

Identification of Digital Skills for the Petrochemical Industry in Malaysia: A Research Framework

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KEYWORDS	ABSTRACT
Digital Economy Digital Transformation Digital Talent Competency Model	Digital economy presents a distinct evolution from the traditional “pre-digital” industries, where business is run anywhere and anytime, leading to new market segments and business process. Digital transformation has become the focus of organizations all over the world where “born-digital” organizations compete with pre-digital competitors. One of the challenges for pre-digital organizations in digital transformation is finding the talent with the right skills or ‘digital talent’. Although it is generally agreed that digital talent would provide competitive advantage to organizations in digital economy, there is a yet consensus on what constitutes digital talent, leading to various interpretations of what it is and what it does. This paper proposes a research framework for the identification of digital talent for the <i>Chemical and Petrochemical</i> industry in Malaysia. There are six main phases in the framework namely <i>Identification of Digital Competencies</i>; <i>Preparation of Questionnaire</i>; <i>Distribution of Questionnaire</i>; <i>Development of a New Digital Talent Model</i>; <i>Development of Support Tool</i>; and <i>Validation</i>. Expert reviews and questionnaire will be used as the research tools. Expected results include a set of digital talent skills, a new digital talent model, and a digital talent support tool for the petrochemical industry.

1.0 Introduction

The current world’s economy is in an era that is underpinned by data, information, services, and new business models. *Digital economy* presents a distinct evolution from the traditional “pre-digital” industries, where business now can be run from anywhere and at any time, leading to new market segments and business processes. Digital transformation has become the focus of organizations around the world [1]. Organizations need to re-assess and re-define their business process and view technology as means to stay competitive [2].

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Digital economy has witnessed “*born-digital*” organizations competing with pre-digital organizations. The goal of digital transformation is for the latter is to increase competitiveness and to catch up with born-digital organizations without being disrupted [3]. One of the challenges for pre-digital organizations is finding the talent with the right skills or “*digital talent*”. The recruitment of digital talent is a challenging task for two reasons: unbalanced supply and demand; and unfamiliarity with digital talent [4].

The meaning of “digital talent” varies across organizations and industries [5]. It has been referred to as “*employees with IT-related knowledge, skills and abilities*” [4], “*professionals in the digital content industry*” [6], “*talent required by AI and the knowledge industry*” [7], “*professionals who form insights and knowledge in specific areas and apply them to the digital field*” [8].

Although it is generally agreed that digital talent would provide competitive advantage to organizations in digital economy [9]; there is a yet consensus on what constitutes digital talent [10], [11], leading to various interpretations of what it is and what it does [12]. Organizations are often left with the dilemma of how to manage digital talent [9], [13]. Some organizations have given up the search for suitable talents especially for IT-related positions [4].

This paper proposes a research framework for identifying digital talent in the Chemical and Petrochemical industry in Malaysia.

2.0 Malaysian Petrochemical Industry

The Malaysian economy is the 4th largest in Southeast Asia and ranked 36th in the world. It has a high density of knowledge-based industries and adopts latest technology for manufacturing and digital economy. Malaysia is ranked the 27th most competitive economy in the world [14]. Malaysia's industry accounts for more than a third of its GDP and can be broadly categorized into two namely manufacturing and services sectors. In total, there are 25 industries in Malaysia as stipulated by the Ministry of International Trade and Industry (Table 1).

Table 1: List of Malaysian Industries

MANUFACTURING SECTOR	SERVICES SECTOR
1. Aerospace Industry	1. Legal
2. Automotive Industry	2. Accounting, Auditing, Bookkeeping & Taxation
3. Cement Industry	3. Architectural
4. Chemical and Petrochemical Industry	4. Engineering
5. Electrical and Electronics Industry	5. Communication
6. Food Industry	6. Construction & Related Engineering
7. Iron Steel Industry	7. Distribution
8. Machinery and Equipment Industry	8. Education
9. Medical Devices Industry	9. Environment
10. Pharmaceutical Industry	10. Health Related & Social Services
11. Rubber Industry	11. Tourism & Related Travel
12. Textile Apparel & Footwear Industry	12. Transport
13. Wood Based Industry	

The *Chemical and Petrochemical* industry is represented by the Malaysian Petrochemicals Association (MPA). Its members include companies engaging in the manufacturing and trading of petrochemicals and plastic resins; and providing services required by the petrochemical industry.

