SETNC 2013

Universiti Malaysia PAHANG

The Direction and Future Challenges of Engineering Technology in Malaysia

by
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Presentation Outlines

Universiti Malaysia PAHANG

- Background
- National Agenda
- MBOT & Engineering Technology
- Initiatives at MTUN
- Initiatives at UMP
- Challenges
- Wayforward

Learning Objectives

At the end of presentation, participants will be able to:

- Understand the Engineering Technology issues in Malaysia.
- Value the benefits of Engineering Technology to the country.
- Appreciate initiatives in Engineering Technology.
- Experience the challenges faced during the whole process.
- Visualize the Future Direction.

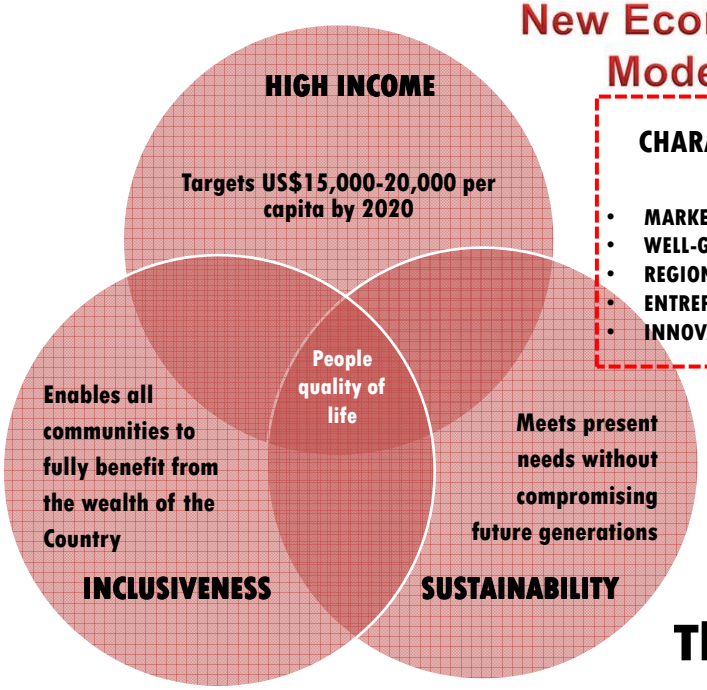
MALAYSIAN SCENARIO …

VISION 2020
NEW ECONOMIC MODEL

ROAD TO 2020

Malaysia's has introduced 4 pillars to achieve Vision 2020

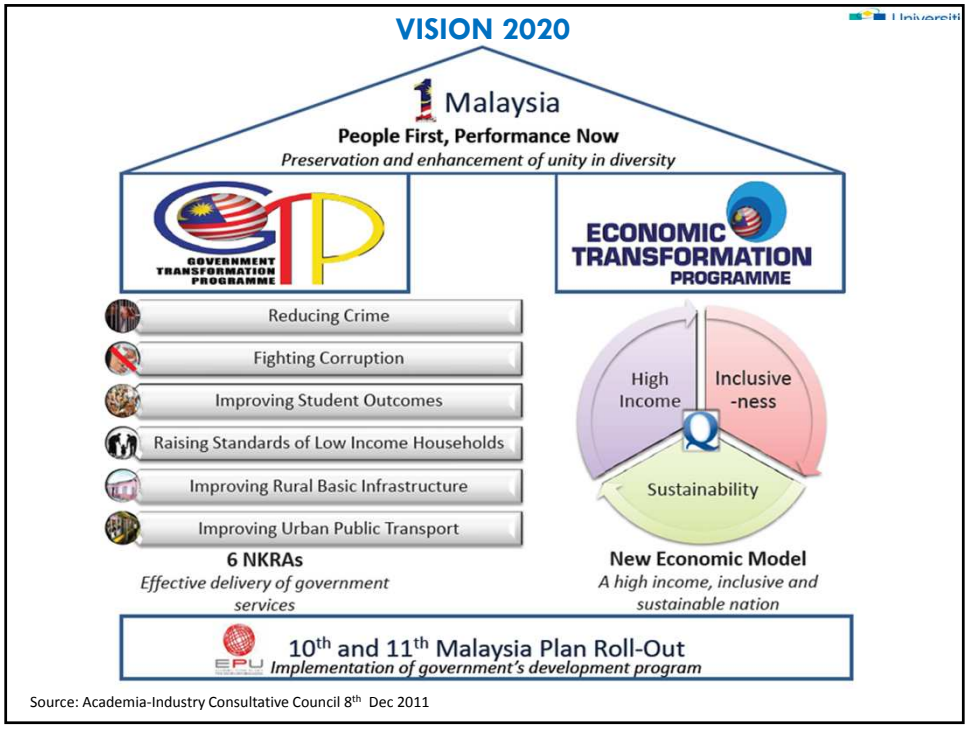
New Economy Model



CHARACTERISTICS IN 2020

- MARKET LED
- WELL-GOVERNED
- REGIONALLY INTEGRATED
- ENTREPRENURIAL
- INNOVATIVE

The Goals



Source: Academia-Industry Consultative Council 8th Dec 2011

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ETP focuses on:

- 12 National Key Economy Areas (NKEAs)
- 131 entry point projects
- 3.3 millions new jobs by 2020
- 60% are middle & high income jobs

ETP 1 year progress:

- 66% or RM10 billion worth of projects have started
- 53% of 131 entry point projects have taken off
- Private investments increased 23.4% to RM512.2 billion from RM 41.5 billion

Source: Academia-Industry Consultative Council 8th Dec 2011

We cannot continue at the current pace unless we transform…

Economic Transformation Programme

1 NKEAs (drivers) — National Key Economic Areas

2 SRIs (enablers) — Strategic Reform Initiatives

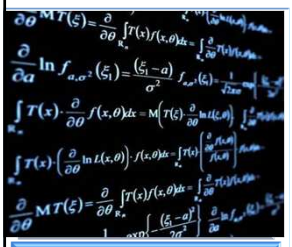
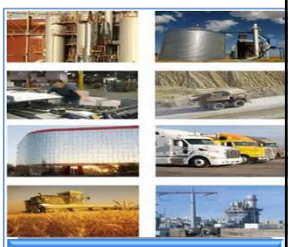
PEMANDU 6

INDUSTRY SCENARIO IN MALAYSIA 1970 - 2000

FOREIGN DIRECT INVESTMENT – set up manufacturing plants.

RESEARCH AND DESIGN COMPANIES – very few.

MALAYSIAN ENGINEERING EDUCATION SCENARIO

1970 and 80s	1990s	2000 onward
		
THEORY-ORIENTED; DESIGN AND RESEARCH-based	TRANSITION	PRACTICE-ORIENTED
	Paper to Cabinet on setting up technical University colleges	Technical universities established

TEVT is critical in the 10th Malaysia Plan

Target	Policy guidelines from the 10th Malaysian Plan
40%[2] skilled workforce[1] by 2020	**Improving the Perception of TVET and Attracting More Trainees** ▪ …a national media campaign will be developed and rolled-out… ▪ 69 out of 88 technical schools will be converted into vocational schools … six new vocational schools will be established by 2015 …
1,031,000 more managers & professionals	**Upgrading and Harmonising TVET Curriculum Quality in Line with Industry Requirements** ▪ …standardize TVET curriculum… ▪ Recognizing and equating various levels of Malaysian Skills Certificate with certifications issued by TVET providers ▪ …a Board of Technologists Malaysia will be established ▪ Malaysia-Japan International Institute of Technology will be established as an independent institute
1,434,000 more skilled workers	**Developing Highly Effective Instructors** ▪ Highly experienced industry personnel…to become instructors … ▪ part-time working arrangements will be expanded ▪ …Centre for Instructor and Advanced Skills Training (CIAST) will be expanded.. ▪ A new centre for instructor skills training will be developed to add a further training capacity of 800 instructors each year
482,000 more semi-skilled workers	**Streamlining Delivery of TVET** ▪ The current funding approach of TVET will be reviewed…provide financial assistance to students to study at Malaysian Skills Certificate Level 3 ▪ The performance rating of TVET institutions will be utilized when making decisions for buying places…in private TVET institutions ▪ A total of RM 150 million will be set aside to train 20,000 school dropouts during the Plan period

[1] Skilled workforce defined as those with at least SKM 3 certificate, diploma, or degree certification semi-skilled defined as those with at least SKM 1 or 2 certification, while unskilled workers have only SPM certification. A 40% target is projected by Ministry of Human Resource, and a 50% target committed to in the 10th Malaysian Plan [2] Target based on MOHR estimates, different from 10th Malaysia Plan published targets of 50%

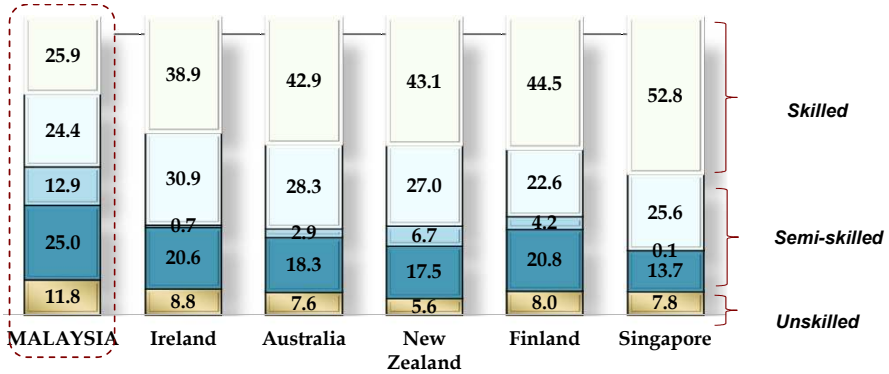
SOURCE: 10th Malaysia Plan

On the supply side, there is also a significant pool of students for expansion of TVET

