, or product that needs further technical development.

Lessons

The lessons from international experience with innovation activities include:

- Activities to support innovation on the one hand and entrepreneurship on the other overlap a very considerable extent. Although the concepts are logically distinct the supporting activities are not.
- The approaches taken needs to be broad, and the most important thing for universities is to understand that those that are most successful in innovation have an innovation culture that permeates every aspect of their activities – from the design and content of their undergraduate programs right through to the research that they conduct.
- The broad policy goal for innovation should be to enhance the economic and social impact of universities, not only, but including, by exploiting the results of the research conducted by their faculty
- Governments can play a key role by providing seed funding to enable universities to move promising research results into innovative projects
- People are often at the heart of successful innovative activity – for example making students and faculty available to businesses to enable them to resolve problems. Again, governments can help by creating programs that systematise that sort of activity.
- There are technical issues connected with innovation that are generally beyond the competence of individual faculty and students, which universities can help resolve by providing a central service. Technology transfer offices,

centrally located, can play an invaluable role in helping innovators tackle technical issues like intellectual property rights.

8.2. ENTREPRENEURSHIP

Entrepreneurship is beginning to be regarded as an increasingly important feature to promote, as countries seek to develop their economies. There are good economic reasons for public encouragement of entrepreneurial activity: to the extent that entrepreneurs create businesses and jobs, they play an essential role in economic development.

In the United States even, a well-developed economy, small start-up businesses are reckoned to account for the great majority of the 2 million new jobs created over the past few years. And entrepreneurship, of course, takes place throughout the economy, not just at the high end, and not just among universities, university graduates and university faculty. Nevertheless, given the sort of economy that Indonesia seeks to develop, increasing the role of a higher education in developing entrepreneurship – both among students and among faculty – is likely to be extremely important. Universities have a role not just to provide entrepreneurial training but actually to positively encourage entrepreneurship among students and faculty.

A McKinsey Global Institute (MGI) report on entrepreneurship indicated that there are three pillars to the platform that enables innovation and entrepreneurship to flourish, and universities are increasingly driving or involved in each of these factors:

- Developing fertile innovation ecosystems,
- Creating an entrepreneurial culture, and
- Providing sustained financing for new ventures.¹²⁴

Foremost, creating an innovation ecosystem is critical for the long-term success and quality of entrepreneurial activity.

Many countries have recognised this, and entrepreneurship support of various kinds is offered widely, some of which are described below.

A recent Word Bank report on Entrepreneurship discusses experience in a wide range of countries, and the same report covers the questions of research and innovation as well as entrepreneurship. While the issues are related they are different– the relationship is unidirectional in the case of entrepreneurship, but multi-directional in the case of research and innovation. That is to say that in countries in which research and innovation systems are strong and developed these may and usually do impact the extent of entrepreneurial activity. On the other hand, a strong research base and a strong innovation culture and activity are mutually reinforcing, and success in one needs to success in the other.

On many counts entrepreneurial culture appears to be weak in Indonesia. For example, on the Ernst and Young G20 Entrepreneurship Barometer for 2013 Indonesia appeared in 29th place, in the ranking for 'Entrepreneurial Culture', just ahead of Russia in last place¹²⁵. And Table3 below¹²⁶ shows the Indonesia has the

¹²⁴ McKinsey & Company, "The Power of Many: Realizing the Socioeconomic Potential of Entrepreneurs in the 21st Century Economy," G20 Young Entrepreneur Summit, October 2011. See [http://www.mckinsey.com/locations/paris/home/The Power of Many- McKinsey Report- 20111005.pdf](http://www.mckinsey.com/locations/paris/home/The%20Power%20of%20Many-%20McKinsey%20Report-%2020111005.pdf).

¹²⁵ "The Power of Three" Accessed 4 June 2015 [http://www.ey.com/Publication/vwLUAssets/EY-G20-country-report-2013-Indonesia/\\$FILE/EY-G20-country-report-2013-Indonesia.pdf](http://www.ey.com/Publication/vwLUAssets/EY-G20-country-report-2013-Indonesia/$FILE/EY-G20-country-report-2013-Indonesia.pdf)

¹²⁶ Taken from World Bank Report <http://www.doingbusiness.org/data/exploretopics/entrepreneurship> accessed 4 June 2015

lowest density of new businesses (number of new businesses per 1000 population) in the region other than Philippines, Kiribati and Lao. Although it does have the second highest number of new companies that is simply a function of its size.

Table 3 New businesses created

Economy	Region	Year	New business density	Number of new limited liability companies
Hong Kong SAR, China	East Asia & Pacific	2012	28.12	150,165
Singapore	East Asia & Pacific	2012	8.04	31,532
Timor-Leste	East Asia & Pacific	2012	2.76	1,686
Vanuatu	East Asia & Pacific	2009	2.34	311
Malaysia	East Asia & Pacific	2012	2.28	45,441
Tonga	East Asia & Pacific	2012	1.91	114
Samoa	East Asia & Pacific	2012	1.04	112
Thailand	East Asia & Pacific	2012	0.86	41,210
Indonesia	East Asia & Pacific	2012	0.29	47,549
Philippines	East Asia & Pacific	2012	0.27	16,143
Kiribati	East Asia & Pacific	2011	0.11	7
Lao PDR	East Asia & Pacific	2011	0.1	

It is no surprise, therefore, that the Indonesian government has recently stated its desire to promote entrepreneurship and has encouraged education institutions to do likewise. Dr. Gusti Muhammad Hatta, the previous minister of Higher Education was quoted in Forbes magazine as saying¹²⁷

"We need more entrepreneurs. Entrepreneurship is weak here, thanks to a cluster of dominant natural resource industries such as mining and agriculture that have had their way with regulators for too long, difficult access to capital for small businesses, and poor education for would-be entrepreneurs. The result: one of the lowest rates of new business formation in Asia.

It is also a cultural problem. Indonesians are far less likely to want to start their own business, based on a Global Entrepreneurship Monitor study, that found that 14.5 percent of Americans and 7.2 percent of Singaporeans want to do so, but fewer than one percent of Indonesians

A strong entrepreneurial sector can create employment and other business opportunities that a handful of legacy industries cannot hope to match."

Some of the most successful models of support for entrepreneurship are university-based, and assist students and faculty to develop and market the results of their research, sometimes to the great benefit of universities themselves. These models involve

- Programs to help university students develop entrepreneurial attitudes and skills
- Support of faculty who wish to engage in entrepreneurial activity (and encouragement to them to do so)
- Incubators and similar support where new businesses can operate and share facilities and consult with experienced businessmen and women, and where they can gain access to venture capital and other resources. In some

¹²⁷ "Indonesia Minister: We Need Four Million Entrepreneurs," Forbes website, [forbes.com](http://www.forbes.com/sites/donaldfrazier/2012/05/14/indonesian-minister-we-need-four-million-entrepreneurs/), accessed 29 May 2015

countries, grants can be given to universities to establish incubators to serve the academic community and others.

The country with perhaps the best-known entrepreneurial ethos is the United States, and there are many examples of initiatives among American universities aiming to encourage entrepreneurial activity among both students and faculty, with active support from governments at different levels.

As mentioned above, over the last two decades the majority of job creation in the US has occurred in young start-up companies. As global competition continues to grow it is recognised as critical that the institutions driving innovation should improve their ability to develop products and services with market relevance and economic value, and hundreds of colleges and universities across the US are creating entrepreneurship programs with a short-term objective of creating educational value for students and faculty and universities themselves, and the long-term objective of driving economic growth

These programs separately address both the issues of student entrepreneurship and faculty entrepreneurship activity. A letter addressed to the U.S. Secretary of Commerce that was submitted by 141 university presidents, chancellors, and higher education association leaders through the National Advisory Council on Innovation and Entrepreneurship (NACIE) identified among the areas where universities were supporting innovation and entrepreneurship:

- Promoting student innovation and entrepreneurship,
- Encouraging faculty innovation and entrepreneurship,
- Actively supporting university technology transfer,

8.2.1. Promoting student innovation and entrepreneurship

In the USA, Colleges and universities are investing heavily in the development of their students' entrepreneurial skills. These are not so much focussed on encouraging or enabling students to start the next blockbuster enterprise like Google or Facebook (both of which were started by students), but are more focused on the pedagogical value of entrepreneurship as a set of skills that can be applied across professional environments and activities to supplement the students' classroom experience. Universities are investing in formal programs as well as in extra-curricular activities to channel students' interest in solving global problems through entrepreneurship. Examples of formal programs include degrees and certificates in entrepreneurship, while examples of extra-curricular activities include business plan contests, entrepreneurship clubs, and start-up internships. Many universities are even experimenting with on-campus accelerators, entrepreneurial dorms, and student venture funds. At the very least, these activities provide critical organizational skills to students, and at the very best, may create the next great university spinoff. Some of the most effective practices include:

The University of Colorado System's Innovation and Entrepreneur

Degree Program – Located at the Colorado Springs campus, this program offers a Bachelor's degree in Innovation (B.I.), which provides a unique multi-disciplinary team approach. For example, in addition to completing classes in computer science, a B.I. in Computer Science requires students to develop strong team skills, study innovation, engage in entrepreneurship, practice proposal writing, and learn business and intellectual property law.

The University of Illinois' Patent Clinic – Provides law students the opportunity to draft patent applications for student inventors.

Washington University in St. Louis' student internship program – Offers 25 paid internships per summer for students to work in a start-up's.

Rice University – Raised and provided \$1.2 million in cash and in-kind services for its business plan contest in 2011. This money has served as a de-facto angel round of funding for the recipient companies.

University of Washington – Hosts a multi-level business plan competition comprising of different competitions throughout the school year, in combination with seminars, courses, and mentorship to assist in pushing student ideas to the next level.

University of Florida- "INSPIREation" Hall – Is the nation's first entrepreneurship-based academic residential community - encouraging student interaction with fellow students, leading researchers, distinguished faculty, business professionals, and entrepreneurs.

In Europe, some of the strongest and best established university-based entrepreneurship programs are provided by the Cambridge Centre for Entrepreneurial Learning (CfEL), whose mission is to promote an entrepreneurial culture at the university and to spread the entrepreneurial spirit amongst students.¹²⁸ CfEL is quite different from a classical entrepreneurship centre as its essential focus is on planning and implementing entrepreneurship courses within the whole university, using a specific philosophy and learning approach. CfEL was established in 2003 as a not-for-profit organisation, resulting from the division of two units formerly belonging to the University of Cambridge Entrepreneurship Centre founded in 1999. Teaching and training moved to CfEL (part of Cambridge Judge Business School), and Cambridge Enterprise became the office for university-industry relations and knowledge transfer alongside with the Technology Transfer Office and the University Challenge Fund.

CfEL has nine full-time staff to plan and organise entrepreneurship courses, including a director, program managers, a centre manager and administrative staff. The actual delivery of entrepreneurship courses is largely taken care of by some 200 entrepreneurs and practitioners (entrepreneurs, venture capitalists and business angels, bankers, etc.). A broad recruitment package includes a website, brochures, posters, and a series of information events. Close collaboration with the different departments allows circulation of information to student mailing lists and the organisation of tailored information events.

The overall objective of entrepreneurship education is to develop self-confidence and self-efficacy amongst students. Entrepreneurship is understood as a set of skills, attitudes and behaviours rather than just venture creation: in the words of Dr. Vyakarnam, CfEL's director, "We don't teach how to write business plans – we stopped doing that 4-5 years ago. Instead, we have things to do with confidence, career choices, we have things to do with opportunity recognition. So we are genuinely dealing with entrepreneurship education and not business studies made simple". Teaching methods range from lecturing, video and online assignments, to problem-based learning, project work on real technologies, entrepreneurs in the

¹²⁸ For more information on CfEL, see www.cfel.jbs.cam.ac.uk.

classroom. The main strength of this approach is its clear focus on the development of entrepreneurial skills, attitudes and behaviours through an entrepreneurial pedagogy. This means a “people approach” focusing more on soft skills (developing student self-confidence, self-efficacy, helping students to understand the why and the when of becoming an entrepreneur, learning to deal with uncertainty, learning by trying, trial and error, learning from mistakes (and failures) in contrast to a “how to approach” focusing more on the (business administration) skills and tools to develop a (successful) business plan.