MPA provides a forum to discuss and resolve problems in industry; to liaise with the government and public; to compile and disseminate information of common concerns; and to provide facilities for consultation and exchange of views between members.

The chemical and petrochemical industry is the second largest contributor to Malaysia's total exports of manufactured goods. It is linked to other industries in the economy including automotive, electronics, pharmaceutical and construction. Petrochemical is a technology driven and capital-intensive industry which requires competent workforce for research and development (R&D), operations and development programs.

3.0 Competency

Competency can be generally defined as "*the capability to apply knowledge, skills, and abilities to perform specific tasks in the workplace*". A competency model is a collection of skills that define performance in the workplace. Competency models have been widely used in organizations for defining and assessing competencies. They represent a key component for recruitment, hiring, appraisal, and talent development activities by the *Human Resource Department (HRD)*. Competency models can be developed for specific jobs, groups, organizations, and industries.

Competency modelling started in the 1970s and since then, the numbers of models have grown and have been categorized differently based on the industry. Some of these models are presented below:

- 3.1 Behavioural competency [15]–[17] focuses on behaviours, attitudes, and personal traits of the talent. It is also known as soft skills and distinguishes a talent from the hiring pool. Initially, it was used to predict how successful a talent will be at the job they are applying for. However, it can also be applied to talents at all levels and not restricted to job positions in the organization.
- 3.2 Occupational Competency [18]–[20] describes competency as "*knowledge, skills and attitudes*", distinguishing outstanding talent in a given job. It defines performance in the workplace and designs standards for occupational credential such as certification. It focuses on personal, interpersonal and systems thinking skills.
- 3.3 Labor Competency [21]–[23] serves as a basis for training policies and regulating the labour market. It refers to competency as a combination of "*aptitudes and attitudes*" and measured based on a group of talents, as opposed to individual talent. This model is mostly used in the Education, Hospitality and Engineering industries; and focuses on the aspects of knowledge, capability, skills, attitude and behaviour.
- 3.4 Leadership competency [24]–[26] represents a set of knowledge, skills, and abilities for effective leadership in an organization. It provides a structured framework for defining and developing key skills and behaviours of supervisors, managers, and executives. Organizations can better identify and develop their next generation of leaders that have the biggest impact on the organization's performance.
- 3.5 Organizational competency [27]–[29] can be viewed as the organization's strategic strength. It is a set of competencies that defines what the organization does best and how it expects it to be accomplished. The competency provides an inventory of expected behaviours, skills and attitudes which lead to the successful performance of the organization.
- 3.6 Core competency [30]–[32] is a combination of resources and skills that distinguish an organization from its competitors. It defines the organization's competitive edge, and it guides brand reputation, business growth, and marketing strategy. Core competency is unique to individual organization and not easily be replicated.
- 3.7 Functional competency [33]–[35] is defined as the knowledge, skills and personal character of a candidate in carrying out responsibilities in a given job or position. It defines the minimum level of accepted performance for a specific task.

Although a complete list of competency models is out the scope of this paper, it is observed that the majority of competency models can be categorized into two: individual and organizational. For example, behavioural, occupational, and leadership competencies are more related to individual talents whilst organizational and core competencies are more related to the organizations. As such, other models that are not listed can be divided into either one of these two categories.

4.0 Research Framework

This study is divided into six major phases as illustrated in Figure 1, consisting of *Identification of Digital Competencies*; *Preparation of Questionnaire*; *Distribution of Questionnaire*; *Development of a New Digital Talent Model*; *Development of Support Tool*; and *Validation*.

