



# An Analysis of Digital Talent in Academic Publications: Reflection on Malaysia's Digital Transformation Strategies

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**Abstract:** Digital transformation is the integration of Information and Communication Technologies (ICT) into all business areas and affects industries throughout the world. Digital transformation strategies are entrusted to “digital talent”, individuals who are technically equipped and well-versed across domains. However, finding the right talent has proven to be a difficult task and unmanageable to some organizations. Not only there is a shortage of talent, digital economy requires a different set of skills from the current labour market has to offer. This paper aims to shed light into this issue through a systematic literature review. In addition, a reflection on Malaysia's digital transformation strategies is presented. Results revealed that there is yet a standard definition for digital talent and its meaning varies across organizations and industries. Although generic descriptions are available, there is a lack of specific skill-set associated with digital talent. Main research directions include supporting digital transformation, talent cultivation, talent attraction, and shortage of talent. This paper contributes to the literature by presenting efforts to bridge the digital talent gap from three different perspectives: short-term, medium-term, and long-term measures. Malaysia has mapped its human capital development against the United Nation's Sustainable Development Goals since 2016 and is in the right path with regards to its digital transformation strategies. Short-term and medium-term measures are being implemented through up-skilling and re-skilling programs whilst long-term measures are underway although the results of digital transformation across industries have yet to be studied extensively.

**Keywords:** Digital economy, digital transformation, digital talent, sustainable development goals

## 1. Introduction

Digital economy is an economy that is underpinned by *Information and Communication Technologies* (ICT) across all business sectors [1] and widely perceived as conducting business over the Internet [2]. It reflects the transition from the third to the fourth industrial revolution (4IR) with largely connected individuals, organizations, computer systems

and smart devices at the backbone. Digital economy drives innovation and promotes economic growth, influencing how organizations and individuals use ICT to execute daily tasks better and faster.

Digital economy has created new market segments, businesses and work processes. Geographical barriers have been torn down, working hours have been made more flexible, and business organizations have become more technology-dependent than ever before. Work can now be carried out virtually, from clerical tasks to management meetings, with the aid of ICT.

Digital Transformation is the integration of ICT into all business areas and affects industries throughout the world. It undermines conventional notions about how businesses are structured, how consumers obtain goods and services, and how countries adapt to these challenges [3]. It demands organizations to view ICT not only as means to stay competitive, but a crucial element to be a market leader. Organizations need to assess and re-invent their current business models with input from customers, suppliers and other stakeholders in its business ecosystem.

The digital transformation journey requires the right talent, “digital talent”, at the helm. These talents are well-versed across domains as opposed to traditional single-domain experts. However, finding the right talent has proven to be a difficult task and unmanageable to some organizations. Not only there is a shortage of talents, digital economy requires a different set of skills from the current labour market has to offer.

Although it is agreed that digital talent would provide competitive advantage to business organizations [4], there is a yet consensus on what constitutes “digital talent”, leading to various interpretations of what it is and what it does [5]. In addition, organizations are often left with the dilemma of how to manage digital talents [4], [6]. This affects organizations as talent management influences the restructuring, training, development, and recruiting strategies [7]. Digital talent is an issue for governments, researchers, and organizations alike [5].

This paper aims to shed light into this issue and presents an analysis of digital talent as published in academic publications. It aims to identify the characteristics of “digital talent”; how such talents can be attracted; and current efforts for digital talent implementation. In addition, a reflection on Malaysia’s digital transformation strategies is presented.

## 2. Methodology

A systematic literature was carried out using four online databases namely Science Direct, Scopus, IEEE and Springer. Literature review research can be defined as “a research that reviews, critiques, and synthesizes representative literature on a topic in such a way that perspectives on the topic are generated” [8]. There are three main processes in the systematic searching strategies namely *identification*, *screening*, and *eligibility* as illustrated in Figure 1.

### 2.1 Identification

Identification is the process for searching synonyms, related terms, and variations of the main keyword for example “*digital talent*” and “*digital competency*”. These keywords were developed based on [9]. The authors managed to develop full search strings using Boolean operators, phrase searching, truncations, wild cards, and field code functions for searching four databases: Scopus, Science Direct, IEEE and Springer. A total of 211 articles was returned.