Segment	Size Today Thousands	Segment description	Projected capture rate in 2020
Basic education dropouts	30[1]	▪ Basic education dropouts, i.e. students leaving school prior to taking SPM	50%
SPM leavers directly entering workforce	100	▪ Unskilled workers entering workforce without further qualifications, out of which 40k have no SPM credits	30%
Foreign students	0.2	▪ Foreign students coming to Malaysia for Skills Training ▪ Malaysian Skills training curriculum exported abroad	16,000
Lifelong learning for unskilled and semi-skilled workforce	8,400	▪ Upskilling of those already in workforce	20%
Higher level SKM 3 and 4	40	▪ SKM 1 and 2 holders who do not currently go on to pursue SKM 3 and 4	50%

[1] Number of students leaving the national education system could be higher, up to 80k
SOURCE: MOHR

MALAYSIA vs. DEVELOPED COUNTRIES IN TERM OF SKILL WORKERS



Ref :
Presentation Malaysian Society of Engineering Technologist (MSET) by Prof. Dr. Mazliham Mohd Su'ud, UniKL.

FACTS AND FIGURES

- 40,000 skilled workers needed by 2015 in oil and gas [KSM 2013];
- RM 3.7 billion budget 2013 technical and vocational [KPM];
- Australia ~ AUD 2 billion annually to provide skilled workers;

FACTS AND FIGURES

- 40% or 1.3 millions skilled worker needed by 2020 for Malaysia to be high income nation.
- In Malaysia, 10% joined vocational and technical after high school whereas in German, Finland and Austria 50 – 80%.
- By 2020, 1.3 million workers TVET; ~ 700,000 diploma holders from polytechnic and other institutions

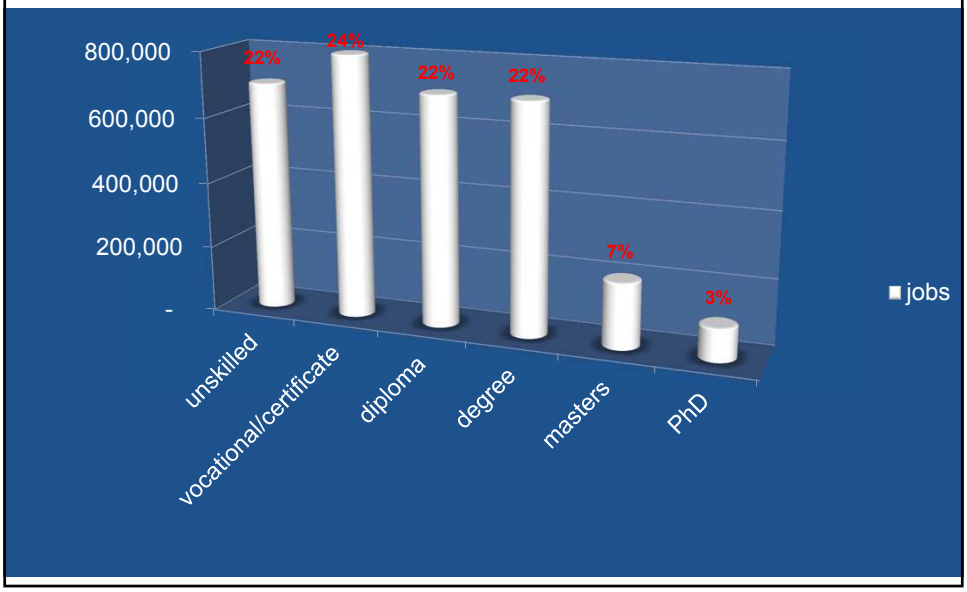
FACTS AND FIGURES

33% skilled workers in industrial sector by 2015 [KSU KKR]

Development of 12 industry sectors in NKEA

SCORE (Sarawak) : by 2030 requires 435,000 manpower; 52.2% skilled and semi-skilled; 70,000 engineering-related

3.3 millions NEW JOBS



New Issue in Engineering Technology

- About 80% of working field in engineering needs engineering technologist
- Out of 100,000 engineers, 80,000 doing engineering technologist work
- Government aims to produce 60,000 Technologists by 2020
- MTUN is responsible to produce Technologists

The Establishment of Malaysia Board of Technologists (MBOT)

Policy decisions on the establishment of MBOT

10th Malaysia Plan

Accelerate the recognition of TEVT certifications through the establishment of MBOT

Cabinet Committee on HCD (JKMPMI) No.3/2010 (20 August 2010)

Recommend the establishment of MBOT to recognise and certify technologist as a profession to increase the pool of skilled workforce required to attain a high income economy

Cabinet Decision (29 September 2010)

Endorse the decision of Cabinet Committee on HCD to establish MBOT

Cabinet Committee on HCD (JKMPMI) No.1/2011 (8 March 2011)

Expedite the establishment of MBOT to recognise TEVT graduates

RATIONALE FOR MBOT

To elevate the standing and recognition of Technologists and Technicians

- Technologists and technicians are currently not recognised and certified as professionals by any professional body
- Technologists and technicians will be accorded international recognition through membership of MBOT in various international accords
- Institutions will be motivated to offer technology and TEVT programmes

To increase the pool of skilled workforce required to attain a high income economy