The achievements of 15 years of entrepreneurship education at the University of Cambridge are summarised below:¹²⁹

- 16,000+ participants
- 200+ programs and events completed
- 200+ business ventures created by CfEL alumni
- 300+ entrepreneurs and practitioners have contributed to CfEL activities
- 18 business plan competitions organised with Cambridge University Entrepreneurs (CUE)
- Advanced Diploma in Entrepreneurship –first accredited entrepreneurship course at the University of Cambridge

In addition to optional modules in entrepreneurship, the centre also offers a formal qualification. Started in 2009 by the Institute of Continuing Education (Division of Professional Studies) and CfEL, the Advanced Diploma provides a highly practical program designed specifically for entrepreneurs. It is organised as part-time program over the duration of 15 months and leads to the qualification of Advanced Diploma in Entrepreneurship awarded by the University of Cambridge.

A focus on entrepreneurship training and more general support for entrepreneurship is also encouraged by the World Bank report referred to above¹³⁰, which comments

"Entrepreneurship training for faculty, students, managers, and workers is a very promising university-industry link for all countries. This will help boost weak management and leadership skills in low- and middle-income East Asia, indirectly lifting productivity. It should also help overcome the reluctance of some faculty members to get in touch with the business world—possibly because of a lack of business acumen and entrepreneurial drive—even if they have promising findings and new commercializable ideas. Deepening the pool of entrepreneurs can also complement research promotion efforts ... the National University of Singapore has introduced several of these [innovative] approaches in its entrepreneurship courses."

The ultimate purpose of entrepreneurship education is two-fold. Contributing to the creation and development of entrepreneurial attitudes and motivations to start-up a firm is as important as developing the skills needed to successfully run and grow a business venture. Assisting the establishment of new firms is a key objective, but not

¹²⁹ <http://www.cfel.jbs.cam.ac.uk/aboutus/achievements.html>, accessed 25 May 2015.

¹³⁰ "Putting Higher Education to Work: Skills and Research for Growth in East Asia", World Bank, 2012

the only one. Creating entrepreneurial mindsets that drive innovation in existing firms is of equal importance, yet success is much more difficult to measure.

Tunisia provides an interesting example of a government supported initiative to encourage entrepreneurship among university students, partly with a view to encouraging them to establish new businesses on graduation, but also partly to instil relevant skills so that those that go onto employment might be better placed to be productive. Tunisia's is particularly interesting initiative in view of the fact that a large share of the labour force in most developing countries is self-employed. The following is taken from a World Bank review of the program in question

In Tunisia, both the graduation rate from university and the unemployment rate among tertiary educated youth have been increasing steadily. Access to post-secondary education has soared over the past decade. Gross enrollment rates in tertiary education reached 34 percent in 2009, up from 12 percent in 1995. At the same time, unemployment rates among youth with a higher education degree have reached alarming levels. According to the Tunisian Labor Force Survey, unemployment among youth (aged 29 or below) holding a university degree increased from 34 percent in 2005 to 56 percent in 2011. These figures are suggestive of a long education-to-work transition for university graduates. University graduates constitute a large share of unemployed youth in Tunisia. While tertiary educated youth (15-29 years old) made up less than 16 percent of those employed in the Tunisian Labor market in 2010, they accounted for over 34 percent of the unemployed. In this context, the graduates' employment problem has become one of the main concerns for policymakers in Tunisia. Tunisia has attempted various reforms aiming to promote employability or self-employment among university graduates.

As part of a Development Policy Loan aiming to support a broad set of employment policies in Tunisia, an innovative entrepreneurship track was introduced into the tertiary curriculum in academic year 2009/10. Up to then, during the last semester of the applied undergraduate curriculum, students took an internship and wrote an academic thesis as graduation requirements. In June 2009, the Ministry of Education and Higher Education passed a reform creating an entrepreneurship track where students would receive business training and coaching to develop a business plan. In August 2009, the Ministries of Education and Higher Education and of Vocational Training and Labor jointly signed an order to allow students to graduate by submitting their business plan instead of a traditional thesis. Upon graduation, participants were invited to submit their business plans to a competition (concours des meilleurs plan d'affaires "entreprendre et gagner"). The fifty winners of the competition became eligible to receive seed capital to establish their business.

The newly established entrepreneurship track aimed primarily at increasing self-employment and fostering an entrepreneurship culture among university graduates, as well as more broadly at improving participants' employment outcomes. This initiative is judged to have been partially successful. It increased self-employment among graduates significantly (by 60% or more), albeit from a low base. However, early indications are that it did not enhance the general employability of graduates compared to those who completed their higher education by the conventional route – the employment/unemployment rates of those who had undertaken this program were similar to those of graduates who had taken the conventional route to graduation.

'Entrepreneurship Now!'

A comprehensive approach to encouraging entrepreneurship among students would cover not only lessons and programs in entrepreneurship, but would also help them to identify business opportunities, negotiate deals, obtain finance and help them with the practicalities of establishing a functioning company (by, for example, providing incubator facilities – see below). A proposal for just such a program has been developed by a consortium of universities in Berlin, under the title "Entrepreneurship Now"¹³¹, which includes elements of all these features and may provide an interesting model for the development of entrepreneurship in Indonesian institutions.

"Entrepreneurship Now!" is a hypothetical program that takes the approach of a complete university entrepreneurship initiative to develop a model for entrepreneurship support at universities across the city. It comprises:

- Entrepreneurial Education
- Identification of business opportunities
- Start-up support

To launch "Entrepreneurship Now!", a university wide marketing campaign is proposed. Note that the viral aspect of the process is more important than the actual winning of business plans and therefore, the marketing and promotion of the program should exploit Web 2.0 strategies and student word-of-mouth. Specific attention and marketing effort should be directed at student opinion leaders on campus. Students who are currently engaged in entrepreneurial activities on campus are included in the selection panel. "Entrepreneurship Now!" is limited to a cohort of 50 students who commit to staying with the program throughout their university course of study. Entry to the program will be by application only; the following entry criteria apply:

1. Students with a lot of extracurricular activities are preferred candidates.
2. Grades are de-emphasised with a preference for B-average students that have taken a wide variety of classes (these tend to be more curious, adventurous, and likely have an entrepreneurial orientation).

Selected students should be asked to complete an assessment instrument such as the Entrepreneurial Mindset survey¹³² or the Myers-Briggs Type Indicator in order to place them in start-up teams that maximise a combination of diversity of experience and personality type.

Students will be required to take the following classes in preparation for their foray into entrepreneurial venturing.

1. *Opportunity Identification.* This is a standard class on environmental scanning, ideation, and translation to commercial application. The result of this class is a feasibility study for a commercial idea.

¹³¹ Hofer,A. et al. (2010), "From strategy to practice in University entrepreneurship support: strengthening entrepreneurship and local economic development in eastern Germany: youth, entrepreneurship and innovation", OECD Local Economic And Employment Development (LEED) working papers, 2010/09, OECD Publishing

¹³² <http://www.amazon.com/Entrepreneurial-Mindset-Continuously-Opportunity-Uncertainty/dp/0875848346>.

2. *Entrepreneurial Finance.* This class is designed to acquaint students with financial statements from a small business perspective, sources of entrepreneurial financing (banks, friends and family, venture capital, vendor financing), risk management, and forecasting.
3. *Entrepreneurial Marketing.* This class is designed to acquaint students with concepts in viral marketing and selling, market research on a tight budget, and product design and positioning.

Student teams will be required to attend weekly IdeaLabs in which they practice the process of ideation and opportunity scanning. In these sessions, they will practice using the tools for market research and financial analysis to conduct quick opportunity assessments in order to become acculturated to the habit of thinking entrepreneurially. In addition to the IdeaLab, students will be given the opportunity to participate in formal venture capital networks in which business ideas are presented, to become acquainted with the skill of making elevator pitches. Such venture forums can be augmented by technology "dating" events, akin to the "ideas and beer" events held around Berlin, in which bi-weekly brownbag sessions pair teams of scientists who present their research with teams of "Entrepreneurship Now!" students to discover business opportunities.

Entrepreneurship education and start-up support is organised hand-in-hand. "Entrepreneurship Now!" activities are closely linked with business plan competitions organised at a regional level. In particular the Opportunity Identification course prepares students for participation. Students are assigned to mentor-professors one year ahead of the competition. "Entrepreneurship Now!" students will be given priority in the assignment of incubator space. This will highlight their status and it will ensure an "end to end" process so that any student joining the program will be assured of support to the launch and post-launch of their business.

In the final analysis, even if students who graduate from this program do not start businesses, their experience will become the basis for rumours, stories, and conversation around campus. The idea is that this viral effect is more likely to be effective at infusing the entrepreneurial imperative on campus than broad programs or public policy support activities.

Encouraging faculty innovation and entrepreneurship

Faculty and doctoral graduate students conduct the research powering many of the innovations that spawn high-growth start-ups. However, even at the most entrepreneurial universities, many faculty and graduate students do not always consider the market and societal relevance of their research. To address this issue, universities are putting in place a series of policy changes to encourage more faculty entrepreneurship, which in turn will complement the student entrepreneurship. These changes include greater recognition of faculty entrepreneurs, integrating entrepreneurship into the faculty tenure and selection process, and increasing faculty connections to outside partners - through externships, engagement with business, and targeted resources for start-up creation. Finally, in the best cases, of which the USA provides some of the best examples, universities are actively working with national agencies to address some of the regulatory challenges around faculty entrepreneurship, in particular, those related to conflict of interest and national

security issues. Activities to support faculty, often overlap with actions to support innovation, and examples of these have been given above, in the discussion of support for innovation. Some of the most effective practices specifically to support faculty include:

The University of Pittsburgh – The Office of Technology Management and the Office of the Provost hosts an annual, seven week course aimed at educating and motivating both student and faculty researchers in innovation development, commercialization, and entrepreneurship. The course takes participants through each step of the innovation and commercialization process, from idea conception to intellectual property protection and licensing, and all the way to early-stage market research and networking strategies. Private, individualized workshops are also offered where students and faculty can explore their own innovation ideas in a team setting.

University of Southern California – The University promotes faculty entrepreneurship and innovation by supporting, rewarding, and funding the work of faculty members. The Lloyd Greif Center for Entrepreneurial Studies presents three faculty members with research grants totalling \$11,000 as part of annual Faculty Research Awards. The Center also rewards entrepreneurial-minded faculty with the annual Greif Research Impact Award, which is given to the faculty member who has written an article that has the most effect on the area of entrepreneurship.

University of Virginia – In 2010, UVA's School of Medicine was among the first to include innovation and entrepreneurship activities among its promotion and tenure criteria. Candidates for promotion and tenure are asked to provide a report on their inventions and the patent status of those inventions; registered copyright materials; license agreements involving their technologies; and any other contributions to technology transfer-related activities, including entrepreneurship and economic development impact.

University of Nebraska Medical Center's Entrepreneur in Residence (EIR) – The EIR works with licensing staff and researchers at the University of Nebraska's Medical Center to help identify, evaluate, develop, and support the creation of new companies based on UNMC innovations.

Actively supporting the university technology transfer function

The concept of an “incubator” is a simple but powerful one. It recognises that establishing a business in the conventional way can be a high-risk matter. The start-up costs – the infrastructure that has to be put in place, the commitment to leases, the establishment of an administrative framework – can be daunting to the point where many potentially successful entrepreneurs would not take the first step. So universities can establish a low-cost low-risk environment where much of the infrastructure is provided centrally to enable entrepreneurs among their faculty, their graduates and even their students to set up their businesses with far lower upfront cost and therefore a lower risk than would normally be required. Often these expand to enable fledgling businesses install themselves, thus providing a wider service to

the local society and economy. Two detailed examples of the establishment of incubators are provided below.