### 2.2 Screening

All articles were screened using the sorting function of the respective database based on the selection criteria suggested by [10]. Higgins and Green [11] suggested that restriction on timeline publication should be activated if it is known that related studies could only have been reported during a specific time period. As such, publications between 2018 and 2022 was selected as one of the inclusion criteria. In addition, only articles published in the English language were selected to avoid translations issues. This process excluded 147 articles as they did not fit the inclusion criteria and a further 12 articles were excluded due to duplicates. A total of 52 articles were forwarded to the third process.

### 2.3 Eligibility

The title and abstract of the articles were manually examined in this process, excluding 24 articles due relevancy. A total of 22 articles were finally selected.

### 2.4 Quality Appraisal

The selected articles were presented to three experts for quality appraisal purposes. Petticrew and Roberts [12] suggested ranking articles into three quality categories namely high, moderate, and low. Only articles categorized as high and moderate should be reviewed. The experts focused on the methodology of the articles to determine the rank of the quality. In order for the articles to be included in the review, the quality must be at least a “moderate” as determined by all experts. Disagreements were discussed between the experts before deciding on the inclusion or exclusion of an article for review. This process has managed to rank 15 articles as high, seven articles as moderate and nine articles as low. Therefore, only 22 articles were selected for review.

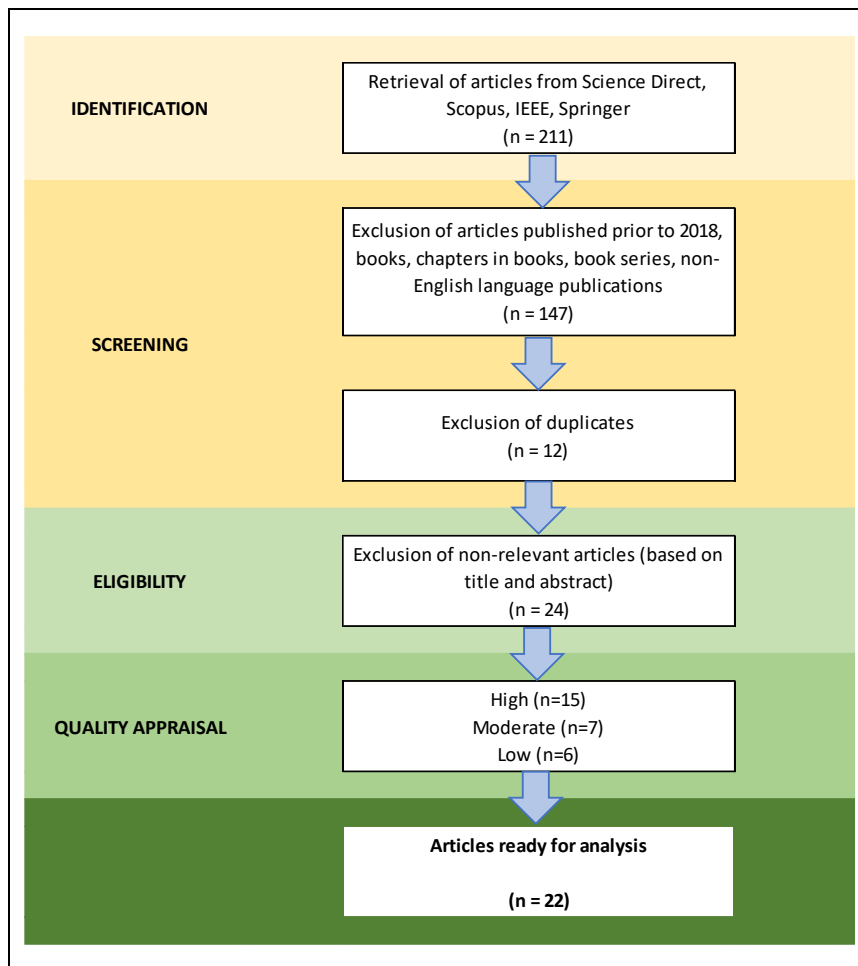


Fig. 1 – Research methodology

### 3. Results and Discussion

Results are presented in three categories for discussion purposes namely *Digital Talent Characteristics*, *Research Directions*, and *Digital Talent Implementation*.

