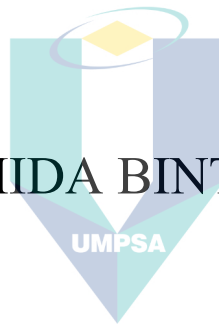


PROFESSIONAL DEVELOPMENT SUCCESS
THROUGH EDUCATIONAL SUPPLY CHAIN
ATTRIBUTES AND INDUSTRIAL
EXPERIENCE



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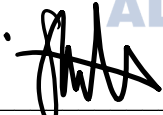
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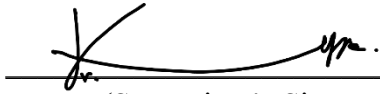
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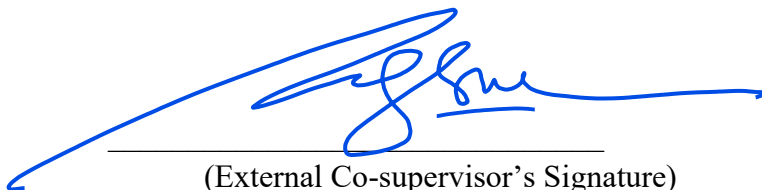


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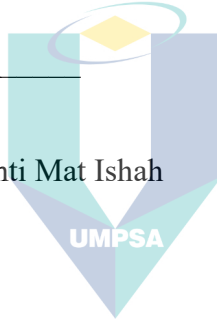
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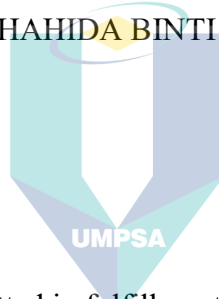
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PROFESSIONAL DEVELOPMENT SUCCESS
THROUGH EDUCATIONAL SUPPLY CHAIN ATTRIBUTES
AND INDUSTRIAL EXPERIENCE

NUR SHAHIDA BINTI MAT ISHAH



Thesis submitted in fulfillment of the requirements

اونيورميتي ماليزيا تيمڠ سلطان عبدالله
for the award of the degree of
Master of Science

UNIVERSITI MALAYSIA PAHANG
AL-SULTAN ABDULLAH

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JULY 2024

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ABSTRAK

Ketakpadanan siswazah mengakibatkan ketidakseimbangan antara apa yang majikan perlukan daripada tenaga kerja mereka dan apa yang pekerja dapat sebagai balasan, menyebabkan ribuan orang tidak dapat memajukan kerjaya mereka. Ini juga mengakibatkan kekurangan penyertaan dalam tenaga kerja disebabkan oleh peluang kerja yang lebih sedikit dan persaingan yang lebih tinggi untuk pekerjaan. Rantaian bekalan pendidikan di Malaysia mesti menyesuaikan diri dengan perubahan sifat dan permintaan terhadap tenaga kerja dan kemahiran disebabkan oleh globalisasi rantai nilai, peralihan demografi, dan kemajuan teknologi untuk melahirkan lebih ramai graduan profesional. Oleh itu, tujuan kajian ini adalah untuk mengkaji hubungan antara atribut-atribut rantai bekalan pendidikan (EduSC) yang merangkumi etika dan kerohanian, kemahiran menganalisis data, kerja berpasukan, kecekapan bahasa, kemahiran berfikir, dan pengetahuan, dengan kejayaan perkembangan profesional. Kajian ini juga menyiasat peranan pengalaman industri sebagai perantara dalam hubungan antara atribut-atribut EduSC dan kejayaan perkembangan profesional. Teori pandangan berasaskan sumber telah dipilih sebagai teori asas untuk mengenal pasti sifat dan sumber individu yang boleh digunakan untuk mencapai kelebihan daya saing berbanding individu lain. Kajian ini menggunakan reka bentuk penyelidikan deskriptif dengan kaedah penyelidikan kuantitatif bagi mencapai tujuan kajian. Populasi sasaran untuk kajian ini merangkumi semua individu yang bekerja di Malaysia, dan bekerja di sektor pertanian, industri, dan perkhidmatan. Berdasarkan analisis G*Power, 189 sampel dipilih menggunakan pensampelan tindak balas sukarela dan kemudian dinilai menggunakan pemodelan persamaan struktur kuasa dua terkecil separa (PLS-SEM) menggunakan perisian SmartPLS 4. Berdasarkan penemuan kajian, etika dan kerohanian, kemahiran menganalisis data, dan kemahiran berfikir semuanya mempunyai kaitan positif dengan kejayaan perkembangan profesional. Namun, penemuan menunjukkan bahawa pengalaman industri tidak mempunyai kesan perantaraan ke atas hubungan antara atribut-atribut EduSC dan kejayaan perkembangan profesional. Hasil kajian ini meluaskan sempadan pengetahuan untuk EduSC dan mencetuskan kesedaran tentang penglibatan pihak berkepentingan dalam EduSC.

Kata kunci: Rantaian bekalan pendidikan, kejayaan perkembangan profesional, pengalaman industri

ABSTRACT

Graduate mismatch results in an imbalance between what employers require of their workforce and what workers have in return, leaving thousands of people unable to advance in their careers. This also results in a lack of participation in workforce due to fewer job openings and higher competitions for jobs. Malaysia's educational supply chain must adapt to the changing nature and demand for labor and skills due to value chain globalization, demographic shifts, and technological advancements in order to produce more professional graduates. Therefore, the purpose of this study is to investigate the relationship between educational supply chain (EduSC) attributes, which include ethics and spirituality, data analysis skills, teamwork, language proficiency, thinking skills, knowledge, and professional development success. This study also examines the role of industrial experience as a moderator in the relationship between EduSC attributes and professional development success. The resource-based view theory was chosen as the underpinning theory to identify an individual's nature and resources that can be utilized to gain a competitive advantage over other individuals. This study adopts a descriptive research design with a quantitative research method to fulfill the research purposes. The target population for this study includes all employed individuals in Malaysia who work in the agriculture, industries, and services sectors. Based on G*Power analysis, 189 samples were selected using voluntary response sampling and then evaluated using partial least square structural equation modeling (PLS-SEM) using SmartPLS 4 software. According to the findings, ethics and spirituality, data analysis skills, and thinking skills are all positively related to professional development success. Yet, the findings demonstrate that industrial experience has no moderating effect on the relationship between EduSC attributes and professional development success. The outcomes of this study expanded the boundaries of knowledge regarding the EduSC and triggered awareness of stakeholders' involvement in the EduSC.