The "Incubator Platform", established in Sweden in 2002, is a network which today links the eight business incubators located in the region of Vastra Gotland that host businesses, in many cases spun out of local universities. The aim is to engage incubator managers in collaboration and knowledge exchange activities. In the early period incubators had to apply every year for a renewal of the co-financing agreement for government-provided funds. This changed over the years and today a long-term co-financing agreement for the individual incubators and the Platform is in place. The "Incubator Platform" also raises private revenues from annual fees paid by the member incubators for the network activities; most important is *Inkubatorkompetens 2.0* with its focus on networking and competence/skills development. The regional government holds no ownership in the incubators; this usually rests with local universities and respective city councils.

The main objective of *Inkubatorkompetens 2.0* is to support the growth of tenant companies (annual targets are turnover of all tenant firms of SEK 1 billion (2009) and 1 000 or more people employed) through working with the incubator management in offering more and better services to foster excellence in management and growth of tenant firms. What this includes in practice is outlined below.

- Networking and competence/skills development for incubator managers is still the most important pillar with at least eight meetings organised annually and two intensive training sessions for incubator managers. Incubators in the Platform can also request meetings tailored to their needs and specific interests. Part of the annual program is an international study tour.
- Joining efforts paid off in terms of acquisition of European financing (European Regional Development Fund) for skills development activities, both for incubator managers and tenants.
- Making use of economy of scale effects, for example, in procurement or marketing and public relation activities is of great benefit for the Platform incubators and their tenants. In particular this has increased the public policy focus. Joint activities also make the incubators large enough to attract interest from private financiers located outside of the region.

Inkubatorkompetens 2.0 is a key partner of incubator managements and tenant firms in matters of personnel management and recruitment. A number of human resource development specialists work for *Inkubatorkompetens 2.0* and offer their specialised services for the incubators in the Platform and their tenant firms. A major area of work is research into factors favouring and impeding tenant firm survival and growth. Here *Inkubatorkompetens 2.0* works with universities and single academics. Attracting the attention of existing and large private companies has not been a task of the Incubator Platform. This is largely done by the universities and the individual incubators.

Increased co-ordination and co-operation has had the benefit of strengthening the performance of the incubators. Important contributions to the long-term

development of the Platform and its incubators are the attraction of more private financing (business angels and formal venture capitalists) and the assistance provided in recruitment and personnel management. According to Swedish official statistics 180 active limited companies with a turnover of SEK 680 million (\$76.92 million) and 588 employees, emerged from Platform incubators in 2006; this corresponds to almost 70% of all firms originating from incubators in Sweden.

Along similar lines to the Swedish Incubator Platform initiative, in the Netherlands there are two Science Parks in Twente region: Business&Science Park (BSP) in Enschede and Kennispark Twente.

BSP has a size of approximately 40 hectares and hosts around 200 companies. The University of Twente (UT) plays an active role in the park through an intense cooperation with science companies, including facility and laboratory sharing and exchanges of personnel. The combination of university study, high tech knowledge-based industry, and business services generates both ideas and jobs and has proven to be a very strong magnet for like-minded companies and investors. BSP hosts the oldest business incubator in the region, the BTC Twente (Business & Technology Centre Twente), with 85 tenant firms in 2007. Success factors are its policy of "easy in" and "easy out" and the offer of more space within the building once a tenant firms expand. BTC Twente stimulates formal and informal contacts between tenant firms and the 200 BSP companies; the management also acts as coach for the tenant firms. Kennispark was founded by UT, the municipality of Enschede and the Regional Development Agency Oost N.V. It also acts as central umbrella organisation for technology transfer, handling IP protection and spin-off support. The target is to create 10 000 new knowledge intensive jobs in Twente by 2020 (Kennispark 2008). The Kennispark has as a main task to scout (via so-called business accelerators) and develop business ideas and activities that lead to patents and/or new research spinoffs. Business accelerators are persons who fulfil, for a certain (technological) domain, scouting and screening activities, patent strategy, preparing business start-ups, fund raising and similar activities. UT research institutes set up business accelerators to shorten the time-to-market of new products by means of specific support of entrepreneurial employees or by finding companies that will market technological innovations. Matchmaking and specific business support are key activities.

Venture capital and business angel activities are under development. Only 4% of all spin-outs receive private venture capital. Participation Company East Netherlands NV (PPM Oost NV), which invests in companies in the provinces of Gelderland and Overijssel is one of the few VCs, and invests mainly in high-tech and mature companies. In 2006 PPM Oost had invested in 60 companies with a capitalization of EUR 48 million. UT is one of the shareholders. Some banks have "matching services", (matching "capital" with "companies"), and, on an irregular basis, meetings between (informal) investors and companies are organised, such as "Seventh Heaven", an initiative of the Dutch informal investors network (NBIB) organised in collaboration with TOP. UT is very active in advancing venture capital and business angel activities. Drienerlo Investments BV is an example of this. The founders are successful UT alumni who have been since early 2007 investing their own capital in technology companies in Twente, and especially in UT spin-offs. Their UT background allows them to "speak the language" of the budding spin-off entrepreneurs better than many other investors.

Public financing programs compensate for the gap in private financing and for high transaction costs, spillages and uncertainty of R&D results. Spin-off companies are selected at a very early stage and coaching is focused upon this stage. The consequence of this low-selective model is that a large number of businesses are selected, many of which will be small and with low levels of capitalisation. It is common that public money is granted to these early stage projects.

Not all examples of support for entrepreneurship in higher education come from developed economies and leading HE systems.

Malaysia provides an example of a country nearer home that has taken action to encourage entrepreneurship in the higher education sector. In order to enhance technical capabilities among entrepreneurs, in line with the intended direction of the economy, the Government created the Malaysian Technology Development Corporation (MTDC) in 1992. MTDC provides not only technical advice and premises, but also risk capital to promising ventures. In 1998, MTDC set up five incubators in the country in collaboration with the 15 universities. Currently, 75 ventures are being incubated. The majority belong to high-tech areas such as software, information-related and biotechnology.

Other more indirect measures are also being undertaken to instil an entrepreneurial spirit among the younger generation of Malaysians. For instance, the Government has already started to provide entrepreneurial education at the junior high school level, as well as at the university and graduate school levels.

Notwithstanding the experience of Malaysia, Singapore and others in introducing successful incubator programs (incidentally, almost always based around universities), the World Bank report referred to above ¹³³ suggests that there are a number of conditions that incubators need to fulfil in order to be successful in meeting their full potential. These include that:

- The university is a hotbed of ideas and a supportive promoter
- Incubation facilities are networked with other incubators and firms
- The university provides services facilitating the exit of firms from the university orbit.

These conditions may not yet exist in Indonesia, but the direction of travel should undoubtedly be in this direction.

Lessons

Development of entrepreneurship seems to be increasingly recognised as a key to economic development, with the majority of new jobs - particularly in advanced industries – being created in small and start-up businesses. This is clearly recognised in Indonesia where the Government has expressed its wish that entrepreneurship should be fostered.

It appears to be generally agreed that the most important thing in encouraging entrepreneurship is to foster an entrepreneurial culture and attitude among faculty and students.

One way of doing this is to run entrepreneurial courses for students throughout the university. While there are in existence full Bachelors or Masters programs in entrepreneurship those appear to be less important than more generally developing the culture with shorter optional courses.

¹³³ "Putting Higher Education to Work Skills and Research for Growth in East Asia", World Bank, 2012

Fostering entrepreneurship among faculty is as important if not more so. Universities need to encourage entrepreneurial activity among faculty both by ensuring that the rules do not inhibit this (for example rules about time spent on private activities and about private earnings) but also that, as with innovation activity, they provide the infrastructure support to enable entrepreneurs to thrive within the university – things like the technology transfer offices already discussed.

One specific and productive way in which universities can encourage entrepreneurship among students and faculty is to provide start-up or incubator facilities. Not all Universities should do this, but this is an area where cooperation between universities could provide significant benefit. This is something that the Government may consider encouraging with a seed funding program.

5. SUMMARY OF LESSONS AND FINAL WORD

5.1 SUMMARY OF LESSONS

National Efforts to strengthen the higher education and science base

There is a balance to be struck between supporting excellent research and building capacity.

In order to be able to bid for and conduct research projects institutions need to have research capacity and infrastructure – both staff and facilities. One approach to be considered would be for project grants to carry a sufficient overhead.

Collaborative research projects with international collaborators should be encouraged. One way of doing this would be to include within the ISF a program explicitly for projects conducted with international collaborators

Specifically, what may be required in Indonesia is:

- Increased and targeted funding for basic science.
- The identification of strategic topics and the most promising people and institutions in which to invest. This ought to be done as a result of a systematic review of research strengths around the country.
- Nurturing talented individuals to keep them in the country – possibly through salary enhancements but certainly through the provision of facilities that will enable them to pursue their research
- Encouraging small institutions to merge to create institutions of viable size, and beyond that to create structures that will enable independent institutions to engage in increasingly deep collaboration and cooperation to ensure that all regions benefit from the advantages provided by higher education.

Innovation

The lessons from international experience with innovation activities include:

- Activities to support innovation on the one hand and entrepreneurship on the other overlap a very considerable extent. Although the concepts are logically distinct the supporting activities are not.
- The approaches taken needs to be broad, and the most important thing for universities is to understand that those that are most successful in innovation have an innovation culture that permeates every aspect of their activities – from the design and content of their undergraduate programs right through to the research that they conduct.
- The broad policy goal for innovation should be to enhance the economic and social impact of universities, not only, but including, by exploiting the results of the research conducted by their faculty
- Governments can play a key role by providing seed funding to enable universities to move promising research results into innovative projects
- People are often at the heart of successful innovative activity – for example making students and faculty available to businesses to enable them to resolve problems. Again, governments can help by creating programs that systematise that sort of activity.

- There are technical issues connected with innovation that are generally beyond the competence of individual faculty and students, which universities can help resolve by providing a central service. Technology transfer offices, centrally located, can play an invaluable role in helping innovators tackle technical issues like intellectual property rights.

Entrepreneurship

Development of entrepreneurship seems to be increasingly recognised as a key to economic development, with the majority of new jobs - particularly in advanced industries – being created in small and start-up businesses. This is clearly recognised in Indonesia where the Government has expressed its wish that entrepreneurship should be fostered.

It appears to be generally agreed that the most important thing in encouraging entrepreneurship is to foster an entrepreneurial culture and attitude among faculty and students.

One way of doing this is to run entrepreneurial courses for students throughout the university. While there are in existence full Bachelors or Masters programs in entrepreneurship those appear to be less important than more generally developing the culture with shorter optional courses.

Fostering entrepreneurship among faculty is as important if not more so. Universities need to encourage entrepreneurial activity among faculty both by ensuring that the rules do not inhibit this (for example rules about time spent on private activities and about private earnings) but also that, as with innovation activity, they provide the infrastructure support to enable entrepreneurs to thrive within the university – things like the technology transfer offices already discussed.

One specific and productive way in which universities can encourage entrepreneurship among students and faculty is to provide start-up or incubator facilities. Not all universities should do this, but this is an area where cooperation between universities could provide significant benefit. This is something that the Government may consider encouraging with a seed funding program

5.2. FINAL WORD

It is clear from the various reports that have been produced by international and local bodies that Indonesia is well behind many of its regional competitors in terms of its research innovation development, and it would be unrealistic to expect a general improvement on a large scale.

The best approach, as proposed by the World Bank in its report “Putting Higher Education to Work Skills and Research for Growth in East Asia” would be to invest selectively but substantially in a relatively small number of institutions in order to boost their research capacity and output, but do so in a way that might have spin-offs for other institutions. It will be for the Indonesian science foundation to consider its strategy in this respect, but requiring principal investigators and the universities to form some sort of relationship with others as a condition of project grant funding might be a worthwhile approach.

And those same institutions where basic research is developed will be the natural home of measures to support innovation – and in particular the development of incubators and science parks. These can be self-financing, but may need encouragement with start-up seed funding, and that will be something for the

Government to consider. However, the development of entrepreneurship is repeated regularly in the various studies that have been conducted, as very largely a matter of attitude of mind and awareness of possibilities, as well as the availability of possibilities, and that is something that should be widespread throughout the higher education system. All universities should be encouraged to develop entrepreneurship programs – which can be done collaboratively between institutions, not necessarily discretely by individual institutions, and again this is something that might be centrally encouraged by Government.