#### 3.1 Digital Talent Characteristics

There is no widely accepted definition for “digital talent” found in literature. This might be due to the fact that the meaning of digital talent varies across organizations and industries [13]. General descriptions are available and include “a combination of hard digital skills and soft digital skills” [14]; “(people) who are comfortable with information systems and modern management techniques” [15]; and “employees with IT-related knowledge, skills and abilities” [16].

Industry-specific definitions include “professionals in the digital content industry” [17], “talent required by AI and the knowledge industry” [18], “professionals who form insights and knowledge in specific areas and apply them to the digital field” [19]; “programmers” [19]; and “talent arising from the Millennial Generation or Y Generation” [20].

An extensive definition is presented by Barinova [21]:

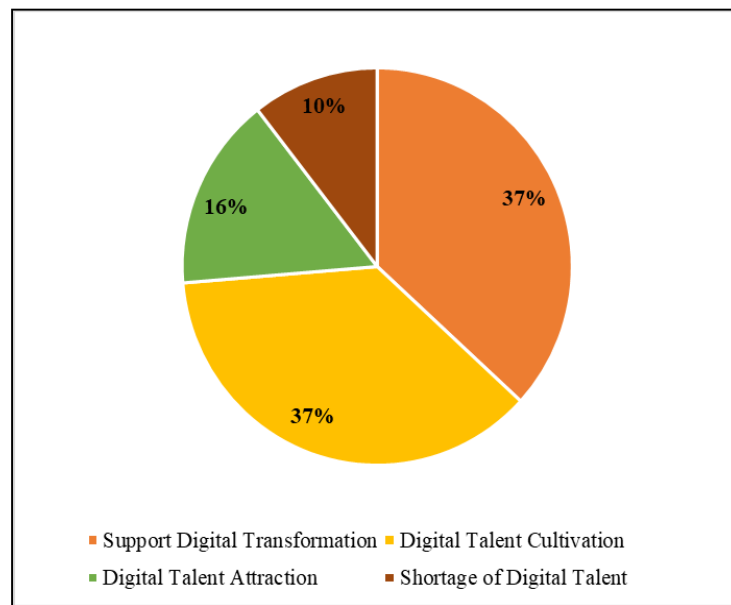
“... digital talent is a universal analytical skill in a certain field of activity, which allows us to achieve high results based on the adoption of innovative decisions. Digital talent is a new type of employee that understands its value to employers. They are entrepreneurial, decision-oriented based on data analysis, focused on flexible forms of employment and have experience working in multidisciplinary international teams. Digital talents are unevenly distributed across regions of the world...”

It is interesting to note that there is yet a set of specific “skills” associated with digital talent. It has been referred to as “a combination of hard digital skills and soft digital skills” [14]; “hard skills, soft skills and contextual skills” [20]; “digital skills, human skills and business skills” [4]; “a broad knowledge in different domains” [22]; and “cross-cultural and intergenerational interaction skills” [21].

Notwithstanding the differences in definition and characteristics, it is widely viewed that digital talent emerged from digital transformation as stated by many authors including Carcary [23] “to deliver digital strategy in digital transformation”; Tsai [24] “necessary skills for the digital transformation economy”; and Barinova [21] “digital projects carried out by qualified personnel”. Digital talent is not confined to ICT per se such as artificial intelligence [4], [18], but exists in other domains as well including medicine [25], education [22], [24], [26]– [28], animation [17] and automation [13].

### 3.2 Research Directions

Main research directions in digital talent is to support digital transformation [13], [14], [16], [21], [23], [28], [29] and digital talent cultivation [15], [17]– [19], [22], [25], [26] as illustrated in Figure 2.



**Fig. 2 –Directions of research in digital talent**

Other issues investigated include digital talent attraction [4], [20], [30] and shortage of digital talent [24], [27]. Most studies are qualitative in nature, involving the distribution of questionnaires and/ or the administration of interview sessions involving industries across America [29], [30], Europe [29], India [14], Australia [13], UAE [14], and Germany [16].

