MANAGEMENT OF TECHNOLOGY – EMERGING FIELD OF KNOWLEDGE TOWARDS GLOBAL COMPETITIVENESS

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INTRODUCTION

- Technology – tremendous effect on modern living
- Technology – a new 'commodity'
- Technology – makes work more 'efficient' but man makes work 'effective'
- Business environment : continual, rapid and unpredictable change – much change will be technological in nature.

Outline

- definition of management of technology

- scope of technology management and the significance of managing technology

- management of technology programme

- direction and challenges of the technology management programme

- job opportunities and career prospects for management of technology graduates

DEFINITION OF MANAGEMENT OF TECHNOLOGY

- **What is meant by technology?**
  - Technology is the knowledge, resulting output, process, tool, method, as well as employee recruitment system in preparing the best service (Khalil, 2000; White & Bruton, 2007)
  - Technology is the scientific application and engineering knowledge used to solve problems (William, 1993)

DEFINITION OF MANAGEMENT OF TECHNOLOGY

- **What is meant by management?**
  - Management means an art of performing administration or business
  - Management requires the understanding about human and organisational behaviour, which includes many functions
  - Management is also a technology when the needs of the business are to be achieved

DEFINITION OF MANAGEMENT OF TECHNOLOGY

- **What is management of technology?**
  - Relationship between engineering, science, and management disciplines that focus upon the issues related to the planning, developing, and implementing technology capability in forming and completing the operational strategies and objectives of an organisation (National Research Council, 1987)
  - A field that joins disciplines for planning, developing, and implementing technology capability in forming and completing the operational strategies and objectives of an organisation (White & Bruton, 2007)
  - A field incorporating various disciplines that unify science, engineering, and the adoption of knowledge management. (Khalil, 2000)

DEFINITION OF MANAGEMENT OF TECHNOLOGY

- *Management of technology is a field of research and practice in the planning, development, implementation, and monitoring of technological capability that relates various disciplines for forming and completing operation strategy of an organisation towards achieving competitiveness (FPT, 2006).*

ELEMENTS OF TECHNOLOGY MANAGEMENT

- Crucial elements adopted by the industry in the management of technology:
    - the identification and evaluation of selected technology
    - the management of research and development, including project viability
    - the integration of technology in all organisational operations
    - the use of new technology in the processing and production of products
    - the replacement of outdated processing and production methods.

Level of technology integration in management of technology (Khalil, 2000)

Level 1	Level 2	Level 3	Level 4	Level 5
• Research development	• Research development • Manufacturing design	• Research development • Manufacturing design • Marketing • Sales • Physical distribution • Customer service	• Research development • Manufacturing design • Marketing • Sales • Physical distribution • Customer service • Information system • Human resource • Finance • Purchasing • Patenting and Law • Public relations • General administration	• Research development • Manufacturing design • Marketing • Sales • Physical distribution • Customer service • Information system • Human resource • Finance • Purchasing • Patenting and Law • Public relations • General administration • Customer • Supplier • Other influence – internal and external

MANAGEMENT OF TECHNOLOGY SCOPE

- Scope of technology management can be investigated according to the six categories below:
  - Method and tool for effective management of resources
  - Business environment condition and the capability to manage the organisation with the external environment
  - Organisational and management structure
  - Management of engineering project research and development
  - Human resource management becomes vital when dealing with drastic changes
  - Social and technological change

MANAGEMENT OF TECHNOLOGY FRAMEWORK

Science and Engineering Disciplines --- **MOT** --- **Business Administration Disciplines**

Science and Engineering Disciplines
- Disciplines-based Knowledge
- Science Disciplines
- Material Technology
- Product Technology
- Production/Process Technology
- Information Technology
- Environmental Technology

MOT
- Strategic/Long-Term Issues
- Relating Technology
- Science and Technology Policy
- Process of Technological Innovations
- R&D Management
- R&D Infrastructure and Technological Change
- Technological Entrepreneurship and New Ventures
- Product/Process Life Cycles
- Technological Forecasting and Planning
- Technological Innovation and Strategic Planning
- Technological Transfer
- International Technology
- Transfer and the Role of Multinational Corporations
- Technological Risk Analysis and Assessment
- Technology and Economic Analysis
- Technology and Human, Social and Cultural Issues
- Training and Education Issues In MOT
- MOT in Manufacturing Industries
- MOT in Service Industries
- Information Technology and Other Emerging Technologies
- Manufacturing Marketing and after Market Interface
- Technological Change and Organizational Structure
- Management of Technical Projects
- Financing Technology and Financial Decision Making
- Quality and Productivity Issues
- Methodologies in MOT
- Eco-efficiency and Environmental Sustainability