Once a basic entrepreneurial approach takes hold, other measures will follow – providing services to local industry, seeking out and facilitating venture capital and so on.

What is inescapable is that strength in basic research is key and that is something that needs to be developed, and it is to be hoped, with the creation of the Indonesian Science Fund will now begin to flourish in Indonesia.

APPENDIX 2 - Projections of Labor Market in Indonesia

In order to form a view of skills demand and supply of labor at the macro level, we conducted analyses on the National Labor Force Survey (Survey Angkatan Kerja Nasional, or SAKERNAS) database based on the regular household survey distributed by Central Agency of Statistics (Badan Pusat Statistik or BPS) Indonesia. This provides information at a high level and is not detailed, but enables some conclusions to be drawn about the development of demand in the future by broad economic sector and based on past trends.

The projection of labor market equilibrium for all sectors and all education levels can be done at a high level using SAKERNAS data produced by BPS Indonesia. The SAKERNAS data available for this study are from 2005 to 2013.

Theoretically, on the one side households are revealed the supply of labor, and on the other side both firms and schools are revealed the demand for labor. Since SAKERNAS is a household survey, which presents the supply of labor, one could argue that in the equilibrium labor market at certain time it shows both demand and supply. The projection of labor was prepared based on time trend and wage trend of formal workers.

A.5.1. Methodology

Based on availability of data in SAKERNAS, we apply econometric method to estimate the projection of labor in formal sector which is defined in SAKERNAS as permanent workers with regular payment (in Indonesian language as *buruhkaryawan/pegawai*) from 2014 and 2018 using two different economic models, time trend and wage trend. The income data for entrepreneur and informal workers are not available in SAKERNAS.

1. Time Trend

We are using time trend to assume similar behavioral time trend labor growth rate from period 2005 to 2013 to project the next five year period 2014 and 2018

$$\ln L_{ijt} = f_{ijt}(t) = \ln e^{rt} L_0$$

Where:

i = education level 1, 2, ..., m

j = economic sector 1, 2, ..., n

t = Time period of estimation and projection: 2005-2018

L_{it} = Number of formal workers, at province i, time period t

r = labor growth rate at education level i, economic sector j, time period t

2. Wage Trend:

In this projection model, we assume that the behavior of labor market from 2014 to 2018 is influenced only by the wage behavior in the period of 2005 to 2013. The data on wage is only available for formal workers, but not available for the informal workers. We use the wage growth trend for specific education level and economic sector as the assumption of wage growth for workers with each education level in each economic sector.

$$L_{ijt} = f(W_{ijt})$$

The economic behavioral model of this function is:

$$\ln L_{it} = \alpha + \beta_1 \ln W_{ijt} + \beta_2 \ln (W_{ijt})^2$$

$$W_{ijt} = e^{rt} W_0$$

where:

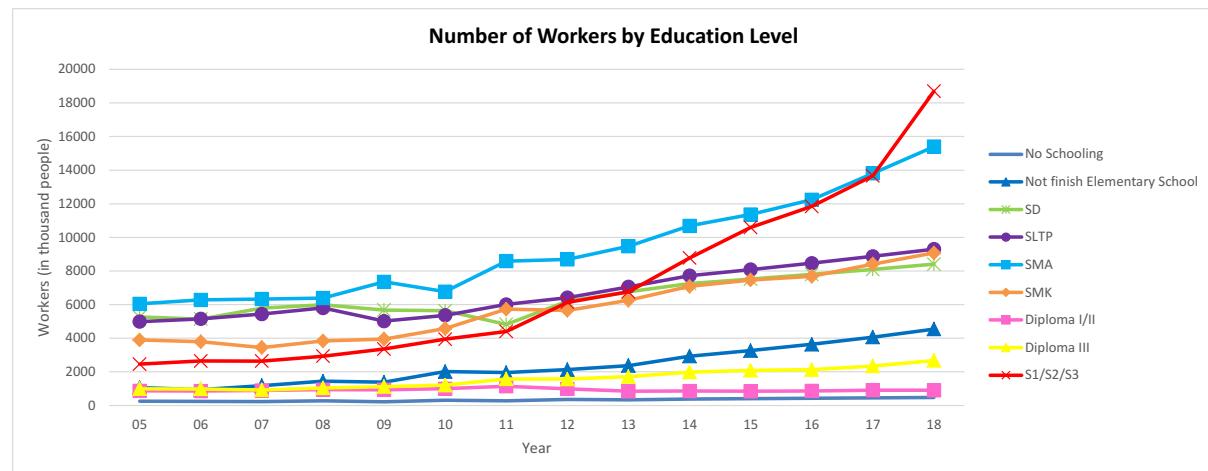
- i = education level 1, 2, ..., m
- j = economic sector 1, 2, ..., n
- t = Time period of estimation and projection: 2005 – 2018
- L_{it} = Number of formal workers, at province i, time period t
- W_{it} = Wage rate at education level i, time period t,
- r = wage growth rate at education level i, time period t

A .5.2. Results at National Level

We prepare five year projections of labor, from 2014 to 2018, for national level and the nine economic sectors.

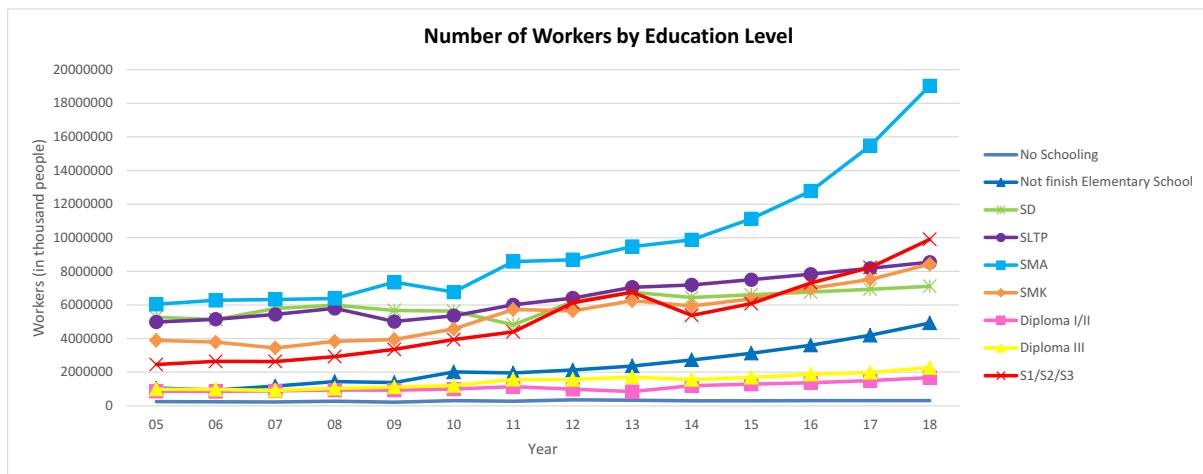
National. Both time trend and wage trend projection show that SMA and university levels are having the highest labor growth in 2014 to 2018 period.

Figure A5.2.1. Labor Projection by Education Level, 2014-2018: National Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

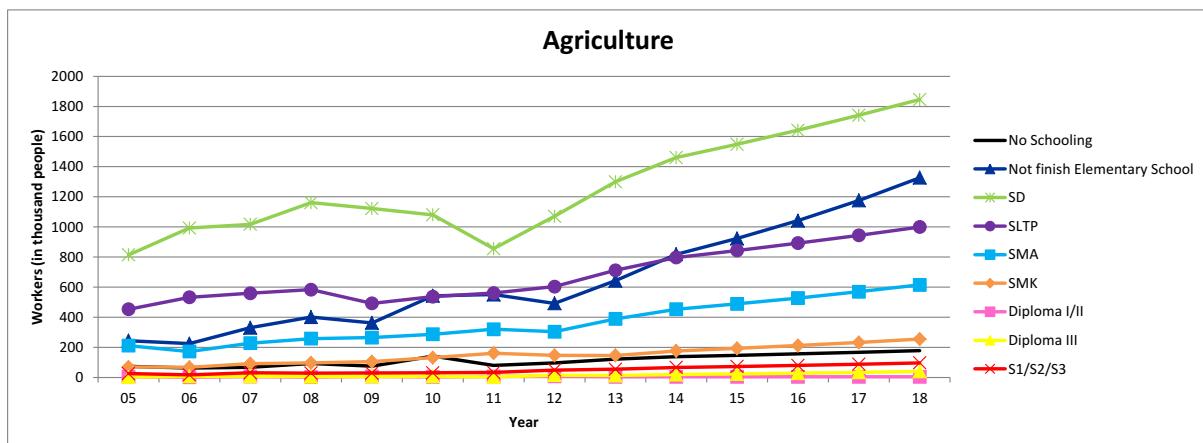


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 Study Team

Agriculture The time-trend projection of labor in the agriculture sector 2014-2018 shows that this sector relies on low-skilled labor (junior high school/SLTP or lower) as a result of slow technical progress. Methods are still mostly very simple and traditional.

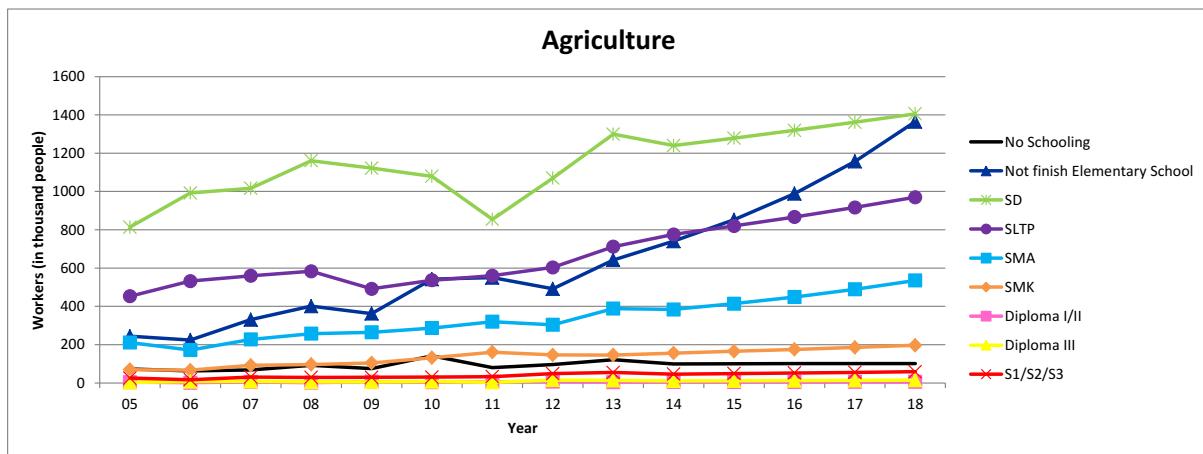
Figure A5.2.1. Labor Projection by Education Level, 2014-2018: Agriculture – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

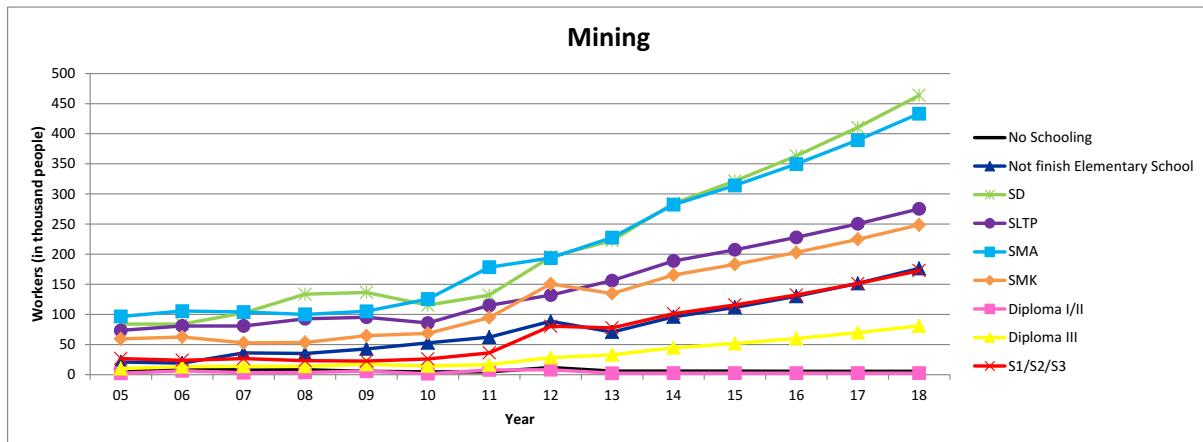


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Mining. Since mining is a relatively capital intensive sector, the labor projections for 2014-2018 suggest a higher level skills are required - senior high school level and university levels.