- Only 28% of the total workforce is employed in the higher skilled jobs category reflecting a huge pool of unskilled workforce
- Potential pool of 100,000 students (22% of total students enter the workforce after SPM) who are technically inclined
- Of the total 3.3 million jobs to be created under ETP by 2020, 700,000 jobs require skilled workforce with diploma in TEVT

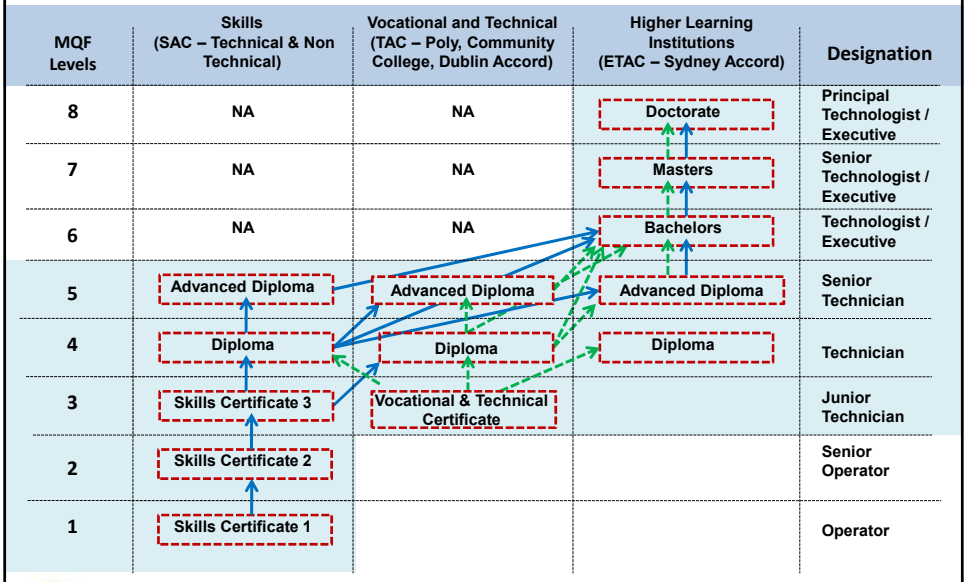
To improve public perception of TEVT and attract more students

- On average, 10% of students enroll in TEVT institutions annually (low compared to 44% in OECD countries) reflecting the unattractiveness of TEVT
- 38 diploma / advanced diploma engineering and technology courses offered by 30 polytechnics will be accredited
- 30% of the 5,639 skills programmes that are technical-based will be accredited
- More students will be motivated to enroll in TEVT

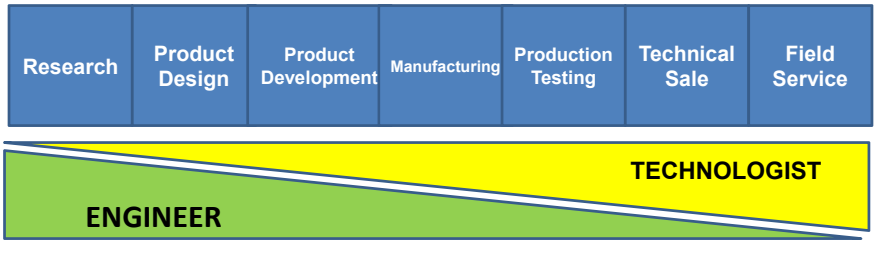
To protect public safety and health through...

- Quality assurance (qualification, accreditation, training)
- License professional technologists / certified technicians to offer professional technology and technical services
- Regulate code of conduct and ethics of technologists and technicians