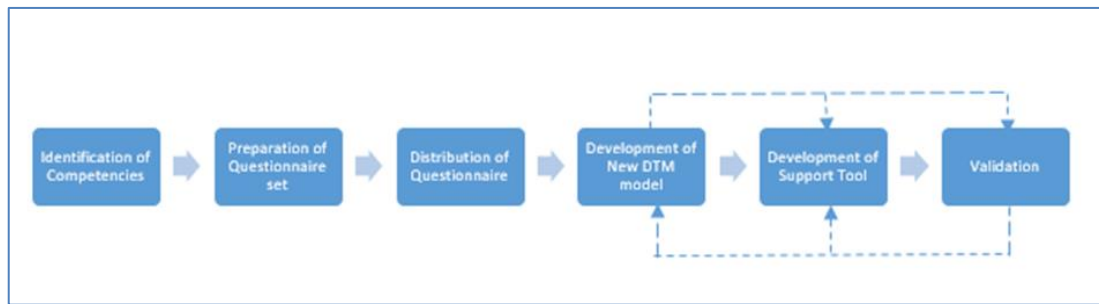


Figure 1: Research Framework

4.1 Identification of Digital Talent Competencies

The state-of-the-art in Digital Talent and Competency Models will be reviewed and investigated. Relevant literature will be exhausted including academic publications as well as international standards. The aim of this phase is to identify suitable competencies for digital talent. This phase will take up six months of the study, resulting in a list of digital talent competencies.

4.2 Preparation of Questionnaire

A set of questionnaire will be developed as the research tool and validated. This phase will take up three months of the study, resulting in a set of questionnaire for digital talent competency.

4.3 Distribution of Questionnaire

In this phase, the questionnaire will be distributed to the Human Resource department of 20 petrochemical companies in Malaysia, based on the MPA list of companies (Table 2). This phase will take up three months of the study, resulting in a set of questionnaire regarding digital talent.

Table 2: List of Petrochemical Companies in Malaysia

COMPANY	INDUSTRY	LOCATION
1. Air Liquide Global E&C Solutions Malaysia Sdn Bhd	Petrochemical	Selangor
2. Ancom Kimia Sdn Bhd	Petrochemical	Selangor
3. BASF (M) Sdn Bhd	Chemical	Selangor
4. BASF Petronas Chemicals Sdn Bhd	Petrochemical	Selangor
5. Dairen Chemical (M) Sdn Bhd	Chemical	Johor
6. Excel Provision Sdn Bhd	Chemical	Johor
7. Idemitsu Chemicals (M) Sdn Bhd	Chemical	Johor
8. Kaneka (Malaysia) Sdn Bhd	Petrochemical	Pahang
9. Kemaman Bitumen Company Sdn Bhd	Petrochemical	Terengganu
10. Lotte Chemical Titan (M) Sdn Bhd	Petrochemical	Johor
11. Optimistic Organic Sdn Bhd	Chemical	Terengganu
12. Pengerang Petrochemical Company Sdn Bhd	Petrochemical and Chemical	Johor
13. Petrochemicals (M) Sdn Bhd	Petrochemical	Johor
14. Petronas Chemicals Derivatives Sdn Bhd	Chemical	Terengganu
15. Petronas Chemicals LDPE Sdn Bhd	Chemical	Terengganu
16. Petronas Chemicals MTBE Sdn Bhd	Chemical	Pahang
17. Petronas Chemicals Ethlyne Sdn Bhd	Chemical	Terengganu
18. Petrotechnical Inspection (M) Sdn Bhd	Petrochemical	Pahang
19. Recron Malaysia Sdn Bhd	Petrochemical	Kuala Lumpur
20. Toray Plastics (M) Sdn Bhd	Chemical	Pulau Pinang

4.4 Development of New Digital Talent Model

In this phase, results of the survey will be analyzed using *Interpretive Structural Modelling* (ISM), a methodology for identifying competencies and the relationships among them. Main activities include: (1) identifying crucial competencies for digital talent; (2) constructing adjacency matrix; (3) generating reachability matrix; (4) analyzing the reachability matrix; and (5) illustrating the model. This phase will take up three months of the study, resulting in a new model for digital talent.

4.5 Development of Support Tool

A support tool for digital talent will be designed and developed in this phase. The objective is to support digital talent assessment by petrochemical companies. Third party applications such as *SurveyMonkey*, *Quiz Maker* and *Google Form* will be utilized in the development of the tool. It is expected that this phase will take up six months of the study.