### 3.3 Digital Talent Implementation

Efforts to bridge the digital talent gap can be viewed from three different perspectives: short, medium, and long-term measures as illustrated in Table 1.

**Table 1 - Digital talent implementation**

	<b>Short-Term</b>	<b>Medium-Term</b>	<b>Long-Term</b>
<b>Aim</b>	Filling the Gap	Creating Digital Environment	Talent Cultivation
<b>Focus</b>	New Employees	Existing Employee	Future Employees
<b>Approach</b>	Direct Hire Outsourcing	Merger/ Acquisitions Up-Skilling Programs Re-Skilling Programs	New Digital Talent Development Model New Training Medium
<b>Issues</b>	Emergent Talent Markets	Non-Digital Policies/ Regulations	Concerted Efforts by All Stakeholders

### 3.3.1 Short-Term

Short-term measures are immediate solutions for organizations in finding the right talent to ensure daily business operations are not affected. These measures include direct hire or recruitment [29]; outsourcing tasks [23], [29]; and company acquisitions [4], [23]. Organizations should look into to new channels in finding talents such as freelance workers and crowdsourcing [14], [23], [30].

Fuller [30] identified three types of new talent platforms:

- Marketplaces for premium talent that allow organizations to source high-end niche experts for example big data scientists and project managers;
- Marketplaces for freelance workers that match individuals with organizations for specific task-oriented projects; and
- Platforms for crowdsourcing innovation that allow organizations to post problems to large communities of technically skilled users.

It is imperative to note that digital talents are significantly different from traditional talents from at least two perspectives: digital background and work aspirations. Digital talents are mostly “born digital” – they are more tech-savvy and utilize current technology in their daily activities. Secondly, they view the working environment as a series of projects or “gigs”. They prefer to work for themselves rather than for the organization [30]. Although they are ambitious, they would abandon the organization if their values and ethics are not reflected [20].

### 3.3.2 Medium-Term

Medium-term measures involve the creation of “digital culture” in the organization to enhance personal and professional developments of current employees [20], [23]. Organizations have to acknowledge the need for department-wide digital talents and the need to strategically fill the void. The Human Resource department (HR) should play an important role in bridging the talent gap [13], [14], [20].

Nair [14] outlined five approaches how HR can narrow the digital talent gap in the organization:

- Highlights the importance of digital talent to the management and develops strategies for upgrading and attracting digital talent;
- Adopts a diversified approach in acquiring digital talent;
- Supports employees to upgrade their digital skills;
- Illustrates a clear career development path for digital talent; and
- Provides freedom to digital talent to implement necessary changes.

In addition, organizations need to redesign their business culture [4], [29], [30] and implement “actionable metrics” [29] including upskilling [4] and re-skilling campaigns. A major challenge for organizations, it seems, is the archaic policies and regulations that hinder successful digital transformation [30]. The conception of this digital culture and environment [20] is a crucial step in for the organization to equip its current employee with the skills needed.

### 3.3.3 Long-Term

In the long run, organizations should develop an ecosystem for digital talent to ensure adequate supply. This can be achieved through the cultivation of digital talent involving numerous stakeholders. Cultivation can take many forms and implemented at many levels. Some authors promote the use of technology in teaching for facilitate the cultivation of talent [17], [19] whilst others propose the adaptation of existing concepts such as “employer branding” to attract, develop and retain digital talents [20] and a "capability approach" where organizations focus on the development of key capabilities including digital talent [23].

On a larger scale, the Russian Federation implemented an "agility training model" in planning the development digital talents [21]. A unified system of measures is used in the Samara region to identify talent as young as 14 years old. These talents are included in the regional activities by research organizations and enterprises. Currently more than 5,000 schoolchildren, 700 higher education institutions students, 350 scientific consultants, 2,000 teachers and university professors, and 20 leading enterprises are involved.

Taiwan developed a model for developing cross-domain ICT talent known as “DIGI+Talent Accelerator & Jumpstart Program” [24], [26], [27]. The four-year program aims to integrate more than 30 research institutions, 160 colleges, and 400 companies to cultivate 1,500 talent with a 70% employment rate. An intelligent talent management system was developed using blockchain technology to record talents’ data regarding online learning history, project outcomes, and certification of completion (digital resume). The system would be able to predict the most effective training strategies and instruction for talents across different knowledge domains. The same model has been adapted to other domains including medical and defense.