MBOT will enhance the career path of TEVT graduates



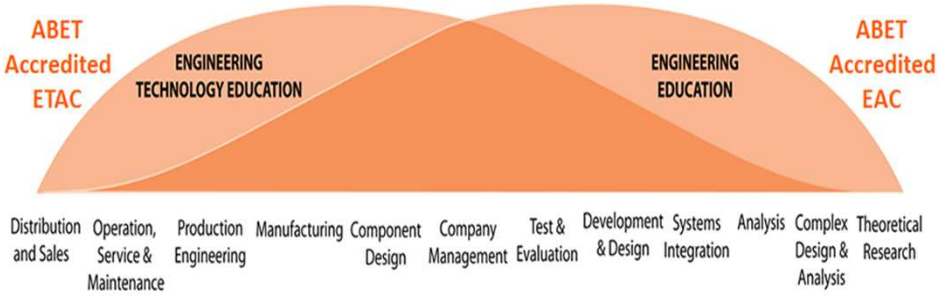
ENGINEER AND ENGINEERING TECHNOLOGIST SPECTRUM

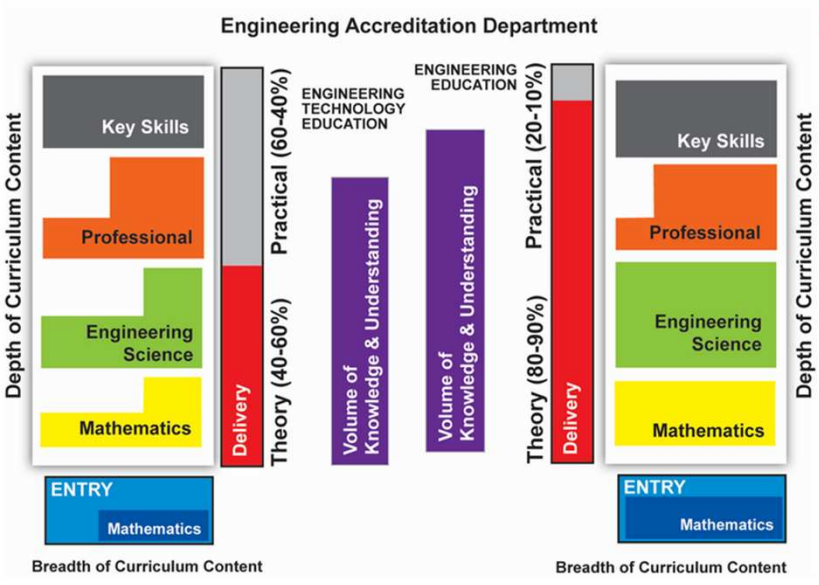


In order to distinguish between engineering and engineering technology, a technological spectrum is used to illustrate the differences. Generally, in an organization, engineers would most likely work in the design and development fields while technologists, technicians and craftsmen would be more inclined to work in manufacturing and production line. The engineers role are more towards the left of the spectrum while the technologists are more towards the right of the spectrum although the main activities of both engineers and technologist are in the center of the spectrum.

Source : Cheshier, 1998

EDUCATION SPECTRUM

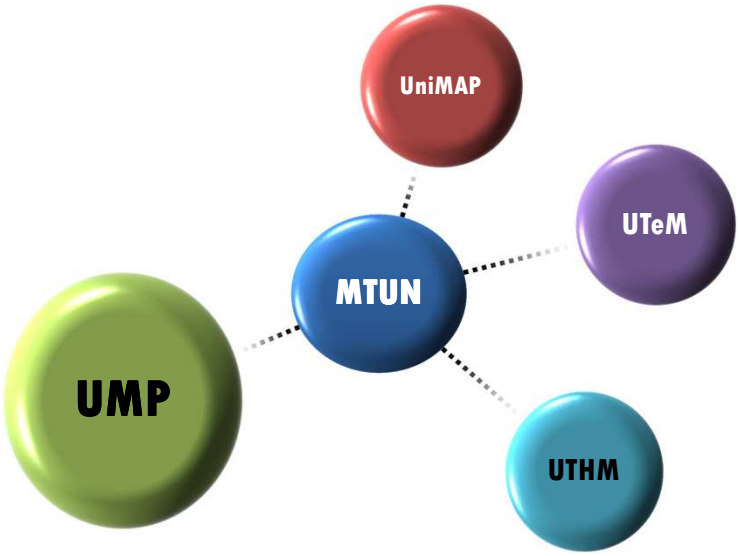




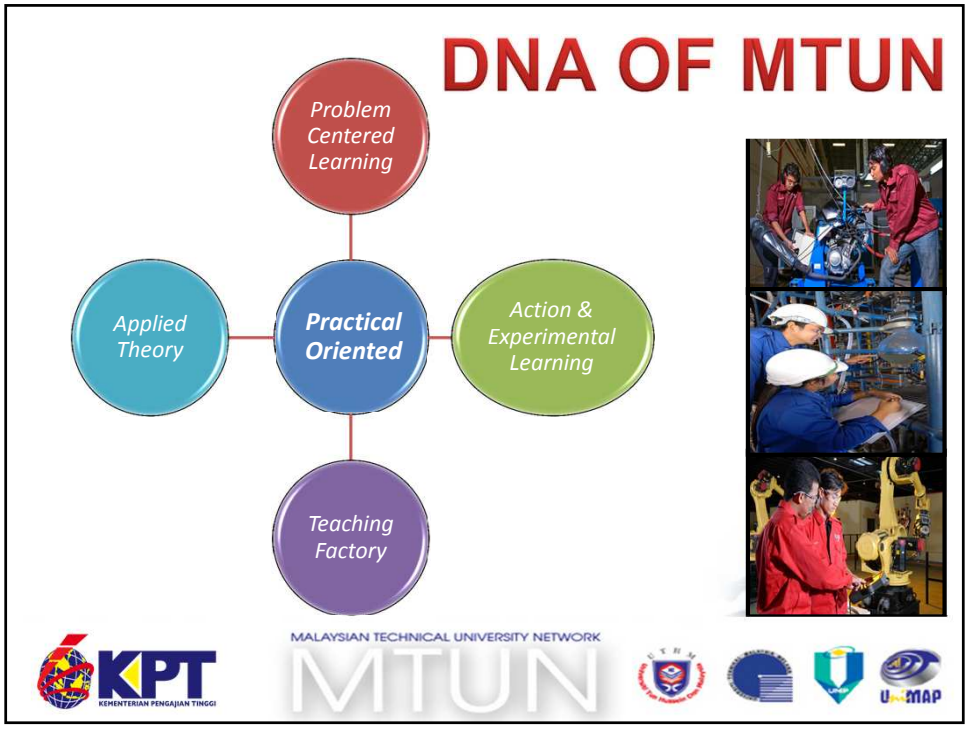
CASE STUDY

MTUN AND UMP

Malaysian Technical University Network (MTUN)