Keywords: Educational supply chain, professional development success, industrial experience

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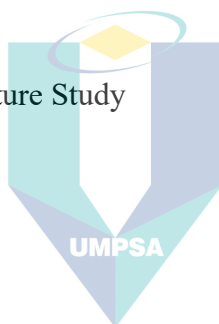
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LIST OF ABBREVIATIONS

| | |
|--------------|--|
| AHP | Analytical Hierarchy Process |
| AVE | Average variance extracted |
| EduSC | Educational supply chain |
| EduSCM | Educational supply chain management |
| FLCAS | Foreign language classroom anxiety |
| GDP | Gross Domestic Product |
| HEI | Higher education institutions |
| HOTS | High order thinking skill |
| HTMT | Heterotrait-monotrait |
| ILO | International Labour Organization |
| Industry 4.0 | Industrial revolution 4.0 |
| IT | Information technology |
| IWE | Islamic work ethics |
| KBAT | Kemahiran berfikir aras tinggi |
| MBA | Master of Business Administration |
| MEF | Malaysian Employers Federation |
| MOE | Ministry of Education |
| MOHE | Ministry of Higher Education |
| MQA | Malaysian Qualification Agency |
| NEP | National Education Policy |
| OECD | Organization for Economic Co-operation and Development |
| PLS-SEM | Partial Least Square Structural Equation Modelling |
| RBV | Resource-based view |
| SCM | Supply chain management |
| SCP | Structure-conduct-performance |
| SEM | Structural equation modelling |
| SPSS | Statistical Package for Social Science |
| STEM | Science, Technology, Engineering, and Mathematics |
| US | United States |
| USA | United States of America |

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Professional development is essential for improvisation and upgrading one's quality of life. This is due to the fact that technologies are becoming increasingly valuable and are rapidly evolving, requiring people to constantly update their skills and expertise. Different jobs demand different skill sets to be accomplished, which is where professional development comes into use. Professional development is defined as enhancing one's career by learning, training, developing new skills, and keeping up with current trends (Antley, 2020; Barnard, 2021). When it comes to self-improvement through learning and training, everyone has been doing it since they were at least seven years old and continues this pattern while working. This suggests that if everyone has gone through professional development their entire lives, it does not make sense that there are over 600,000 unemployed individuals in Malaysia (Department of Statistics Malaysia, 2022a) who cannot achieve any success in getting any career. This implies that for unemployed people, success in professional development could mean being able to find a job that matches their skill set or the attributes they possess.

To increase employment in Malaysia, the educational supply chain (EduSC) in Malaysia must produce individuals with the skill set or attributes that the working industries require, despite the global trend of climate change, demographic shifts, and value chain globalization (The World Bank Group, 2021). The nature and demand of work and skills has changed (The World Bank Group, 2021) and soft skills are more desirable than working experience or hard skills in the workplace (Thomas, 2019). Skills are classified into two types: soft skills and hard skills. The difference is pretty obvious: soft skills are more difficult to measure and define, whereas hard skills are comparatively specific, measurable, explicit, and easier to define (Bleich, 2020).

Soft skills are non-technical abilities related to interpersonal characteristics and attributes (Workable Technology Limited, 2019). It is intangible, difficult to quantify, yet essential for almost every job (Doyle, 2022; Workable Technology Limited, 2019). Teamwork, work ethics, and time management are examples of soft skills. Hard skills, on the other hand, are frequently regarded as technical skills that can be job-related (Workable Technology Limited, 2019) and are frequently learnable (Doyle, 2021). This ability is measurable and can be described with numbers or scales. Language proficiency, data analysis, and machine operations are examples of hard skills. 40 percent of hirers considered an individual's skills for a successful hire, and skills are considered as the currency of employment (Perna, 2022), where the more skills an individual have, the more successful for the person to be hired to a job.

Skills can be acquired when one have industrial experiences. Industrial experience is defined as the time spent and knowledge gained working in a particular industry or sector of the economy (Indeed, 2022). It involves job categories such as industrial training, internships, and working (Indeed, 2022; Li et al., 2021; Osman et al., 2016). The experience gained through working in industries was proven to be significantly differ (Okoye & Edokpolor, 2021). In addition, effective implementation of industrial experience can equip students with the skills to become employable after graduation (Azodo, 2018; Osman et al., 2016) in which it can influence the professional development success of that student and can help to increase the percentage for an individual to be hired by employers.

The problem with skills-based hiring, according to Rohan Rajiv, Group Product Manager at LinkedIn Talent Solutions, is that the supply of skills and access to well-paying employment are not necessarily equal, leaving many individuals behind (Perna, 2022). This creates a phenomenon called skills mismatch, in which it is defined as the difference between the skills required to meet job demands and the access to skills-related employment (Baley, Figueiredo, & Ulbricht, 2022; International Labour Organization (ILO), 2020; International Labour Organization (ILO) Department of Statistics, 2014a; Lok, 2022). Simply said, skills mismatch is the significant discrepancy between skills and jobs (Baley et al., 2022). The concern of skill mismatch began to surface during the global economic crisis around 2008 and 2009 (International Labour Organization (ILO) Department of Statistics, 2014b; Lok, 2022). The crisis resulted in a massive surge in

unemployment and job elimination around the world. As a result of the crisis's aftermath, the tendency toward obtaining education has intensified, but employers have expected more than simply education to fulfil the demands of technological progress, globalisation, and trade (International Labour Organization (ILO) Department of Statistics, 2014b; Karim & Said, 2024).

A problem with skills mismatch is that it offers the illusion of higher employment, and economic and social stability (Puckett, Hoteit, Perapechka, Loshkareva, & Bikkulova, 2020; Reckwitz, 2021), that may subsequently lead those in employment to constantly learning the wrong skills that are probably not suited to them and learning skills that are outdated that demands ongoing retraining and lifelong learning. With time, people will struggle with a lack of motivation and readiness for personal development since they are trapped in a profession that does not suit them that could cause limited access to the labour market because the wrong people are working for the wrong job, leaving those with the necessary skills behind. It can lead to unequal distribution of labour and employment as the number of jobs available may be high in areas where there are few appropriate job-seeking candidates which resulted in companies giving the job to the unsuitable candidate who is only accessible near the job, that results in an imbalance between qualified labour and jobs; and the willingness of younger generations to work for low pay and short hours due to changing labour values and requirements.

Statistics shows that Malaysia is being dominated by 24.7 percent skilled workers, 62.2 percent semi-skilled workers, and 13.1 percent low-skilled workers (Malay Mail, 2021). It is surprising that highly-skilled workers in Malaysia only made up of just 24.7 percent of the labour force, compared to 64.2 percent overall (Kana, 2022) while Malaysia needs at least 45 percent of highly skilled workers by 2030 in order to compete with other leading nations in the world (Harun, 2022), with the majority of concerns focusing on advanced technology adoption and utilisation (Sulaiman, Ismail, Saukani, & Lelchumanan, 2021). To gain at least 45 percent of highly skilled workers by 2030, the educational supply chain (EduSC) in Malaysia must be constantly enhanced to produce more skilled workers. To produce more skilled workers, graduates must first be successful in getting a career that can allow them to enrol in more professional development programs.