Gama [28] proposed a "dual-architecture" for digital transformation for Colombian universities namely curricular digitalization (knowledge) and institutional digitalization (data). The fundamental pillars include digital talent, who possesses digital expertise to promote, implement and maintain the systems in the 4th Industrial Revolution.

Organizations need to engage with universities and other professional training providers in identifying the type of digital talents required. Universities should play an important role by offering programs and courses that features the skills required by organizations. They too, need to change, as organizations, to train graduates to be proficient in multiple-domains as opposed to single-domain experts [4], [19], [21], [26], [27]. This can be achieved through a blended learning approach [21] using new technologies [13] and platforms [19].

## 4. Digital Talent in Malaysia

Malaysia has identified the importance of digital talent as early as 2015 by outlining human capital development as one of the six cores in the 11<sup>th</sup> Malaysian Plan [31] and re-emphasized in 2018 [32]. In the 12<sup>th</sup> Malaysian Plan, the importance of human capital is highlighted in the economic empowerment and social re-engineering dimensions [33].

Malaysia is committed to the UN’s Agenda for Sustainable Development and has aligned the Malaysian Plan to various SDGs and targets. Malaysia has mapped human capital development against the UN’s Sustainable Development Goals especially SDG 4 (quality education) and SDG 8 (decent work and economic growth). This exercise began in the 11<sup>th</sup> Malaysia Plan (2016-2020) and continued in the 12<sup>th</sup> Malaysian Plan (2021-2025).

To date, short-term and medium-term measures are being implemented by business organizations throughout Malaysia with support from the government. New, home-based talent markets have emerged, especially during the Covid-19 pandemic. The government has initiated up-skilling and re-skilling programs organized by federal agencies and private training providers to accommodate affected businesses and employees. This trend is expected to continue for the next 5 years and extended to school leavers and other groups.

At the national level, the cultivation of digital talents has started, focusing towards new digital transformation models, framework and development strategies, overseen by the Malaysian Digital Economy Corporation. Malaysia has 25 main industries as classified by the Ministry of International Trade and Industries and the results of digital talent transformation strategies across industries have yet to be studied extensively. Moving forward, a research framework for digital talent is proposed consisting of six phases as illustrated in Figure 3.