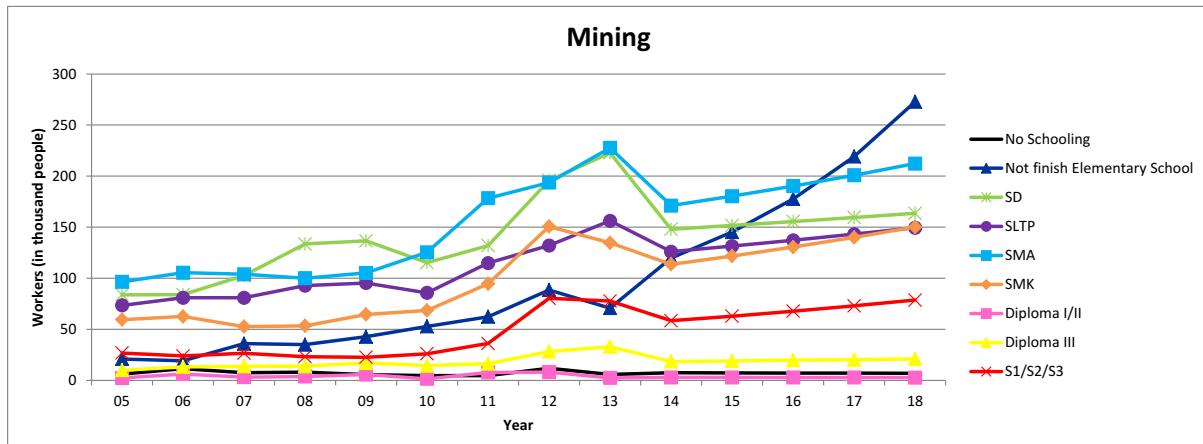
Figure A5.2.2. Labor Projection By Education Level, 2014-2018: Mining – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 StudyTeam

Model 2 – Wage Trend



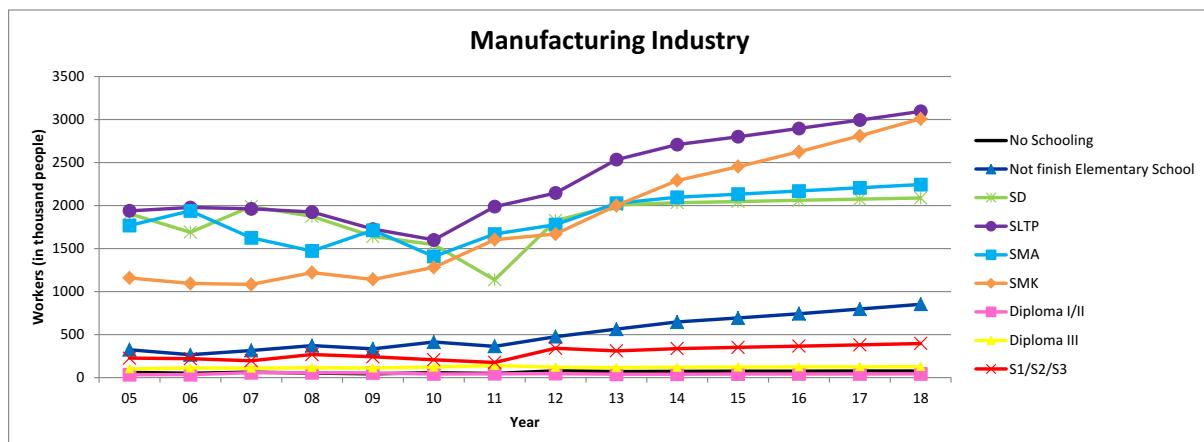
Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 StudyTeam

Manufacturing industry. This sector benefits from a variety of technological developments, and therefore the labor projection for 2014-2018 is dominated by medium skills- high school – levels (those graduating from SLTP, SMA and SMK).

Figure A5.2.3. Labor Projection By Education Level, 2014-2018:

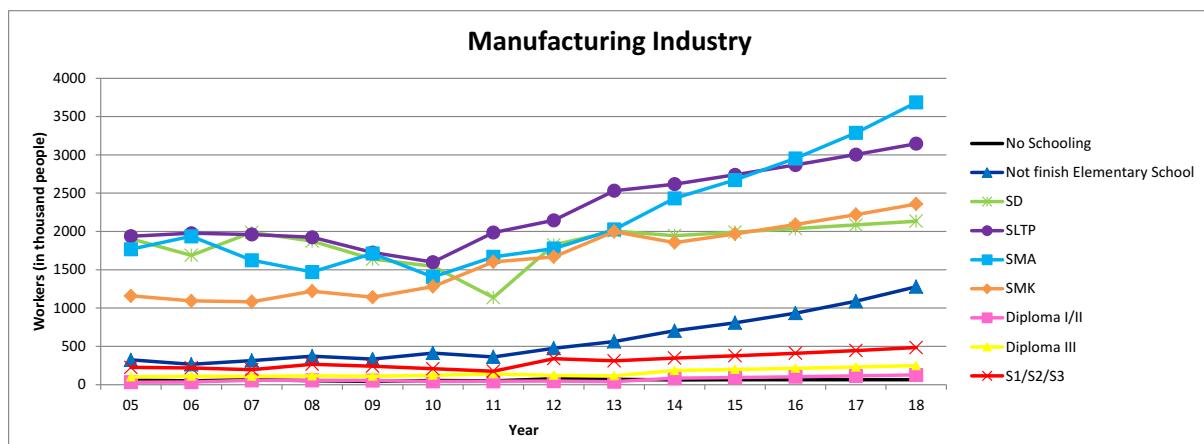
Manufacturing Industry – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

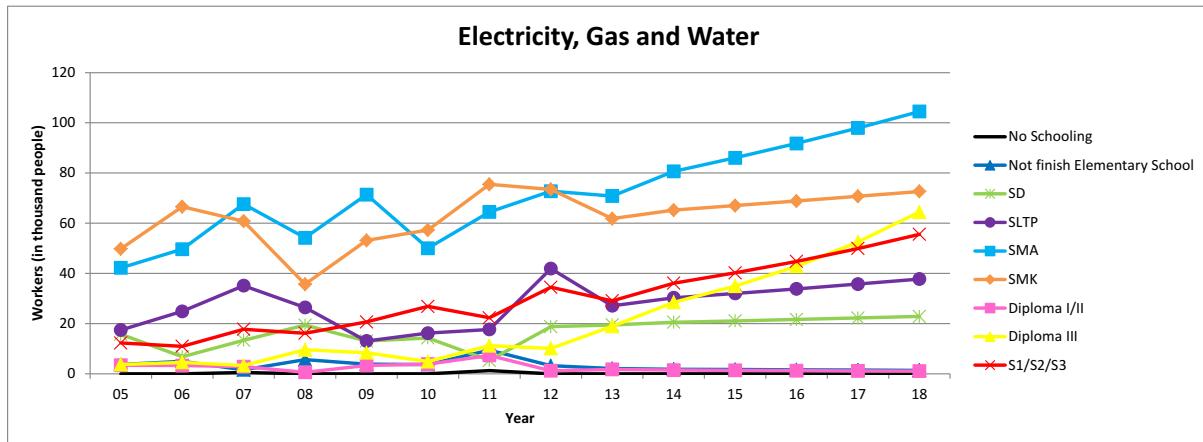


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 Study Team

Electricity, gas and drinking water. This sector has a relatively high technological development, and the labor projections for 2014-2018 show future skills needs at the levels of senior high schools or SMA and SMK, diploma III and university.

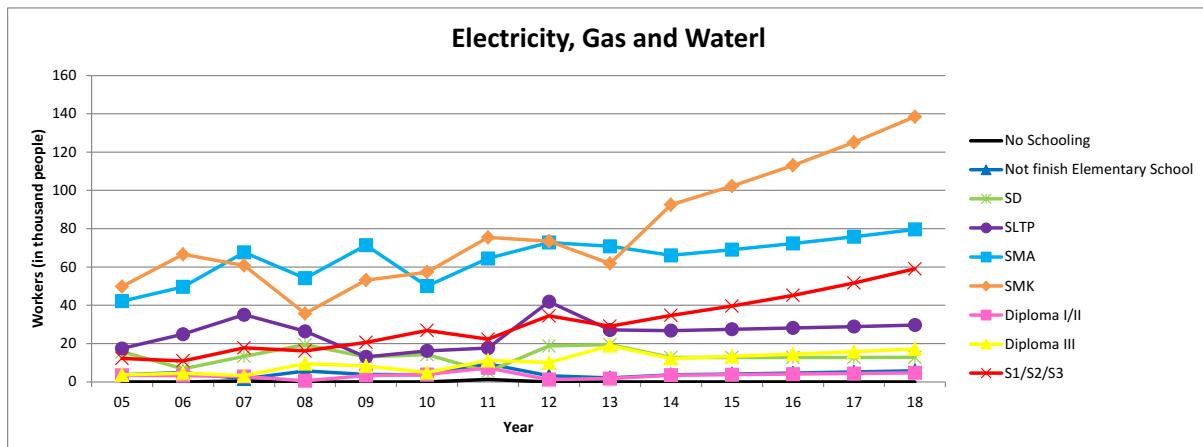
Figure A5.2.4. Labor Projection By Education Level, 2014-2018: Electricity, Gas and Drinking Water – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

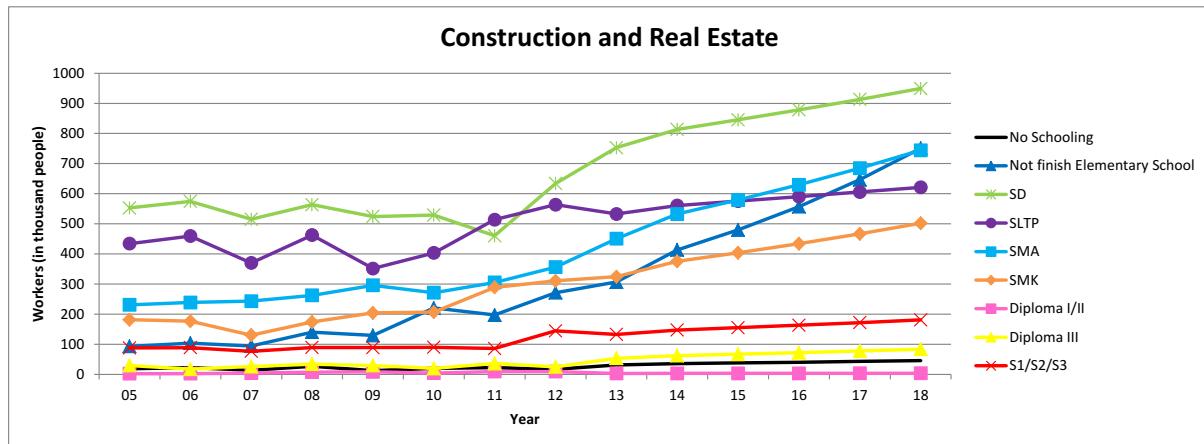
Model 2 – Wage Trend



Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 Study Team

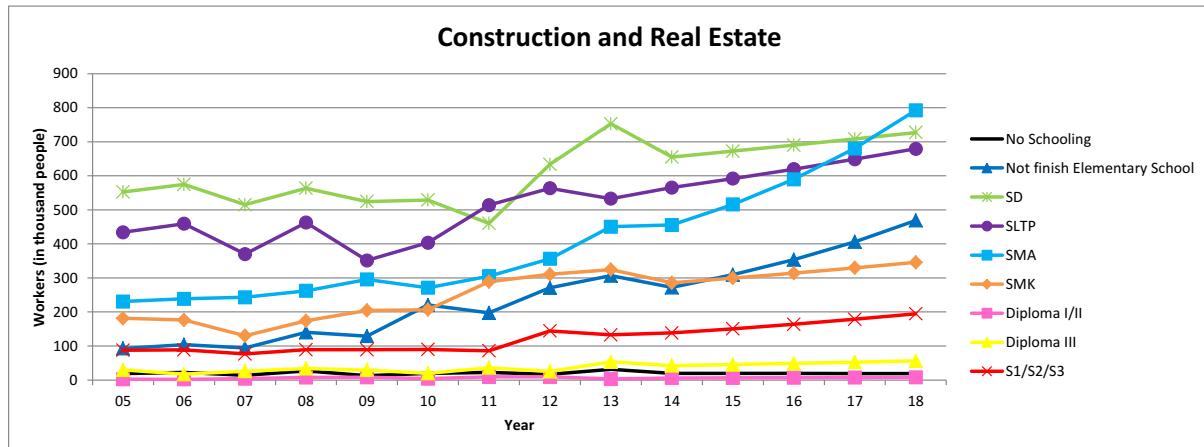
Construction and real estate. Since the construction sector in Indonesia is relatively labor intensive and utilises low technological developments, the major skills needed in the labor projection for 2014-2018 are at junior high schools level or lower. However, there is an increasing trend of SMA and SMK graduates entering the sector, which indicates that this sector faces a transition to a higher skill level.