1.2 Research Problem

As governments throughout the world enforced lockdowns and trade restrictions, the outbreak of COVID-19 has substantially reduced the need for professional services in 2020 (ReportLinker, 2021). In Malaysia, there was an approximately 2.5 percent loss in the skilled occupation category (Department of Statistics Malaysia, 2021a), with the decrease seen in the occupational categories of professional, associate professional, and technician (The Edge Market, 2021). The reason cited was a lack of involvement in professional occupations. This is due to the fact that there are fewer job openings and higher competition for jobs (Department of Statistics Malaysia, 2021a) as a result of the tough economic conditions generated by the pandemic (The Edge Market, 2021).

During the tough economic challenges, industries such as technology, manufacturing, banking and financial services are facing hiring challenges due to a mismatch between company's ambition and a shortage of qualified personnel to achieve business objectives (Naeem, 2022; Sofiah, 2021). The shortage of qualified personnel was mostly triggered by companies who are getting more precise in who they want to hire as more people become educated and more job seekers lack the exact skills and expertise that the employers desired (Naeem, 2022). Companies find it difficult to select suitable candidates that match the corporate culture, have strong industry experience and a genuine sense of accountability. To make matters worse, a number of skilled Malaysian professionals are working abroad (Naeem, 2022).

A phenomenon known as graduate mismatch happened when today's graduates' strengths differ from what employers look for in job candidates (Darusman, 2020), preventing them from getting a career that does not match their qualifications. For example, a graduate with a Bachelor's degree works as a cashier or waiter. Taking in the job itself can increase their industrial experiences, yet still limiting the graduates from further achievements, and capabilities (Karim & Said, 2024; Meyer & Wurdinger, 2016). Malaysian higher education institutions are estimated to produce more than five million graduates starting from 2019, with 23.5 thousand of these graduates remained unemployed for typically six to twelve months following graduation (Department of Statistics Malaysia, 2020, 2021b). Approximately 10.1 percent of graduates remained unemployed for more than a year and more than 44 thousand graduates were not seeking

for jobs. In two years later, there are still more than 669.2 thousand people remained unemployed (Department of Statistics Malaysia, 2022b, 2022c).

Even while this number lowers with the resumption of economic operations during the endemic transition phase from the outbreak of COVID-19, there are still hundred thousand of individuals who can be upgraded to be in the labour force. With such a significant number of unemployed graduates, it is critical that the working industries identify the skills that these graduates need in order to reduce the number of unemployability among them. The problem of skills mismatch and high unemployment rates among graduates in Malaysia underscores the urgency to align educational outcomes with industry demands. This study aims to address this challenge by investigating the relationship between educational supply chain (EduSC) attributes and professional development success, with a focus on the moderating effect of industrial experience. By identifying crucial characteristics within the EduSC framework and examining how industrial experience influences professional development, the research seeks to provide insights that can inform educational policies and practices, ultimately enhancing graduate employability and bridging the gap between academia and industry needs.

The problem statement addresses the critical issue of skill mismatch in Malaysia, where there is a significant gap between the qualifications of graduates and the skills demanded by employers. This mismatch has led to high unemployment rates among graduates, despite the increasing number of educated individuals. Evidence shows that Malaysian higher education institutions produce over 300,000 graduates annually, yet many remain unemployed for up to six months post-graduation, with 669,200 individuals affected as of March 2022 (Department of Statistics Malaysia, 2022a). The mismatch is exacerbated by graduates often accepting jobs that do not align with their qualifications, such as working as cashiers or waiters (Darusman, 2020). The economic impact of this mismatch is substantial, with an estimated global GDP loss of RM21.25 trillion due to mismatched skills (Star Media Group Berhad, 2020). Addressing this issue requires higher education institutions to align their curricula with industry needs, ensuring graduates possess the relevant skills for the job market.

A survey conducted by Malaysia's Khazanah Research Institute revealed that soft skills are more desirable than working experience or hard skills in the workplace (Thomas, 2019). Furthermore, graduate's lack of motivation to improve their skills (Abd Rahman, Ismail, Ridzuan, & Abd Samad, 2020) could be due to a lack of knowledge about the prospects and possibilities of their chosen line of work, despite the specialized nature of their area of study (Yusof & Jamaluddin, 2017). When graduates lack motivation, their efficiency is affected, as productivity deteriorates when they believe they are overqualified or underqualified for the job that they seek or have been given (Darusman, 2020). Therefore, responsibility and ethics must be established in individuals from an early age so that they grow up to be ethical and honest when sharing and gathering information (Tohara, Mohamed Shuhidan, Saiful Bahry, & bin Nordin, 2021). Moreover, implementing workplace spirituality was seen as an effective way to boost employee well-being and productivity at work (Lata & Chaudhary, 2020).

Another approach to boost productivity is to strengthen teamwork among coworkers (Polega, Neto, Brilowski, & Baker, 2019). It can lead to fewer errors, improved levels of satisfaction among employees and customers, and possibilities for professional development (Polega et al., 2019). Meanwhile, data analysis skill has emerged as one of the most significant elements, particularly in the age of IT and big data analytics (Bogdan & Borza, 2019). The necessity for the skill comes after a large amount of data exists that must be mined and refined in order to extract valuable information. Hence, thinking skills must also be implemented in individuals to some extent in order for them to engage with the emergence of new technologies (Indah, Toyyibah, Budhiningrum, & Nur Afifi, 2022). Along with the emergence of new technologies, language proficiency becomes a need as communication is essential in order to communicate information in technologies (Ting, Marzuki, Chuah, Misieng, & Jerome, 2017). Ting et al. (2017) even noted that graduates, in particular, lack language proficiency and communication skills in work settings, resulting in poor information presentations, causing lack of information being distributed correctly. Therefore, the right skills must be instilled in the upcoming workforce to equip them for the opportunities that are accessible in the labour market. Higher education institutions should restructure the curriculum to instil certain traits to graduates to encourage them to be more proactive (Abd Rahman, Ismail, Ridzuan, & Abd Samad, 2020) in becoming more skilled for them to be able to be developed professionally. Malaysia's educational supply chain (EduSC)

system must be equipped with certain attributes to enable the students in the supply chain to meet the industry's current needs.

1.3 Research Objectives

This study is primarily concerned with identifying crucial characteristics in the EduSC that graduates might use for the development of the right skills for their future career. These characteristics should also be applicable when graduates or even ordinary individuals wish to advance professionally. This study also seeks to determine the impact that working experience or industrial experience have on graduates, whether in terms of applicable attributes or professional activities. Therefore, as stated in the study's context, the particular goals of this study are as follows:

1. To examine the relationships between educational supply chain attributes and professional development success.
2. To analyse the moderating effect of industrial experience in the relationship between educational supply chain attributes and professional development success.