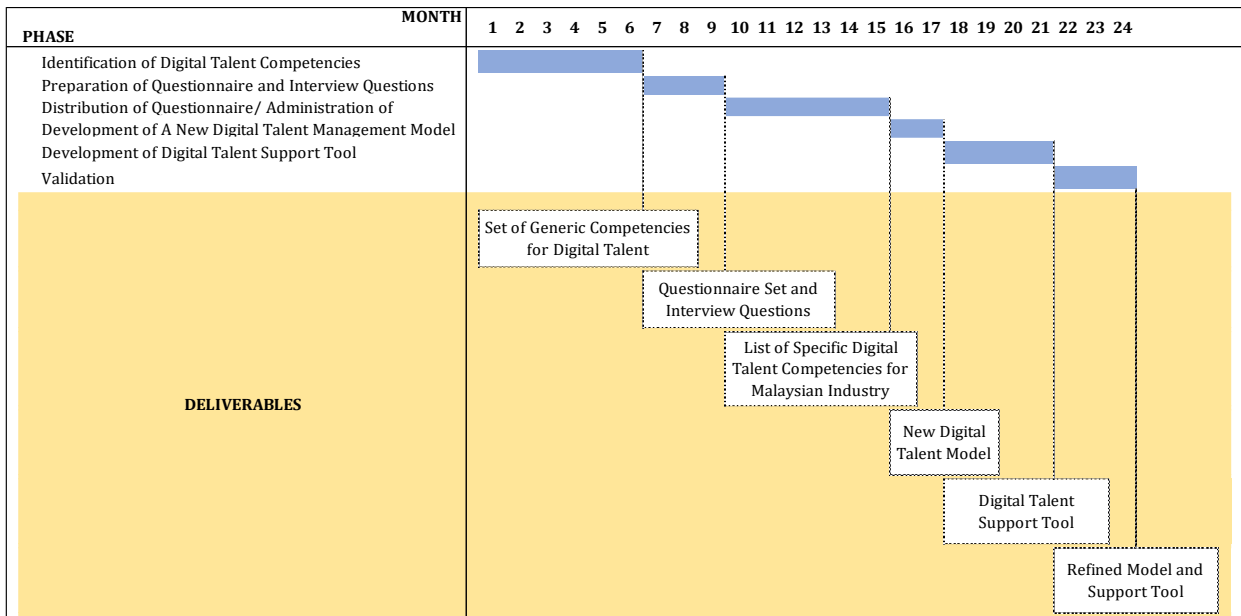


Fig. 3 – Research framework for Digital Talent

#### 4.1 Identification of Digital Talent Competencies

First and foremost, the state-of-the-art of digital talent will be reviewed and investigated. Relevant literature will be exhausted including academic publications as well as international standards. This phase would take up six months, resulting in a set of generic competencies for digital talent.

#### 4.2 Preparation of Questionnaire and Interview Questions

Next, a set of questionnaires will be developed as the research tool and validated using the Rasch model. The questionnaire will also be extended to include open-ended questions for interview session purposes. This phase would take up three months, resulting in a set of questionnaire and interview questions regarding digital talent competencies.

#### 4.3 Distribution of Questionnaire and Administration of Interview Sessions

In the third phase, questionnaire will be distributed to the Human Resource department of selected organizations in Malaysia. As the total number of industries in Malaysia based on the Ministry of International Trade and Industry (MITI) is 25, and the total number of companies registered with the Registrar of Companies (ROC) is 47,028; the sample size is set at 355 (95% confidence level 95% at +/5 intervals). In addition, interview sessions will also be carried out with 25 Human Resource managers (1 company for each industry). This phase would take up six months, resulting in specific list of digital talent competencies for Malaysian industries.

#### 4.4 Development of A New Digital Talent Management Model

In this phase, results of the survey and interview 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 would take up two months, resulting in a new model for digital talent management.

#### 4.5 Development of Digital Talent Support Tool

A computer support tool will be designed and developed in this phase. A traditional waterfall model for system development will be adopted comprising of requirements analysis, design, implementation and testing. Proprietary and open-sourced applications will be utilized in the development of this tool. This phase would take up four months, resulting in a computer support tool for digital talent assessment.

## 4.6 Validation

The final phase is the validation of the model involving 25 Human Resource managers (industry experts). Comments and feedback from the experts will be compiled and analyzed, and further refinements to the model (if needed) will be made. This phase would take up 4 months, resulting in a refined model and support tool for digital talent.

## 5. Conclusion

This paper has presented an analysis of "digital talent" based on academic publications in Science Direct, Scopus, IEEE, and Springer databases. It focuses on the characteristics of digital talent; how these talents can be attracted; and identify current efforts for digital talent implementation.

Results revealed that there is yet a standard definition for "digital talent" and its meaning varies across organizations and industries. Although generic and industry-specific descriptions are available, there is a lack of specific skill-set associated with digital talent. Notwithstanding the differences in definition and characteristics, it is widely viewed that digital talent emerged from digital transformation. Main research directions in digital talent is to support digital transformation, talent cultivation, talent attraction, and shortage of talent.

This paper contributes to the literature by presenting efforts to bridge the digital talent gap from three different perspectives: short-term, medium-term, and long-term measures. Short-term measures are immediate solutions for organizations in finding the right talent in order to ensure daily business operations are not affected. Medium-term measures involve the creation of digital culture in the organization to enhance personal and professional developments of current employees. Long-term measures involve the development a digital talent ecosystem through talent cultivation involving numerous stakeholders.

Malaysia is on the right path with regards to its digital transformation strategies. Short-term and medium-term measures are being implemented by business organizations through up-skilling and re-skilling programs organized by federal agencies and private training providers. Long-term, talent cultivation measures are underway although the results of digital talent transformation strategies across industries have yet to be studied extensively.

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