Figure A5.2.5. Labor Projection By Education Level, 2014-2018:
Construction and Real Estate – National
Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

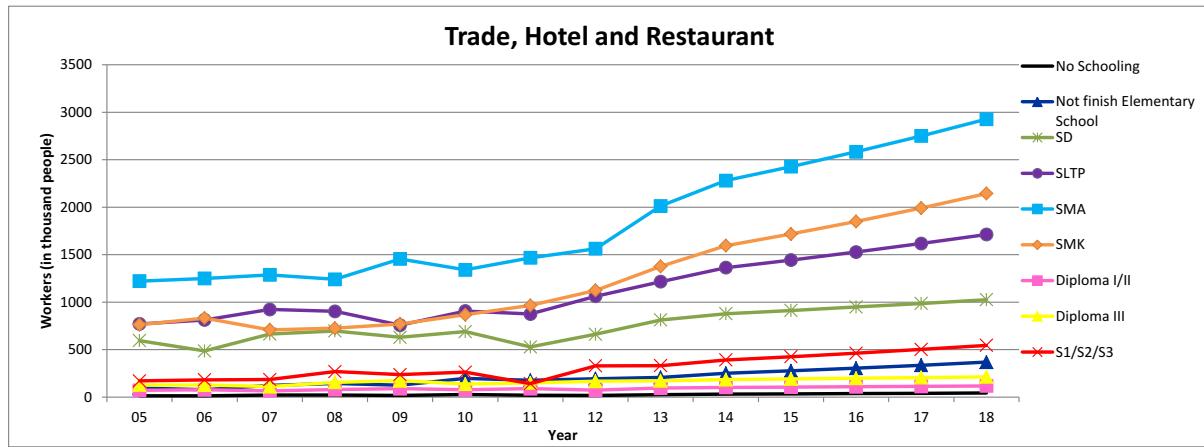
Model 2 – Wage Trend



Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 Study Team

Trade, hotel and restaurant. This sector has transitioned to medium-high technological development. Thus, the labor projection 2014-2018 trends show it requires higher labor skills such as are possessed by SMA, SMK and SLTP graduates.

Figure A5.2.6. Labor Projection By Education Level, 2014-2018:
Trade, Hotel and Restaurant – National
Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

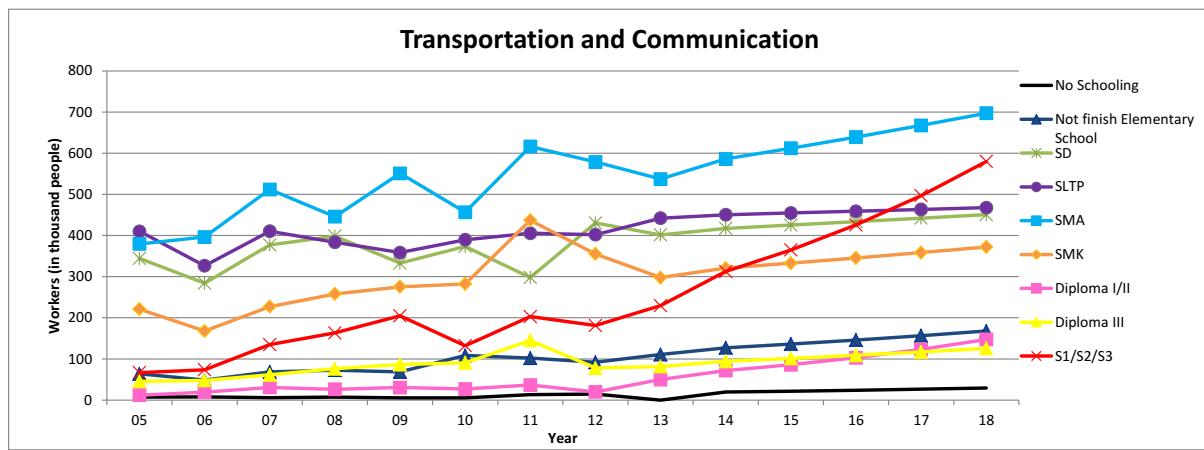
Model 2 – Wage Trend



Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 Study Team

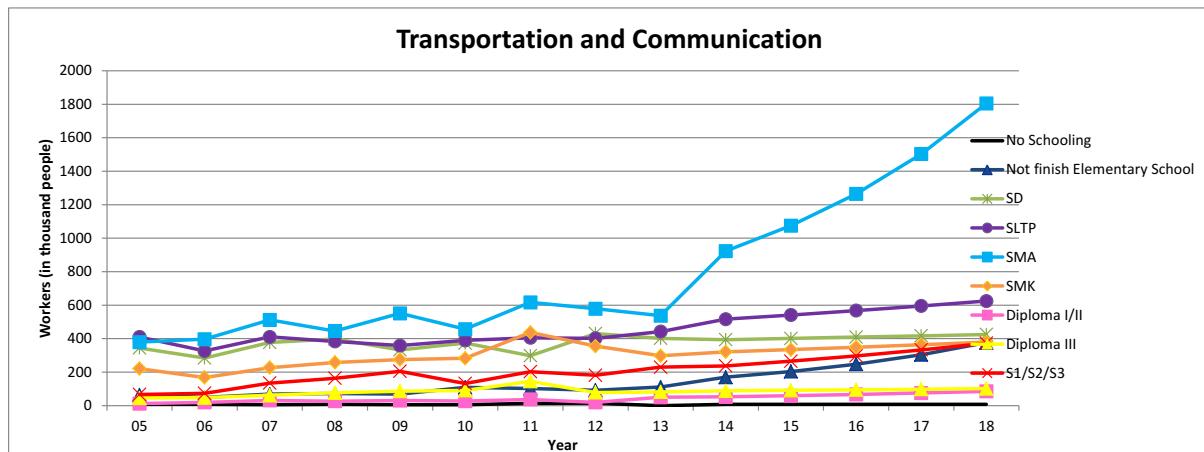
Transportation and communication. This sector has experienced fast technological development in the past decade. Therefore the labor projection for 2014-2018 presents high and fast growth demand for SMA, higher education and diploma III graduates.

Figure A5.2.7. Labor Projection By Education Level, 2014-2018:
Transportation and Communication – National
Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

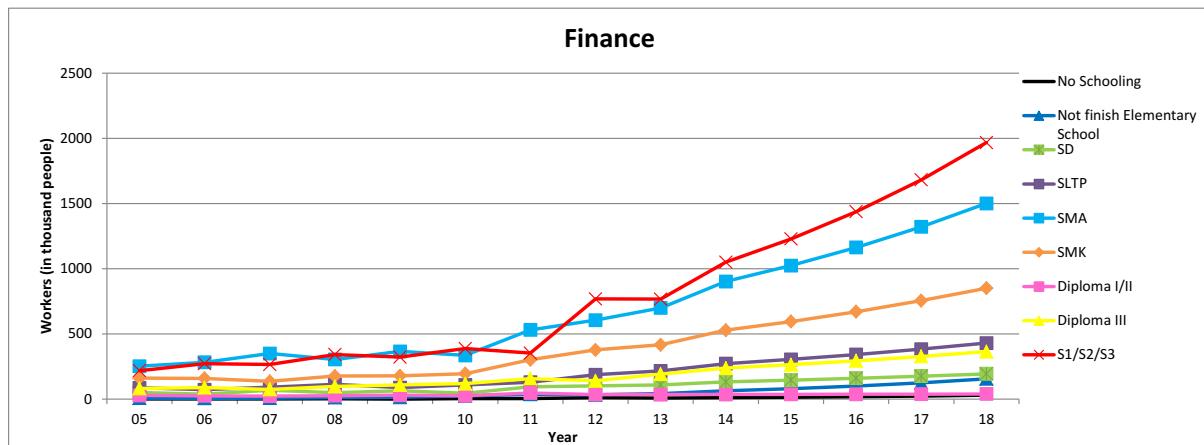
Model 2 – Wage Trend



Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 Study Team

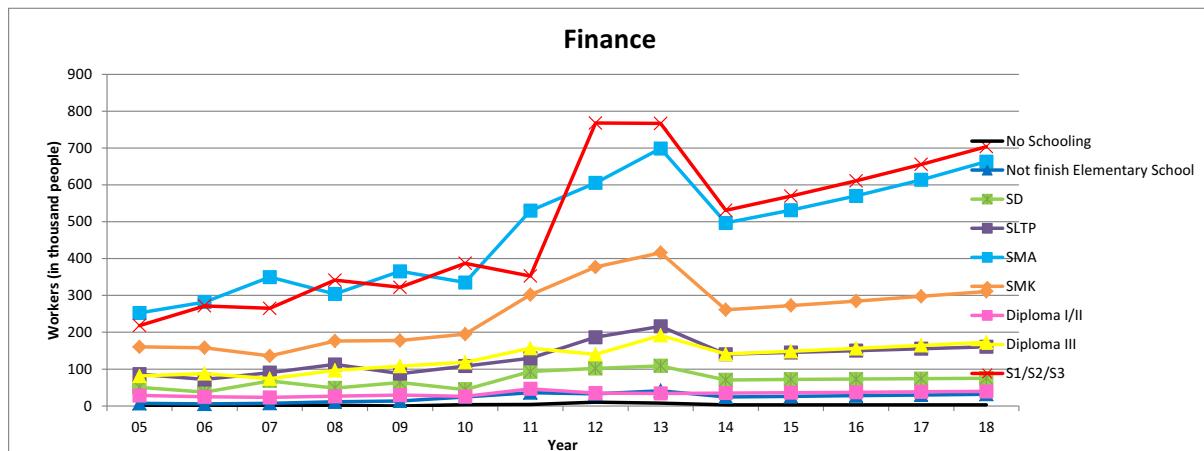
Finance. This sector has experienced the highest technological development compared to others. Therefore high skilled labor dominates the labor projection for 2014-2018. University, SMA and SMK graduates are three highest skills levels demanded in this sector.