1.4 Research Questions

The study's research questions revolve on the relationship between educational supply chain attributes and professional development success. Additionally, the research questions also concern the relation and moderating effect of industrial experience on the relationship between educational supply chain and professional development success. The following two questions are then generated to relate the relationship between the factors given above. As a result, the research questions for this study might be expressed as follows:

1. What is the relationship between educational supply chain attributes and professional development success?

2. Does the industrial experience moderate the relationship between educational supply chain attributes and professional development success?

1.5 Scope of Study

This study focuses into the educational supply chain (EduSC) attributes correlated with professional development success and industrial experience within Malaysia's working population. While EduSC encompasses various components such as operations, inputs, and outputs, this research focuses solely on attributes related to professional development and industrial experience. This is due to the fact that EduSC operations involve complex processes within educational institutions and educational supply chain management (EduSCM), which are beyond the scope of this study. Similarly, the study excludes EduSC inputs, which involve parental involvement and educational institution roles, and outputs, which are relevant to graduates and research outcomes. Further elaboration on EduSC's inputs, processes, and outputs is provided in Chapter 2.2. The entities under study includes graduates, employees, entrepreneurs, and employers directly associated with EduSC (O'Brien & Deans, 1996).

The chosen EduSC attributes - ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge, are adapted from various sources, including reports from Malaysia's Ministry of Higher Education (MOHE) and the Global Skills Gap in the 21st Century report. Industrial experience is identified as the moderating factor in the relationship between EduSC attributes and professional development success, with detailed explanations provided in Chapter 2. Employing a quantitative research approach, this study utilizes a survey questionnaire instrument.

Rather than focusing on specific professional development activities or industrial experiences, this study examines the common characteristics or attributes of the targeted demographic. Professional development success is conceptualized as the gain of targets or achievements by working individuals, which can guide job-seekers in finding positions aligned with their skill sets or attributes. Additionally, the study explores whether industrial experience influences personal attributes. The research population encompasses all employed individuals within Malaysia's working sector, spanning

agriculture, industry, and services, which collectively represent 48.62 percent of the population (Institute of Labor Market Information and Analysis (ILMIA), 2017; Ministry of Economy, 2022). The targeted respondents must meet specific criteria, including employment status, position held within a company, and work in one of Malaysia's three economic groups (agriculture, industry, or services) (Institute of Labor Market Information and Analysis (ILMIA), 2017).

1.6 Significance of Study

Skills mismatch and graduate mismatch seem to be persistent challenges in this country's labour market. Therefore, it is critical that this matter be addressed in order to improve the rate of employment. As a response, unemployed individuals must be prepared with the necessary skills to be eligible for employment, particularly in essential professions such as professional jobs or highly skilled occupations, so that this country can grow and compete competitively with other nations. The significance of preparing for the skills required for employment is discussed in the subtopics below.

1.6.1 Theoretical Significance

The discovery from this research contributes to neoteric knowledge about a new set of attributes or skills that are required in the time frame of this study in Malaysia's educational supply chain (EduSC), as more additional research is needed in the area of Malaysia's EduSC due to the limited number of studies in this field (Lee, Abu Bakar, Hanaysha, & Deraman, 2018). This study also creates a guideline consisting of a set of indicators of learning abilities and professional development success in the hopes of developing a generation of 'future-proof' job-seekers who can succeed in the age of accelerated evolution (Ministry of Education Malaysia, 2018).

This research also contributes to the expanding body of knowledge on educational supply chain (EduSC) management in Malaysia by identifying a new set of attributes and skills necessary for professional development success. Given the limited studies in Malaysia's EduSC (Lee et al., 2023), this research provides fresh insights and fills a

critical gap. The study creates a guideline with indicators of learning abilities and professional development success, aiming to cultivate a generation of 'future-proof' job-seekers adept at thriving in a rapidly evolving job market (Ministry of Education Malaysia, 2018). Although the research does not adhere to traditional EduSC management frameworks (Habib & Hasan, 2019), it introduces novel concepts relevant to supply chain management (SCM), highlighting the importance of integrating SCM principles into educational frameworks to foster progressive and forward-thinking professionals.

1.6.2 Practical Significance

Employers in Malaysia can adapt the findings from this study into finding suitable talent that suits the company. The attributes in the educational supply chain (EduSC) model in this study can either be adopted or adapted by talent scouts to recruit skilled workers suitable to the companies' needs and operations. This study provides an eye-opener to the employers in the attributes of working individuals in Malaysia's work setting that could be different from what the employers have been thinking all this while. This study also highlighted the issue of graduate mismatch and skills mismatch in Malaysia's work setting that contributes to the high number of unemployed individuals.

This study can also raise awareness of the attributes that working industries look for, which can lead to more interactions between corporations and educational institutions because a coordinated supply chain with feasible relationships both inside and outside of the institutions can produce high-quality results (Habib & Hasan, 2019). In addition, the suggested six educational supply chain attributes and industrial experience can help shape the disposition of unemployed individuals and make the professional development and business operation in this country more effective and efficient. In the long run, it is expected that the effort of achieving professional development will eventually contribute to Malaysia's GDP, consequently improving the economy. In addition, increased professional development through the EduSC attributes framework will contribute to Malaysia's reputation and international standard.

Employers in Malaysia can leverage the findings from this study to enhance their recruitment strategies, aligning them with the EduSC attributes identified. This alignment can address the prevalent issue of graduate mismatch and skills mismatch, which contribute to high unemployment rates among graduates (Wahab, Tan, & Roche, 2024). The study underscores the need for stronger collaboration between corporations and educational institutions, suggesting that a well-coordinated supply chain with robust internal and external relationships can yield high-quality results (Lee, K. L. et al., 2023). The six identified EduSC attributes and the emphasis on industrial experience can shape the professional development of unemployed individuals, enhancing business operations and potentially boosting Malaysia's GDP (Lebdioui, 2022). This framework can also guide the Ministry of Education in restructuring the EduSC to better align with industry demands, ultimately improving the employability and skills of graduates entering the workforce (Ismail, Che Ibrahim, Belayutham, & Mohammad, 2022).

1.7 Definition of Key Terms

The definition of key terms clarifies the purpose and the direction of this research. It can also provide readers the understanding of the literal meaning of the keywords that are imported in this research. The key terms for this study are educational supply chain, professional development success, holistic, entrepreneurial, and balanced graduates, talent excellence, lifelong learner, quality technical and vocational graduates, industrial experience, ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge.