4.6 Validation

Finally, the proposed model will be validated by means of expert reviews. Three HR managers will be selected for the purpose of validation. In addition, selected petrochemical companies will be given access to system for a duration of two months. At the end of this period, an interview session will be administered to identify the feasibility and practicality of the support tool. Feedback and comments will be analyzed and refinements to the model and/or tool will be carried out. This phase will take up three months of the study, resulting in a refined digital talent model and support tool.

The research's Gantt Chart is illustrated in Figure 2.

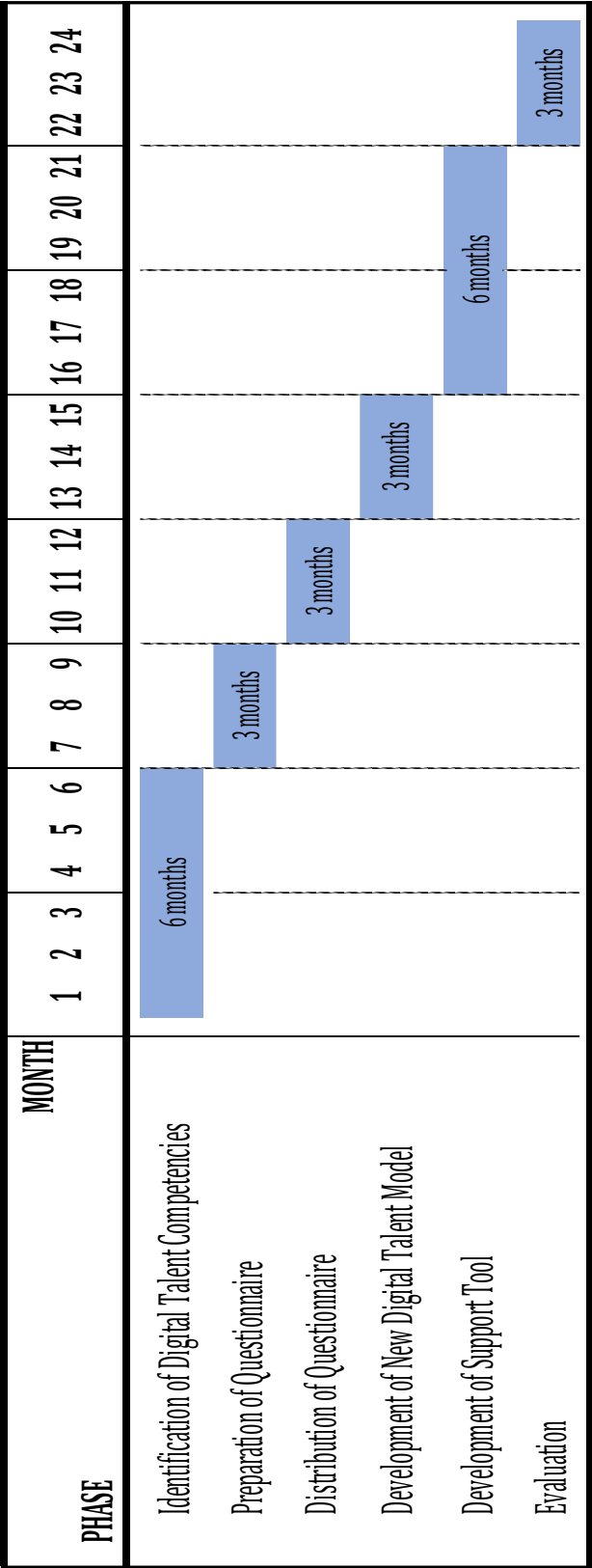


Figure 2: Study Gantt Chart

6 Conclusion

This paper has presented a research framework for the identification of digital talent skills for the petrochemical industry in Malaysia. There are six main phases in the framework: *Identification of Digital Competencies*; *Preparation of Questionnaire*; *Distribution of Questionnaire*; *Development of a New Digital Talent Model*; *Development of Support Tool*; and *Validation*. Expert reviews and questionnaire will be used as the research tools. Expected results include, but not limited to, a list of digital talent skills, a new digital talent model, and a digital talent support tool for the petrochemical industry.

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