DNA OF MTUN



Malaysian Technical University Network (MTUN)

Universiti Malaysia PAHANG

Gambang Campus
Kuantan, Pahang

Kuala Pahang Campus
Pekan, Pahang

30

Implementation for Engineering Technology Program at MTUN

ESTIMATED BUDGET FOR ENGINEERING TECHNOLOGY PROGRAM IN MTUN

2013-2015

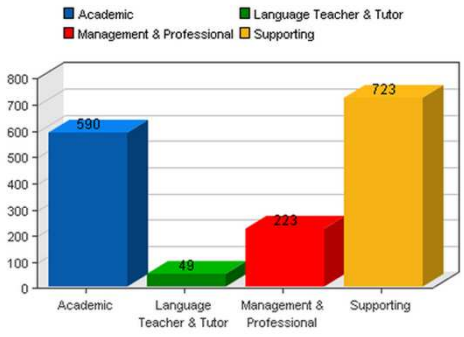
YEAR	TOTAL [RM MILLIONS]
2013	272
2014	285
2015	365
TOTAL	922

45 PROGRAMS
&
~ 7000 STUDENTS

IMPLEMENTATION OF ENGINEERING TECHNOLOGY AT UMP

1998 STARTED AS UTM PAHANG BRANCH
2002 ESTABLISHED AS KUKTEM
2007 REBRANDED TO UMP

TOTAL STAFF



Total: 1,585

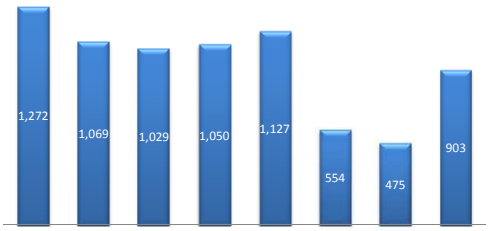
GROUP	TOTAL
ACADEMIC	590
LANGUAGE TEACHER & TUTOR	49
MANAGEMENT & PROFESSIONAL	223
SUPPORTING	723
TOTAL	1,585

ACADEMIC STAFF WITH PhD
(not include Language Teacher & Tutor)

YEAR	ACADEMIC STAFF WITH PhD	TOTAL ACADEMIC STAFF	%
2006	19	250	8%
2007	26	306	9%
2008	38	350	11%
2009	70	434	16%
2010	104	495	21%
2011	148	530	28%
2012	199	573	34%
2013	210	590	36%

Data as at 20 May 2013
Source: Jabatan Pendaftar

UNDERGRADUATE STUDENTS



Total : 7,479

CODE	FACULTY	TOTAL
FKKSA	FACULTY OF CHEMICAL & NATURAL RESOURCES ENGINEERING	1,272
FKASA	FACULTY OF CIVIL ENGINEERING & EARTH RESOURCES	1,069
FKEE	FACULTY OF ELECTRICAL & ELECTRONICS ENGINEERING	1,029
FSKKP	FACULTY OF COMPUTER SYSTEMS & SOFTWARE ENGINEERING	1,050
FKM	FACULTY OF MECHANICAL ENGINEERING	1,127
FSTI	FACULTY OF INDUSTRIAL SCIENCES & TECHNOLOGY	554
FKP	FACULTY OF MANUFACTURING ENGINEERING	475
FTec	FACULTY OF TECHNOLOGY	903
	TOTAL	7,479

Data as at 20 May 2013
Source : Bahagian Pengurusan Akademik (BPA)

MASTERS /PHD STUDENTS

DOCTOR OF PHILOSOPHY

- Doctor of Philosophy (Technology Management)
- Doctor of Philosophy (Computer Science)
- Doctor of Philosophy (Biotechnology)
- Doctor of Philosophy (Industrial Chemistry)
- Doctor of Philosophy(Chemistry)
- Doctor of Philosophy(Electric)
- Doctor of Philosophy(Electronic)
- Doctor of Philosophy(Instrumentation)
- Doctor of Philosophy(Bio-Process)
- Doctor of Philosophy(Mechanical)
- Doctor of Philosophy (Manufacturing)
- Doctor of Philosophy (Automotive)
- Doctor of Philosophy (Civil Engineering)
- Doctor of Philosophy (Construction)
- Doctor of Philosophy (Advanced Material)

MASTER OF ENGINEERING

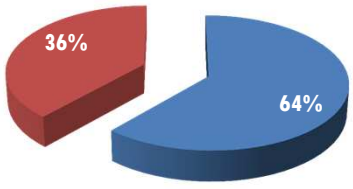
- Master of Engineering (Electric)
- Master of Engineering (Electronic)
- Master of Engineering (Instrumentation)
- Master of Engineering (Chemistry)
- Master of Engineering (Bio-Process)
- Master of Engineering (Mechanical)
- Master of Engineering (Manufacturing)
- Master of Engineering (Automotive)
- Master of Engineering (Civil)
- Master of Engineering (Construction)
- Master of Chemical Engineering with Entrepreneurship (Course Work)