Business Administration Disciplines
- Discipline-based Knowledge
- Accounting
- Finance
- Management
- Marketing
- Economics

MANAGEMENT OF TECHNOLOGY (MOT) PROGRAMME IN UNIVERSITI UTARA MALAYSIA (UUM)

- Bachelor of Management of Technology (BMOT) Degree beginning November 1999

- Establishment of the Management of Technology Faculty in 2003

- UUM programme gives emphasis on the manufacturing, construction, and information technology industries

MANAGEMENT OF TECHNOLOGY (MOT) PROGRAMME IN UNIVERSITI UTARA MALAYSIA (UUM)

- The Faculty of Technology Management in UUM (now administered under the UUM College of Business) also offers a MSc and PhD levels (research) as well as MBA programmes specialising in SCM, Project Management, Tech. Management and Engineering Management.

BACHELOR IN MANAGEMENT OF TECHNOLOGY PROGRAMME - COMPARISON BETWEEN UNIVERSITIES

Bachelor's Degree Programme	UUM	UTHM	UTM
Entry requirements (general requirements)	Science background not required	Science background required	Science background required
Programme duration	4 years/8 semesters	3– 3 ½ years/6–7 semesters	3½ years / 7 semesters
Subject allocation	• Management – 37% • Technology management – 37% • Technology – 26%	• Management – 52% • Technology – 28% • Others – 20%	• Management – 52% • Technology – 28 % • Others – 20%

OVERSEAS UNIVERSITY

- UK – 14 universities u/g, 24 p/graduate and 2 MBAs

- US and Canada – 37 Universities

- Thailand – Asia University, Sri Banggala Univ,

- Singapore – NTU

- 3.5 million website listed in the internet on MOT programmes.

FUTURE DIRECTIONS OF THE MOT PROGRAMME

Type	Direction/Objective
Re-planning/Expansion of programme	Re-plan existing programme or offer a new programme (except an MOT programme on its own), arrange and formulate duration of programme, offer for distance/on-line learning, establish an executive level MOT programme
Cooperation / Collaboration	Cooperation with industry players as associates in research and cooperation at the international level
Focus/ Emphasis on future of programme	e-commerce, biotechnology, corporate cooperation, genetics, entrepreneurship, innovation management, energy technology management

WORK OPPORTUNITIES FOR MOT GRADUATES

- Most graduates are capable of securing various jobs in many middle- to high-level positions in a very short time after they graduate

- Among the types of jobs at the managerial level secured by some graduates include assistant manager, purchasing officer, project supervisor, accounts officer, administrative officer, sales officer, resource manager, business executive, research officer, quality officer, and lecturer

WORK OPPORTUNITIES FOR MOT GRADUATES

- In the aspect of technical work, some graduates have become project managers, assistant engineers, project executives, production executives, planning executives, operations executives, technical executives, quality control executives, project coordinators, production supervisors, and logistics managers

CHALLENGES OF MOT U/G PROGRAMMES

- MOT Programmes – relatively unknown to the public

- Employers misgauge the MOT graduates ability/skill – lack of information on MOT programmes

- Poor promotion by Universities

- High expectation from industries

- Graduates few poor reputation – give poor perception on their ability'

CONCLUSION

- Technology is a tradable commodity; it is also a business; it is also a source of strength.

- It is highly dynamic and can provide strength and profits for an organisation, and ultimately a country.

- It needs to be forecasted, identified, planned, developed, and controlled for ensuring that it is beneficial for the organisation.

- **To achieve this, the field of technology management is pertinent.**

CONCLUSION

- The management of technology not only emphasises on the technical aspect of a certain technology, but rather the integration between technology, management, and organisational needs.

- As any other fields, its introduction in training and education needs to be properly laid out such that it is in-line with the needs of the market and industry.

THANK YOU