Educational Supply Chain (EduSC)

EduSC was defined as a network of all educational institutions, students, educators, employees, and also employers involved in the production of the acceptable curriculum for the institutions to deliver (Habib & Jungthirapanich, 2009a; O'Brien & Deans, 1996). Habib and Jungthirapanich (2009) also explained EduSC as the representation of the supply chain management ideology to educational institutions. It is

also recommended as a tool for tertiary education strategic planning (Habib & Jungthirapanich, 2009).

Professional Development Success

A professional is defined as a job or someone who works in a field that requires a high level of education and training (Cambridge Dictionary, 2022). It also refers to someone who does something as a paid work rather than just a hobby (Oxford Learner's Dictionaries, 2022). According to Paul, Jena, and Sahoo (2019), meaningful work is what differentiates professionals from others. Professional development can also be defined as the factors that influences the production of high-quality graduates and it is relevant mostly to educators as the characteristics that will develop students to be professional is used as lessons in schools and higher education institution (HEI) (Lee et al., 2018). Professional development success can be described as a favourable outcome as a result of the quality and efficacy of a professional's job (Garet, Porter, Desimone, Birman, & Kwang, 2001) and it can be measured by indicators such as holistic, entrepreneurial, and balanced graduates, talent excellence, lifelong learner, and quality technical and vocational attributes (Boyle, Saklofske, & Matthews, 2015; Brusoni et al., 2014; Conceição et al., 2019; Holienka, Holienková, & Gál, 2015; Howe & Goldberg, 2019; Kumar & Garg, 2017; Laal, 2011; Ministry of Education Malaysia, 2016; Panda, 2017; Rainie & Anderson, 2017; Sarkar, 2020; Vlasic, Vale, & Puhar, 2009; Whitener, 2017).

Holistic graduates are those who have completed their studies with a complete development of their spiritual, intellectual, mental, physical, emotional, and social abilities, such that they will be capable of handling the challenges and obstacles of everyday life (Reckwitz, 2021; Rudge, 2015; Sarkar, 2020). An entrepreneurial graduate was described as a student who has completed their course of study and possesses the characteristics of strategic risk-taking, creative tendency, and a strong desire for achievement and autonomy (Holienska et al., 2015). A balanced graduate can be defined as a graduate who possesses a wide variety of abilities in appropriate proportions (Ministry of Education Malaysia, 2015; Sulaiman et al., 2017). In short, holistic, entrepreneurial, and balanced graduates are graduates who have a complete self-

development, not afraid to take risks, and also possess a wide range of abilities that are properly utilised when needed.

Talent excellence is defined as the supply of a skilled workforce that is expected to fulfil the workforce demands (Misni, Nik Mahmood, & Jamil, 2020). It symbolizes the outstanding feature in a person which is often developed to become a potential.

Learning is described as the process of becoming aware of what people think, feel, and act and critically developing experiences surrounding it while lifelong learning is considered to be a form of adult learning that lasts a lifetime (Barhate & Dirani, 2022; Laal, 2011). It was revealed that lifelong learning is one of the pillars for development and everyone is either a direct or indirectly a lifelong learner (Lok, 2022; Vlasic et al., 2009).

A quality technical and vocational graduate is one who has received standard education in technologies, engineering, and associated sciences, as well as excellent practical skills, attitudes, understanding, and knowledge relating to occupations in many sectors of economic and social life (Howe & Goldberg, 2019; Okoye & Edokpolor, 2021).

Industrial Experience

Industrial experience can be described as the practical experience gained from working in an industry, which includes the application of practical skills and theoretical knowledge (Ahmad, Mat Ali, & Sulaiman, 2018; Azodo, 2018). It was stated to be a vitally important aspect in developing and preparing skills and knowledge of the students for the real work market (Sohaimi & Senasi, 2020) and graduates are also said to have better perceptions towards way of life when they had prior working experience (Misni et al., 2020).

Educational Supply Chain Attributes

The educational supply chain attributes can be described as the tools, input, and characteristics for the coordination and knowledge sharing up and down the process among all stakeholders in an educational supply chain (Habib & Hasan, 2019; Lee et al., 2018). The attributes can include intangibles like knowledge, language proficiency, thinking skills, data analysis skill, teamwork, and ethics and spirituality (Barhate & Dirani, 2022; (Karzunina, West, Da Costa, Philippou, & Gordon, 2018; Ministry of Education Malaysia, 2013), and tangibles such as performances, and sales (Abbas & Khan, 2017).

Ethics and Spirituality

Ethics consists of appropriate behaviours that seems to be the foundation in one's life (Göçen & Özğan, 2018) while spirituality is considered something that all humans have by heart (Motlagh, Jamali, & Ghoorchian, 2016) and often have positive interdependence with ethics (Göçen & Özğan, 2018; Motlagh et al., 2016). Therefore, ethics and spirituality can be described as a value that influences a person's moral judgement about right and wrong in combination with a firm belief in and submission to the Creator (Göçen & Özğan, 2018; Mohd & Jamta, 2018).

Data Analysis Skill

Data analysis is described as the process of diagnosing and processing an amount of information that has enormous potential of helping the brain to diagnose and process information, incorporate new skills, and have a more accurate sense of what is going on around someone's life (Zeide, 2017). Therefore, data analysis skill can be defined as the ability to collect information, conduct research, and then make decisions (Mikalef, Boura, Lekakos, & Krogstie, 2019) to discover which information has an impact on selected responses (Lin, Lee, Lau, & Yang, 2018).

Teamwork

Teamwork is described as a dedication shared by a group of people who work together to achieve the same goal (Baker, Salas, King, Battles, & Barach, 2005; Sulaiman et al., 2017).

Language Proficiency

Language proficiency can be described as the language skills learned that is often deemed necessary for success in the education system (Kalinowski, Gronostaj, & Vock 2019). Language proficiency also acts as a medium for the exchange of information between people (Mohd Nor et al., 2019).

Thinking Skills

Thinking skills are a vital capacity and can be described as a specific and dedicated process to solve problems and answer questions with questionable facts and knowledge (Ricketts, 2005).



Knowledge

Knowledge is regarded as the foundation of all information in this world, and it is critical that the knowledge received be relevant in order for it to be practical (Abd Rahman et al., 2020; Irawan, Rahardjo, & Sarwanto, 2017). Knowledge can be defined as facts or information, as well as an understanding of anything that one perceives and then rearranges, experiments with, communicates to others, transforms, and finally presents as helpful information to themselves or others (MacLellan & Soden, 2007).

1.8 Organization of Thesis

This thesis will consist of five chapters that include an introduction, main body of report, and conclusions. Chapter one is written about the introduction to the whole research. It described the background of study, issues and problems that contributed to the research, research gaps which is the missing element in the existing literature of similar studies in the past, research objectives and research questions. It also highlights the scope and significance of this study and also the definition of key terms stated in the abstract.