MASTER OF SCIENCE

- Master of Science (Computer)
- Sarjana Sains (Software Engineering)
- Sarjana Sains (Biotechnology)
- Sarjana Sains (Industrial Chemistry)
- Sarjana Sains (Advanced Material)

MASTER OF TECNOLOGY MANAGEMENT

- Master of Technology Management (Industrial Safety & Health)
- Master of Technology Management (Human Capital Resources)
- Master of Technology Management (Project Management)
- Master of Technology Management (Operation Management)
- Master of Business Administration



MASTERS	526
-Course work	87
-Research	439
PhD	305
Total	831

Data as at 20 May 2013
Source : Institut Pengajian Siswazah

Universiti Malaysia PAHANG

VISION

To be a world-class Technological University.

MISSION

We provide high quality education, research and services in engineering and technology in a culture of creativity and innovation.

OBJECTIVE

1. To produce outstanding graduates by providing competitive engineering and technological programmes.
2. To spearhead cutting edge industry-relevant research initiatives.
3. To be a leading service provider to industries and community based on our niche and areas of expertise.
4. To be recognized as an institution for excellent management and work culture.

Universiti Malaysia PAHANG

ENGINEERING TECHNOLOGY PROGRAMS

NIU NORTHERN ILLINOIS UNIVERSITY

2012

- MANUFCTURING ENGINEERING TECHNOLOGY
- ELECTRICAL ENGINEERING TECHNOLOGY
- MECHANICAL [energy & environment] ENGINEERING TECHNOLOGY

ITT DUBLIN Institute of Technology Tallaght Institiúid Teicneolaíochta Tamhlacht

2013

- PHARMACEUTICAL ENGINEERING TECHNOLOGY

USQ UNIVERSITY OF SOUTHERN QUEENSLAND AUSTRALIA

2013

- INFRASTRUCTURE MANAGEMENT ENGINEERING TECHNOLOGY

Universiti Malaysia PAHANG

WHY NIU NORTHERN ILLINOIS UNIVERSITY

ENGINEERING TECHNOLOGY PROGRAM

Universiti Malaysia PAHANG

Academic Quality

- National Recognition of academic excellence
- World-renowned faculty who teach undergraduates
- Undergraduate research opportunities
- Exceptional resources of a major comprehensive university, including top-level facilities
- Student / Faculty ratio (17 students to 1 Professor)

Abundant Academic Option

- 6 Business program, including Accounting
- 4 Engineering Programs
- 8 Health Science Programs, including Nursing
- More than 70 Graduates Programs

THE CARNEGIE FOUNDATION for the ADVANCEMENT of TEACHING

COLLEGES

- College of Business
- College of Education
- College of Engineering and Engineering Technology
- College of Health and Human Sciences
- College of Law
- College of Liberal Arts and Sciences
- College of Visual and Performing Arts

Ref: http://www.niu.edu/academics/departments.shtml

Universiti Malaysia PAHANG

RECOGNITIONS

Nationally recognized for community services

Ranked in top 100 universities

Academic Prestige

NIU NORTHERN ILLINOIS UNIVERSITY

Universiti Malaysia PAHANG

College of Engineering and Engineering Technology

- The undergraduate programs in electrical engineering, industrial and systems engineering, and mechanical engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).
- In the technology program, the emphases in electrical engineering technology and manufacturing engineering technology are accredited by the Technology Accreditation Commission of ABET, and the emphasis in industrial technology is accredited by the National Association of Industrial Technology

Opportunities

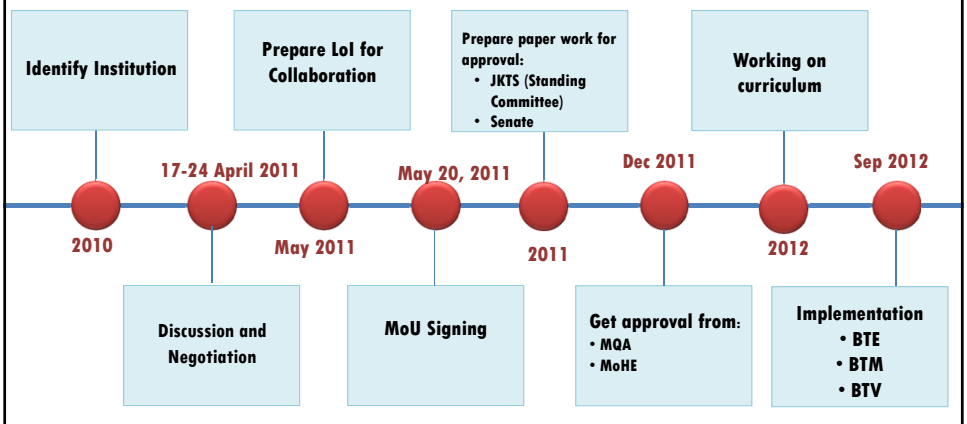
International ization	Recognition	Mobility	Fellowship
• Branding • Competitive	• Washington Accord • World Recognition	• Student Exchange • Staff Attachment	• Fellowship Program