Figure A5.2.8. Labor Projection By Education Level, 2014-2018: Finance – National
Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend

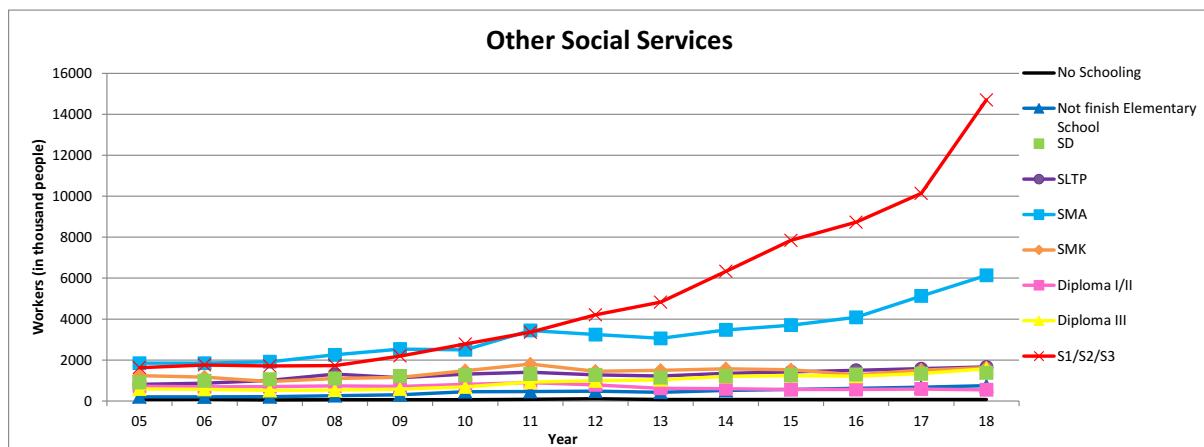


Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 Study Team

Other social services. The labor projection for 2014-2018 shows that skills possessed by university and SMA graduates will be most in demand.

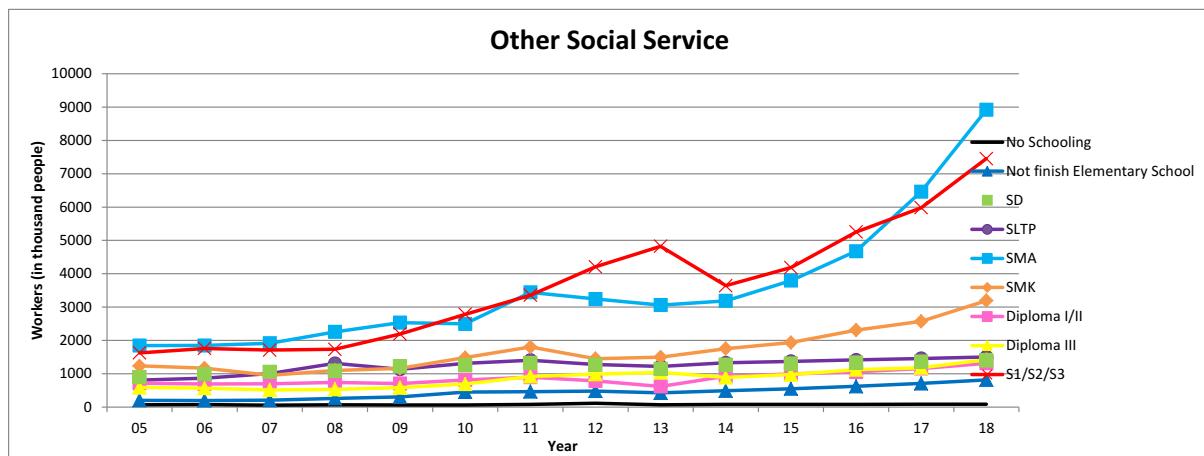
Figure A5.2.9. Labor Projection By Education Level, 2014-2018: Other Services – National

Model 1 – Time Trend



Source: BPS, SAKERNAS 2005-2013, time trend projection by the ACDP 016 Study Team

Model 2 – Wage Trend



Source: BPS, SAKERNAS 2005-2013, wage trend projection by the ACDP 016 Study Team

Conclusions:

It is apparent from this analysis of projections of trends in skill levels to 2014–18, conducted at the macro level using SAKERNAS data, that there will be acceleration in skills levels required in most sectors. Applying both the time trend and wage trend models, we find that the strongest growth in high-level skills demand arising in finance, in transport and communication and in "other services". The only sectors is not showing significant increases in high-level skills are agriculture, manufacturing and construction.

Demand will vary in different regions, and information about this should be part of the labour market information systems that we recommend should be developed both local and national levels

Appendix 3 - Brief Review on Policy Direction Relevant To The Study

The RPJMN 2015-2019. The third National Medium Terms Development Plan (RPJMN) of 2015-2019 has been prepared as the elaboration of the Vision, Mission, Action Programme of the President/Vice President Jokowi and Jusuf Kalla, and guided by the National Long Term Development Plan 2005-2025. Apart from applying PANCASILA as nation ideology, the government also use **TRISAKTI** and its elaboration into **Nawacita** as foundation in developing policies and programs stipulated in RPJM 2015-2019. The **TRISAKTI** which consist of sovereignty in politics, self-reliance in the economy, and personality in culture.

Development in third RPJMN (2015-2019) is directed to further strengthen overall development in various fields by emphasizing the achievement of economic competitiveness based on the advantages of natural resources and human resources quality and capability of science and technology which continuously increased.

Policies in education development which are relevant to the study among other are: (i) Implement the 12-year compulsory education by expanding and improving the quality of secondary education equity to accelerate the availability of trained human resources to meet the needs of the labor market; (ii) Strengthen the curriculum and its implementation; (iii) Improving the relevance and competitiveness of higher education; and (iv) Improving access, quality and relevance of education and job skills training.

Some the following strategies are planned to implement the above policies in education:

- improvement of the quality assurance of secondary education so that graduates of secondary education actually benefit learning results as a basis to continue to higher education or to create/get a better job;
- strengthening public-private partnerships with states clearly the government's contribution in helping schools / madrasah private and accountability of schools / private madrasah in the use of government assistance;
- strengthening the vocational students' academic skills such as math, problem solving and language to meet the needs of industries that require the mastery of basic skills;
- incentives both financial and non-financial to drive the industry in the provision of apprenticeship;
- curriculum development that is aligned with the employment needs based on input from the business / industry;
- alignment of curriculum development programs and vocational skills according to the main economic activity in the district / city and labor market needs.
- strengthening the curriculum which gives the 21st century skills
- diversification of the curriculum so that students can develop optimally in accordance with the potential, interests, and intelligence of the individual;
- evaluation of the implementation of the curriculum is rigorous, comprehensive, and sustainable;
- increase participation from teachers and stakeholders to actively participate in giving feedback implementation of the curriculum at grade level;
- development of innovative study programs/departments in Higher Education Institutions according to the needs and industrial development, accompanied by an increase in the competence of graduates by field of science in accordance with the needs of the labor market, especially in agriculture, maritime, tourism, manufacturing industry and creative economy;

- increase the expertise and skills of higher education graduates certified to shorten the waiting period work (job seeking period);
- strengthening cooperation between higher education institutions/universities and the world of industry for research and development activities;
- developing entrepreneurship education and training that is integrated in the course, with a partnership between higher education institutions/universities with the business/industrial world.

In the field of economy there are policies and strategies in macroeconomic framework, state finance, monetary, financial services, industry, state-owned enterprises, small and medium enterprises (SMEs) and cooperatives, tourism, creative economy, strengthening investments, domestic trade, foreign trade, labor, and international economic cooperation. In the field of industry, a relevant policy is improving competitiveness and productivity (export value and value added per labor) with the following strategies: improving technical efficiency, increasing mastery of science and technology/innovation, improvement and implementation mastery new product development (new product development) by the domestic industry, development of input factors among other through improving the quality of human resources industry and improving capacity and quality of its schools. In order to increase competitiveness and productivity of the industry, facilitation and incentives will be prioritized to: (1) strategic industries; (2) the maritime industry; and (3) labour-intensive industries.

Development of tourism industry is directed to increasing the participation of local businesses in the national tourism industry and increase the diversity and competitiveness of products / services national tourism in any tourism destination of marketing focus through: (i) development of tourism business for local communities, (ii) investment facilitation efforts of the tourism sector, and (iii) facilitating the development and improvement of the skill level of local labor in the field of tourism. Further, institutional development of tourism will be aimed to build human resources of tourism and national tourism organization with the strategy: (i) coordinate with higher education institutions which have undergraduate program in the field of tourism; (ii) boost the capacity and quality of tourism education institutions, expanding the majors and interests, building a tourism school; and (iii) participate in maintaining the quality of tourism education organized by the private sector.

Strengthening investment is pursued through two pillars' policies: first is improving investment climate and business climate and to improve the efficiency of business licensing process; and the second is an inclusive investment promotion mainly from domestic investors. The two pillars of this policy will be carried out in an integrated manner both at the central and regional levels. In this regards maritime sector and balance distribution between Java and outside Java have got high attention. There is a policy for providing incentives and facilitation of investment (in the form of fiscal and non-fiscal incentives) that can (a) encourage investment for development of manufacturing sector by promoting a balance distribution of investment between Java and outside Java; and (b) encourage investment to develop Indonesia as a pivot maritime and marine sector development.

The third stage RPJMN 2015-2019 puts the creation of quality employment is a major issue in the development, with the direction of policy and implementation strategies among others are as the following:

- Strengthening labor competitiveness in entering the labor market globally
- Harmonization of standardization and certification of competence

- Develop a partnership program between the government and the business/industry and between the central government and local governments to improve the quality of labor
- Development of training funding patterns to support the improvement of labor skills
- Improved governance of the implementation of a training program to accelerate the certification of workers.
- Strengthening Training Center (BLK) through (i). reorientation BLK into Training and Entrepreneurship (BLKK), and (ii) revitalization Training Center (BLK) in the District
- Expansion of scale economies towards sectors / sub-sectors whose productivity is high to provide employment quality and large to improve social welfare
- Make functioning the labor market through (i) improving the effectiveness and efficiency of the labor market as well as maintaining the balance between supply and labor requirements; (ii) integrating labor market information systems to respond to the information needs of companies, training providers and job seekers to build partnerships between policymakers with private job market; (iii) increase industry involvement in the design and implementation of employment services, as well as develop a system that uses a standard mechanism for feedback from stakeholders; (iv) ensure that the job matching and counselling in place; (v) cooperation (outreach) with educational institutions, training as well as the employer so as to awaken a sustainable cooperation; and (vi) enhancement of the role of local governments in the development of mechanisms of employment.
- Etc.

In order to increase support for science and technology for improving the competitiveness of the production sector, science and technology development is directed among other at: (a) Implementation of R&D: with an output of technologies / new products diffused into the production sector; and (b) Strengthening University-Industry/Business-Government (U-I-G) partnership: facilitated through science and technology park, incubators, and venture capital. Development of Technopreneur is one of the derived policy. In RPJMN 2015-2019, the growth of new entrepreneur-based goods and services creation will be increased, especially in the universities of engineering and agriculture.

In the field of science and technology, universities is also an element of R & D institutions in the national innovation system. The University has a very large resource pool as results of the combination between students and lecturers in large numbers at the same locations. In addition to the large numbers, these resources also have a good variety of disciplines and scientific thinking. Because it always turns, the student has the potential to generate fresh ideas of science and technology development. In contrast, research institutions have a permanent power, so the supply of fresh ideas do not happen all the time. Developed countries have a mechanism to harvest fresh ideas from students by making it as the source of invention through research contracts from the Government to the university. Indonesia needs to find the appropriate mechanism.

National regional development framework to accelerate and expand the development of the region is as follows

1. To encourage the accelerated development of centers of economic growth, as the main drivers of growth (engine of growth), in each island, with the potentials and advantages of the region, especially for the development of food, energy, maritime, tourism and industry. Industrialization should be encouraged to process raw materials, in order to increase added value and create new employment opportunities.