Chapter two explains all of the literature reviews regarding the educational supply chain management concept and its history, developing a professional graduate and the literature review on the theory of EduSC. This chapter also illustrates the EduSC conceptual framework and the hypotheses for this research.

The methodology will be explained in chapter three where all of the methods used for this research are explained. This chapter also includes research philosophies, research design, measurement developments in which the justifications on questionnaire distributions, elaboration on population and sample, research methods, data collection methods, and data analysis techniques will be explained.

Chapter four reveals the outcome and analysis of this study, with data screening process and succeeded by data analysis activities through the use of appropriate statistical techniques. This chapter also includes demographic analysis, assessment of measurement model, and also hypotheses testing results. The result of testing and calculations of hypotheses included in this study will be written, followed by examination of the structural model and the test of the moderating effect.

The conclusions, discussions, limitations of the study, and recommendations for further research will all be presented in chapter five.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presented the discussion of the collection on the writings of authors that is related to the topic in this study. There were not many literatures that can manifest the title of this study as it is, however associated and interconnected content were organized and explained in this chapter. Therefore, the background, reasoning, processes and even current situations of the selected topics like EduSC and professional development success were put in writing. Complex information was inscribed in either diagrams or written in a table to ease understanding on topics related to professional development success through educational supply chain attributes and industrial experience. Theoretical framework is also included complete with explanations together with the underpinning theory.

2.2 Professional Development Success

Professional development success is critical for retaining a high-quality workforce (Cottrell, 2021; Organisation for Economic Co-operation and Development (OECD), 2009). According to Organisation for Economic Co-operation and Development (OECD) (2021), professional development success involves ongoing training, practice, and feedback, with adequate resources and follow-up support. Successful programs inspire employees to work efficiently while also increasing their desire to learn more. On the other hand, Garet et al. (2001) defined professional development success as the favourable outcomes as a result of the quality and effectiveness of a professional's work. Teitel (2001) mentioned that the dedication to continuous professional learning as a method of improving the ability to support other people's achievements was one of the most distinctive features of professional development success.

The term "professional development success" incorporates two fundamental concepts: professional development and success. Professional development encompasses ongoing education and career training post-entry into the labor force, aiming to enhance skills, competency, and career advancement (Antley, 2020; Cottrell, 2021; Mason, 2016). In the 21st century, professional development has evolved with collaborative practices and technological advancements reshaping its implementation methods (McAleavy, Hall-Chen, Horrocks, & Riggall, 2018; Portland Public School District, 2015). Practicality, specificity, and consistency are pivotal for effective professional development initiatives (McAleavy et al., 2018). Opportunities for professional development range from formal engagements like seminars and mentorship to informal activities such as reading professional literature (Jamil, Abd Razak, Raju, & Mohamed, 2011; McDonald & Hite, 2023). Achieving professional development success signifies not only personal achievement but also enhanced professionalism, commitment, integrity, and performance in the workplace, which ultimately impacts productivity and customer satisfaction (Keaton, 2017; Nilugal et al., 2015). This study seeks to explore the connection between educational supply chain attributes, industrial experience, and professional development success in Malaysia, offering insights into aligning educational outcomes with industry demands (Lee et al., 2023; Wahab et al., 2024). Additionally, it aims to address skills gaps identified in various sectors (Al Harrasi et al., 2023; Husin et al., 2023; Syamil Halik Bassah & Asri Mohd Noor, 2023), contributing to the holistic development and employability of graduates in Malaysia's dynamic workforce area.

The nature of some professions, such as medical or health care, physicians, nurses, pharmacists, technicians, and health officers, necessitates professional and continuously developed personnel with professional education to assure proper and safe patient care (Baker et al., 2005). Employees for jobs like accountants, for example, must be professional and consistently developed in order to be efficient and satisfy their customers to keep up with the internalization of the global economy and the emergence of various new information technology (IT) (Klibi & Oussii, 2013). This indicates that the nature of currently available jobs essentially demands professional development success in order for the company's operations to run smoothly in the long run, hence improving the nation's economy status and GDP.

This is why that it has become crucial to synchronize education in an EduSC, starting from primary to secondary, higher education as well as adult education because learning while working has become important in developing professionalism in graduates (Vlasic et al., 2009). Changes and improvements are naturally taking place in educational systems all across the world (Jamil et al., 2011). Students involved in an EduSC need to prepare themselves with certain a set of skills or talents to make sure that they are able to fend for themselves once they graduate. They need to improve their speaking skills, change the way to dress, improving online profiles, have more confidence, and learn something new every day (Nicholos, 2017). Hard skills can be learned in school and vital, but soft skills are what will help push students forward (Zuo, Zhao, Nguyen, Ma, & Gao, 2018) and achieve professional development success. Therefore, measuring one's professional development success is critical in order to ensure that graduates can achieve professional development success by succeeding in professional development success metrics.

To analyse professional development success, measures of change effectiveness must be described and evaluated (De La Harpe, Radloff, & Wyber, 2000; Li et al., 2021). The success of one's professional development can only be evaluated by the difference between before and after being professionally developed. There are numerous metrics that can be used to assess the change. The National Education Policy (NEP) emphasised that education in Malaysia is an ongoing effort to enhance the potentials of individuals in a holistic and integrated manner in order to produce individuals who are intellectually, spiritually, emotionally, and physically balanced and harmonious, based on a firm belief in and devotion to God (Bahagian Perancangan dan Penyelidikan Dasar Pendidikan, 2017). Therefore, the MOE of Malaysia is dedicated to produce individuals who are holistic, balanced, have entrepreneurial traits and exceptional talent, become lifelong learners, and participate in quality technical and vocational programmes (Ministry of Education Malaysia, 2013, 2015, 2018). These characteristics were therefore chosen as indicators for professional development success since professional development success involves continuing education and training to improve one's career. Each indicator for professional development success were listed to be measured by:

1. Holistic, entrepreneurial, and balanced graduates, which is measured by development of physical capabilities, intellectual abilities (Panda, 2017; Sarkar, 2020), cognitive or mental abilities, emotional abilities, and social skills (Sarkar, 2020), ability to meet current needs and predicting future requirements (Boyle et al., 2015; Kumar & Garg, 2017), emotion management (Boyle et al., 2015), sorting priorities, and work-lifestyle balance (Whitener, 2017), knowledge and skill, business created and its success, ability to complete a task successfully, and the lack of fear in taking risks (Holienka et al., 2015).
2. Talent excellence, which is measured by academic achievement, flexible and adaptable, success, self-esteem, empathy, and level of satisfaction and experience (Boyle et al., 2015; Brusoni et al., 2014).
3. Lifelong learner, which is measured by stress management, work performance, education achievements, creativity, and knowledge and skills (Boyle et al., 2015; Conceição et al., 2019; Howe & Goldberg, 2019; Laal, 2011; Vlastic et al., 2009).
4. Quality technical and vocational graduates, which is measured by accreditation, knowledge and education, assertiveness, communication skills, and optimism (Boyle et al., 2015; Ministry of Education Malaysia, 2016; Rainie & Anderson, 2017).