Companies that employ NIU's Eng Tech graduates

accenture
High performance. Delivered.
BOEING
CATERPILLAR®
NORTHROP GRUMMAN
CHRYSLER
MITSUBISHI MOTORS
WRIGLEY
Ingersoll Cutting Tools
IBM
MOTOROLA
NISSAN FORKLIFT
ups
SIEMENS

The Process

Process Flow of Collaboration Procedures



DISCUSSION AND NEGOTIATION

Northern Illinois University + Universiti Malaysia PAHANG



MoU Signing

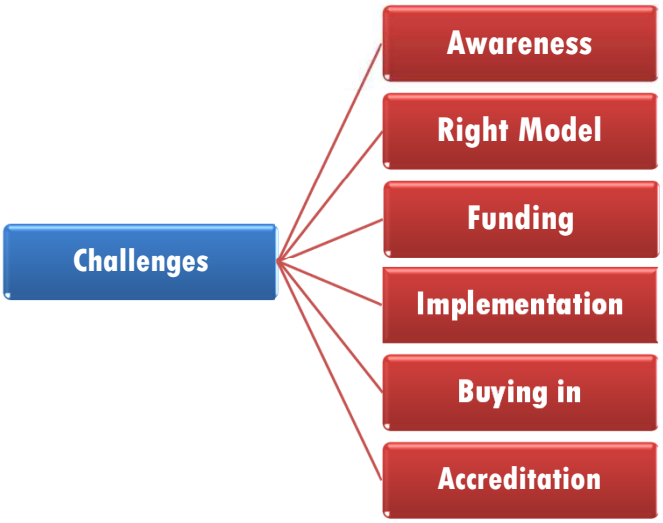
Materializing Memorandum of Understanding (MoU) with Northern Illinois University (NIU) on May 20, 2011




Implementation

- Bachelor of Engineering Technology (Electrical) with Honors.
- Bachelor of Engineering Technology (Manufacturing) with Honors.
- Bachelor of Engineering Technology (Energy & Environmental) with Honors.

Engineering Technology Initiatives



1 Awareness

Engineering vs. Engineering Technology	• Terminology • Functions and Roles
Perception	• Future Students and their Parents
Presence	• Very few graduates in the market
Availability	• Started in UniKL • Just recently established in MTUN

2 The Right Model

COUNTRY	BOARD	SCOPE	ACCORD
Malaysia	Board of Engineers Malaysia (BEM)	Engineering Programme	Washington
UK	Engineering Council (EC)	Engineering, Technology, Construction & Build Environment	Washington Sydney Dublin
Canada	Canadian Council of Technicians & Technologists (CCTT)	Bioscience, Building, Chemical, Civil, Electrical, Electronic, Forestry, Geomatics, Instrumentation, Industrial, Information Technology, Mechanical, Petroleum & Geosciences	Sydney Dublin
	Engineers Canada	All Engineering fields	Washington
USA	Accreditation Board for Engineering and Technology (ABET)	Education in Applied Science, Computing, Engineering and Technology	Washington Sydney
Australia	Institution of Engineers Australia (IEA)	All Engineering fields	Sydney Washington
Ireland	Engineers Ireland	All Engineering fields and ICT	Washington Sydney Dublin

3 Funding

Univ has to bear the cost for	Government Fund
• Curriculum development • Administrative works	• Limited funding • Delay or uncertain

4 Implementation

Programs	• Searching for suitable programs • Dealing with host institutions
Delivery	• Curriculum • Teaching materials
Manpower	• Lecturers and Technicians • Industrial Experience
Students	• Promotion, Application and Selection

5 Buying In

STAKEHOLDERS

society

industry

students

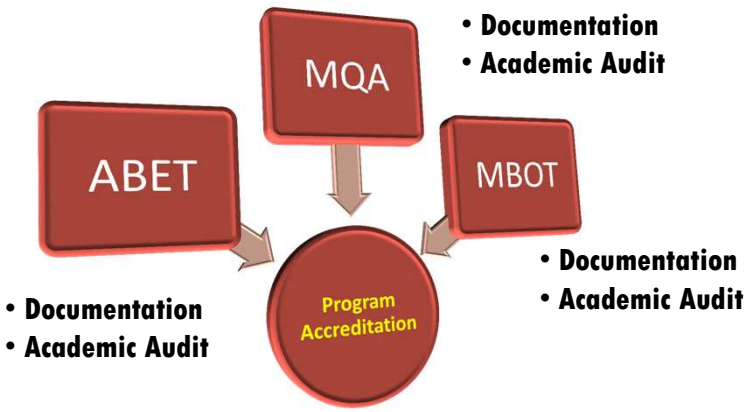
SHAREHOLDERS

government

KEMENTERIAN PENDIDIKAN MALAYSIA

ministry

6 Accreditation



WAYFORWARD

MALAYSIA 2020

ENGINEERING TECHNOLOGY

RECOGNITION & ACCEPTANCE

BENCH MARKING

FOCUS

QUALITY