2. Accelerating economic development of region-based maritime (marine) utilizing marine resources and maritime services, namely the increase in fish production; the development of marine energy and mineral; development of nautical tourism; and the ability of the maritime and shipping industry.
3. Selecting growth centers that have prospective commodity (high added value and create employment high), particularly those in each economic corridor. In addition, priority will also be given to the development of coastal areas that have marine resources and maritime services.
4. Optimizing investments by Government, state/local enterprises, and private enterprises in industrial clusters to trigger a multiplier effect (multiplier effect) in the surrounding area, including in the disadvantaged regions.
5. Refer to the Spatial Plan and the Strategic Environmental Assessment (SEA) in regional development need to be maintained.
6. The link between the growth center of the region and the surrounding area, should be facilitated by an integrated regional infrastructure and is well connected and integrated, particularly road infrastructure and transportation, both air and sea communications.
7. To improve the distribution logistics of goods, services, and information, the central and local governments, as well as through cooperation with the business world, including SOEs, seeks to (a) lower the transaction costs of logistics (transaction costs); (b) reduce the high economic cost; (c) lowering the average dwelling time (waiting time of ships in port); (d) developing the system of logistics and distribution electronically, and (e) the optimization of export-import licensing electronically and in integrated manner across sectors.
8. Increasing the capability of human resources and science and technology to support the development of industrial clusters. Availability of skilled human resources and skilled labor is the main capital to initiate the establishment of large-scale projects in each industrial cluster.
9. Continuously strives to create and improve the business climate and investment climate conducive for investors, incl. deregulation, facilitation and catalysing through the provision of fiscal and non fiscal incentives.
10. Improving coordination, synchronization and synergy of the policies among of Ministry/ Agency and between the Ministries/Agencies and Local Government.
11. To increase and strengthen the institutional capacity of local governments, including the clarity of the division of authority between the central government, provincial government and district/ city governments.
12. The development of disadvantaged areas, including rural villages, need to be improved by empowering the local economy, the creation of local transport access to the growth areas, and accelerate the fulfilment of basic infrastructure.
13. Acceleration of development of urban areas to create liveable city that is safe and comfortable; green climate resilience and disaster; intelligent; and competitive city. Increasing the development of rural areas aiming to realize the independence of the public and creating villages self-reliant and resilient sustainable social, economic, and ecological, as well as strengthening linkages urban-rural economic activities.

14. Handling the border region aimed at establishing the border region as the front page of a sovereign state, competitive, and safe; by applying (i) security approach and (ii) prosperity approach.
15. Strengthen the ability of disaster mitigation and management areas, especially areas with a high risk of disaster.

Theme of Regional Development under National Medium Term Strategy

REGION	THEME OF DEVELOPMENT
PAPUA	<ul style="list-style-type: none"> • Center area of food production through industrial development base on paddy, maize, ground nut, sago, cassava, vegetables and fruits, as well as development of livestock and non-food crops such as sugarcane, rubber and oil palm. • Accelerating economic development base on maritime through development of marine tourism; • Energy barn of eastern part of Indonesia through developing oil, natural gas and copper.
MALUKU	<ul style="list-style-type: none"> • Producer centre of marine-based food and national fishery centre with acceleration of maritime-based economic development through fishery-based industrial development • Processing industries base on copper and nickel
NUSA TENGGARA	<ul style="list-style-type: none"> • Gate for eco-tourism by directing MICE industry development • Cantilever for national food with economic acceleration base on marine fishery, salt and sea grass • Industrial development base on livestock – particularly cattle – and maize • Development of manganese ore and copper industries
SULAWESI	<ul style="list-style-type: none"> • Indonesia gate for international trading and gate of eastern Indonesia with development of logistic-based industries • Centre of national food with industrial development base on cacao, paddy, maize • Industrial development base on rattan, asphalt, nickel and iron core • Development acceleration base on maritime through fishery-based industrial development and marine tourism
KALIMANTAN	<ul style="list-style-type: none"> • As one of lungs of the world through maintaining Kalimantan forest area • Centre of national energy with development of downstream coal industries • Industrial development base on oil palm, rubber, bauxite, liquid natural gas, zircon & quartz sand • Development of food estate.
JAVA-BALI	<ul style="list-style-type: none"> • Centre area of food production and cantilever of national industry and service sectors with development of food and beverage industries, textile, automotive, main weapons system equipment, telematics, chemicals, alumina, and steel • One of the gate of world class tourism destination by developing creative industries and acceleration of maritime-based industries through developing industry of shipping and marine tourism
SUMATERA	<ul style="list-style-type: none"> • One of the Indonesia gate for international trade and national energy • Directed to developing downstream coal-industries and industries base on oil palm, rubber, tin, bauxite and kaolin

Strategic Plan (Renstra) of the Ministry of Research, Technology and Higher Education (MoRTEH).

Strategic Plan (Renstra) of MoRTEH has been issued by Ministerial Regulation (Permen) No. 13/2015 about Strategic Plan of MoRTEH Year 2015-2019. This Permen was legalized by 8 May 2015. Based on the Strategic Plan of MoRTEH, the policy directions are: (i) Increasing the educated and skilled workers who are highly educated; (ii) Improving the quality of higher education and R&D institutions; (iii) Increasing resources for R&D and high-quality education; (iv) Increasing the productivity of research and development; and (v) Increasing innovation of the nation.

In accordance with the revitalization of the main tasks, functions and authorities, substantially Kemenristekdikti policy strategy is directed to:

- Increase the Gross Enrolment Ratio (GER), certified graduates competency, students and graduates who are capable in entrepreneurs, students who received a gold medal in the international arena, quality of Education Institution for Educator (*Lembaga Pendidikan Tenaga Kependidikan/LPTK*, and prospective educators who follow teacher professional education);
- Increase the number of universities included in the ranking of the world's top 500 universities and "A" accredited (superior), Leading Science and Technology Center and the Science Technology Park (STP) were built and mature;
- Increase the number of qualified teachers with Ph.D or doctoral degree, the number of educators following the teacher certification, the number of R&D resources (researcher / engineer) qualified master and doctoral degrees, the amount of human resources of Higher Education and R&D institutions with increased competence and revitalization of sarpras Science and Higher Education;
- Increase the number of patents, international publication; and prototypes including the R & D results worthy of the industry; and
- Increase the amount of product innovation i.e. R & D results that have been produced and utilized by the user.

Strategic Plan (Renstra) of Ministry of Education and Culture (MoEC). Strategic Plan (Renstra) of MoEC has been issued by Ministerial Regulation (Permen) No. 22/2015 about Strategic Plan for MoEC Year 2015-2019. Particularly to implement Priority Development Agenda (Nawacita 6): Increase Productivity People and Competitiveness in the International Market; efforts are being made in order to improve people's productivity and competitiveness in the international market, particularly in relation to the duties and functions of MoEC in implementing education development is, (i) increase the capacity innovation and technology; and (ii) improve the competitiveness of the workforce.

Target on development of innovation and technology in the education development is increasing the capacity of science and technology as the following: (i) increasing support for science and technology activities, including the provision of human quality, infrastructure, institutions, networks; and (ii) establishment of 100 Techno Park in the county, city, and Science Park in every province. The policy direction is the development of techno parks counties and cities that serve as:

- Centre for technology application in the fields of agriculture, livestock, fisheries, and processing (post-harvest), the manufacturing industry, the creative economy, and other services that have been studied by research institutions, private sector, and universities to be applied in economies of scale;

- The place for training, apprenticeship, technology dissemination center, and center for business advocacy to the public.

Targets for improving the competitiveness of the workforce is as follows: (1) improving the quality and skills of workers by increasing the proportion of the workforce that is competent and recognized nationally and internationally through a series of certification process for highly skilled workers from 8.4% to 14.0% and intermediate skills from 30.0% to 42%; (2) accelerating the implementation of Mutual Recognition Arrangement (MRA) which have not been realized, for priority service sectors, namely air transport, information and communication technologies (e-ASEAN), and logistics services; (3) developing a regional competency standard (regional standard competency framework), for priority service sectors in the ASEAN economic community; (4) establish KKNI (Indonesian National Qualifications Framework) in educational/training institutions to achieve the recognition of equality, in particular for government training institutions; (5) increasing competitiveness ranking for labor market efficiency at international level at 42%. Policy direction in order to increase the competitiveness of labor-related duties and functions of MoEC is to improve the competence and productivity of labor through: (1) harmonization of standardization and certification of competencies through cross-sector cooperation, cross-regional and cross-country business partners, within the framework of market transparency; (2) developing a partnership program between the government and business / industry, between the central government and local governments; and (3) developing pattern for training funding.

Strategic Plan (Renstra) of the Ministry of Religion Affair (MoRA). Strategic Plan (Renstra) of MoRA has been issued by Ministerial Regulation (Permen) No. 39/2015 about Strategic Plan for MoRA Year 2015-2019. According to the tasks and functions, the Ministry of Religion (MoRA) has two target areas, namely the targets and objectives related to the field of religious and education. Target in relation to education field are: (i) increased access of low-income people to Indonesia Pintar program on elementary-secondary education through Indonesia Smart Card (KIP), (ii) increasing primary education enrolment rate in basic, medium, and higher education, (iii) declining number of students who do not continue their education, (iv) increasing quality assurance of education service, (v) increasing the proportion of competent and professional educators in general education with religion character, (vi) increasing the proportion of professional religion teachers, and (vii) increasing access to appropriate religion education according to their religion aspirations.

Policy direction in relation to education field and relevant to this study among other are as follow: development of vocational education characterized by religion, development of apprenticeship programs in business/industry, development of skills programs in secondary education, empowerment of institutions/organizations madrasah development partners, empowerment of center for the development of educational institutions in the province; strengthening the regulations of quality assurance in education services, strengthening the implementation of the educational curriculum, etc.

In the field of higher education, there are policy direction on the development of the integration of theology and science for religion universities and improving the quality of research / research and innovation universities. The latest is directed to (a) increase in researches by educators, students and research institutes on religion universities; (b) improving the quality of university research and innovation, (c) increase in the national accredited journals; (d) increase in internationally accredited journals (indexed by Scopus); (e) improvement of scientific papers getting a patent; (f) increase in community service by religious universities; (g) cooperation with the industry for apprenticeship programs for students in the business/industry; and (h) improved access to and

participation in competitions, contests, Olympics, seminars and the development of student talent at National and International level.

Strategic Plan (Renstra) of the Ministry of Man Power (MoMP). Strategic Plan (Renstra) of MoMP has been issued by Ministerial Regulation (Permen) No. 14/2015 about Strategic Plan for MoMP Year 2015-2019. Among 7 (seven) strategic targets, there are two strategic targets which are relevant to the study, namely: (i) increased competence and labor productivity to enter labor market, and (ii) improving the quality of placement services and empowerment of labor.

The policy direction to pursue the achievement of increased competence and labor productivity to enter labor market are:

- harmonization, standardization and certification of competencies through cross-sector cooperation, cross-regional and cross-country business partners within the framework of market openness
- Development of a partnership program between the government and the business / industry and between the central government and local governments to improve the quality of labor
- Development Funding Pattern Training,
- Structuring competency-based training institution through a comprehensive management training program to develop training institutes at the national level as a superior training and mentoring for the provincial training institutions, as well as provincial training institutions be seeded and assistance for training institutes district / city
- Improving the quality of governance systems to speed up the training program requires a labor certification training program dissemination strategy more intensively and extensively so that the quality of the labor force is ready to enter the labor market. In addition, the necessary management of a comprehensive training program from the central to the district / city, so that the existing training institutes into a superior training, as well as to perform the function of training assistance for training institutions at lower level.
- Identify and choose a sector / sub-sector value-added and high labor absorption, thus becoming the focus for development

The policy direction to pursue the achievement of improved quality of placement services and empowerment of labor are: increased labor force access to productive resources through increased skills of workers; encouraging Productive Community-based Economic Development; facilitating labor mobility - internally and externally - as well as the functioning of the Labor Market; etc.

Particularly to facilitate labor mobility and functioning of the Labor Market, the following strategies are taken: (a) Improve the effectiveness and efficiency of the labor market as well as maintaining the balance between supply and labor requirements; (b) Integrate the labor market information system (LMIS) to respond to the information needs of companies, training providers and job seekers as well as policy makers to work together with the private sector job market; (c) increase the industrial involvement in the design and implementation of employment services, as well as develop a standard system that uses a feedback mechanism from the stakeholders; (d) ensure that job matching, counselling implemented correctly; (e) outreach/cooperation with educational institutions, training as well as the employer so as to awaken an ongoing collaboration.