Holistic graduates was defined as the comprehensive and balanced development of students along with high moral standards (Ministry of Education Malaysia, 2016) and holistic development were defined as the development of a child's intellectual, mental, physical, emotional, and social abilities so that he or she can face the challenges and obstacles of everyday life (Sarkar, 2020). It includes the complete development of one's physical, intellectual, emotional, and social skills. Accordingly, entrepreneurial traits are specific personality traits that are common among entrepreneurs, i.e., people who own and manage entrepreneurial companies and are involved in entrepreneurial projects at various stages of development (Holienka et al., 2015; Karim & Said, 2024). Meanwhile, balance is described as a condition in which different things occur in equal proportions or have equal importance. It is important to have a proper balance between fulfilling current demands and predicting future needs (Kumar & Garg, 2017).

Besides that, talent excellence can be described as the characteristic of being very good at a particular or natural ability to perform something well (Cambridge University Press, 2011, 2023). Lifelong learners are people who learn at all phases of their lives, and the learning should be integrated in all of their life contexts, from school to the work, home, and community (Laal, 2011). On the other hand, quality technical and vocational graduates meant that graduates that possess a high level of skill-based ability, knowledge, and education (Ministry of Education Malaysia, 2015).

2.3 Educational Supply Chain (EduSC)

The term ‘supply chain’ is mostly common in manufacturing businesses where each party in the chain receives inputs such as raw materials from suppliers, processes or manufacturing those inputs, and then distribute products by transporting and delivering them to customers (Habib & Jungthirapanich, 2008; Mahdiraji, Arabzadeh, & Ghaffari, 2012; Van der Vost, 2004) as illustrates in **Figure 2.1**. It is defined as a network of organizations involved in an operation that produces values in the form of product or services to be delivered to customers that are linked by upstream and downstream relationships (Habib & Jungthirapanich, 2009). This is because that business can no longer work solely as one entity but rather in a supply chain (Van der Vost, 2004) and most organizations must be at least in one supply chain system. A good supply chain must be established to ensure that businesses run smoothly without giving out any problems on any side in the supply chain as today’s business market increasingly competes versus each other as in “supply chain vs supply chain” (Ashby, Leat, & Hudson-Smith, 2012).

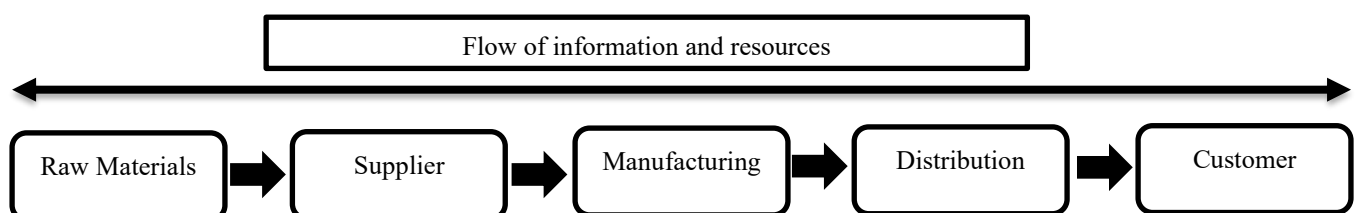


Figure 2.1: A Given Supply Chain

Source: Adopted from Mahdiraji et al. (2012) and Van der Vost (2004)

A supply chain was also expressed as a set of three or more establishments explicitly involved in the upstream and downstream flow of products, information, and services while Mahdiraji et al. (2012) wrote that supply chain is a system of powerful set of resources, product, and information flows in different levels that exists to meet the needs of the customers and satisfy their requirements. However, Hami, Yamin, Shafie, Muhamad, and Ebrahim (2018) claimed that a supply chain is managed by running closed-loop production to ensure the sustainability of business entities. In addition, there are a few more definitions defined by many researchers each according to the context of their own different studies which are classified as in **Table 2.1**.

Table 2.1: Different Definitions for Supply Chain in Different Studies

| Sources | Focus of study | Definitions |
|--|----------------|--|
| Habib and Jungthirapanich (2009b) | Education | Network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer. |
| Mahdiraji et al. (2012) | Management | Dynamic set of information flow, product, and capital in different levels, in which the customer is only an engaged and internal part of this chain. |
| Pirttilä, Virolainen, Lind, Finance and Kärri (2020) | Finance | Concerns all supply chain objects: the flow of goods, information, and finance; processes; current and fixed assets; and the personnel involved in the supply chain. |
| Choi and Luo (2019) | Fashion | Considered as selling a product at a single period. |

In Malaysia, the working population are classified into three sector which are agriculture, industry, and services (Institute of Labor Market Information and Analysis (ILMIA), 2017). Since education is a part of the service sector, it is depicted differently from manufacturing businesses in that its outputs or products, such as knowledge, are intangible (Habib & Jungthirapanich, 2008), and might be difficult to be determined (Habib & Jungthirapanich, 2009a; Habib & Hasan, 2019). An educational supply chain (EduSC) is similar to the conventional supply chain in that it is an interconnected system that involves a set of resources, products, and information flow at different levels to meet the demands or requirements of customers (Mahdiraji et al., 2012), except that the stakeholders involved are students, parents, government, and educational institutions. In this supply chain, raw materials are described to be students as well as internal and external projects, the ‘manufacturing’ processes happened in the

university, and finished products are stated to be graduates and research outcomes (Habib & Jungthirapanich, 2008). The process that is involved would be educational-related activities or tasks. To understand this supply chain better, Habib and Jungthirapanich (2008) illustrated a holistic view of an EduSC which can be shown in **Figure 2.2**.

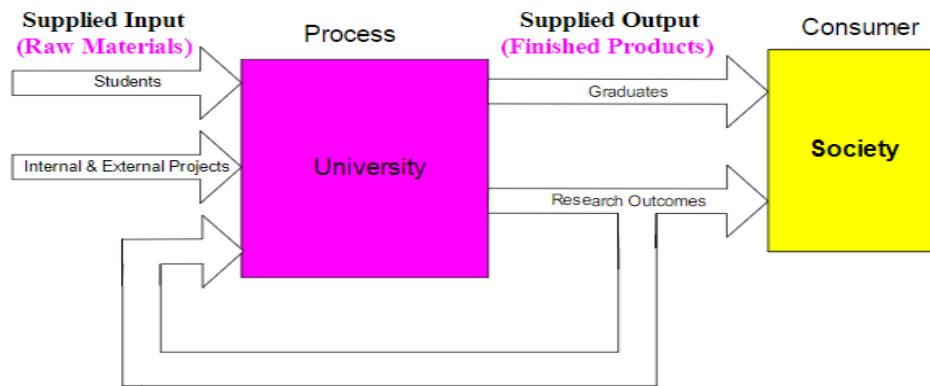


Figure 2.2: Holistic View of EduSC

Source: Adopted from Habib and Jungthirapanich (2008)

Then, Lee et al. (2018) developed a conceptual framework for EduSC that includes management of the flow of students, information, and funds as shown in **Figure 2.3**. In an EduSC, the upstream of an educational supply chain is referred to the flow of students, information, and funds that begin from the first stage of formal education (i.e., kindergarten and pre-school) until primary school, secondary school, and higher education (Lee et al., 2018). Whereas the downstream of the educational supply chain relates to the process of delivering graduates into the working industry or to the real world as a self-working entrepreneur. Parent's participation and other sentiments are also involved in the EduSC due to their direct link to the supply chain. Parents are considered to play a substantial role in the educational supply chain because they spend longer time with their children rather than the time the children spend in school (Lee et al., 2018). In addition, one of the main providers in educational processes can be the customers themselves, such as teachers and lecturers, in educational institutions. They provide or deliver knowledge to students while also receiving inputs from educational institutions on curriculum and courses to teach. Therefore, Habib and Jungthirapanich (2008) expressed EduSC as bi-directional, with production flowing in both directions, upstream and downstream.

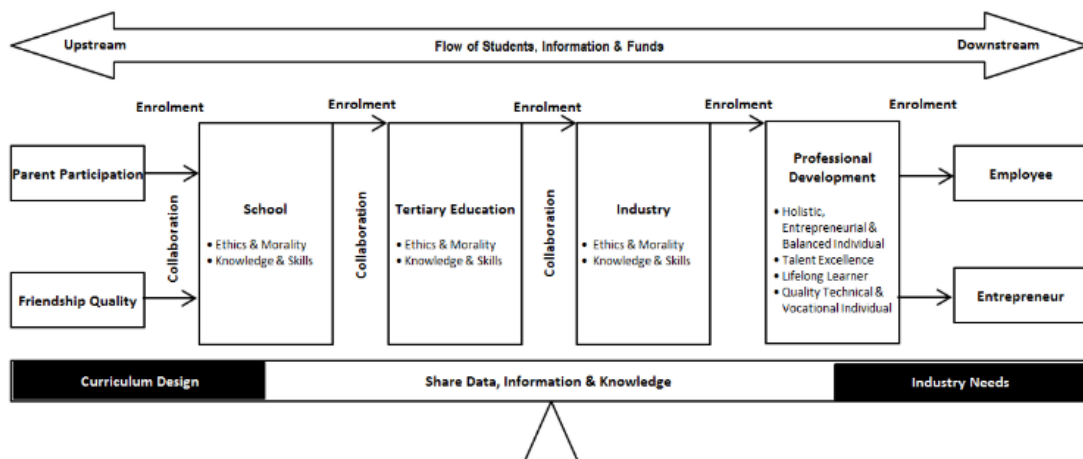


Figure 2.3: Conceptual Framework of Educational Supply Chain Management

Source: Adopted from Lee et al. (2018)

Previously, O'Brien and Deans (1996) defined an EduSC as a notion in which a university develops an appropriate curriculum for students in close collaboration with schools, further education colleges, students, university employees, and employers of its graduates. The process of students moving through an EduSC was shown by Bell (2014) in **Figure 2.4**. The model of EduSC first developed by Habib and Jungthirapanich (2008) recognized many providers, multiple customers, service providers, and the end consumer of the EduSC. This model has become the starting reference for this study as some parts from it are adapted to the model of this study.

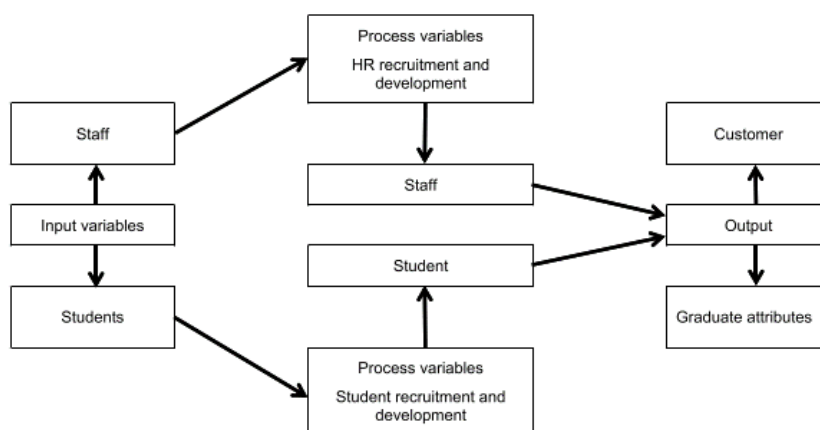


Figure 2.4: Process of Students in an EduSC

Source: Adopted from Bell (2014)

According to Habib and Hasan (2019), one of the key objectives of an EduSC is to improve the welfare of the end customers, which in this study's context are the graduates. To fulfil the objectives, educational institutions should have a basic understanding of their supply chain partners, which include suppliers, customers, and consumers (Habib & Jungthirapanich, 2009a). EduSC was being made reference to the concept of adapting industry models to higher education (Habib & Jungthirapanich, 2009b). It is also regarded as an educational institution's portrayal of a supply chain management paradigm, as well as a tool for strategic planning in tertiary education (Habib & Jungthirapanich, 2009).

Nowadays, the EduSC is overwhelmed with new institutions offering diverse specialization to cater to a wide range of students (Abbas & Khan, 2017). It resulted in the depletion of critical intangibles seen as essential criteria for entry into the professional industry. Therefore, graduates must realize the crucial intangibles that are appropriate for themselves while also being appropriate for the available professional work in the labour market that caters to the customers of an EduSC (Bell, 2014). Malaysia's MOHE recommended in a 2013 report that for students to be competitive in the global market, they must have the following characteristics or attributes: knowledge, thinking skills, leadership skills, bilingual proficiency, ethics and spirituality, and national identity (Ministry of Education Malaysia, 2013).

However, given today's ever-changing labour market and work - related trends, this study would like to propose that leadership skills and national identity be replaced by attributes such as data analysis skill and teamwork. The reason for this change is based on studies by Karzunina et al. (2018), Ministry of Education Malaysia (2018), Hassandarvish (2020), Antley (2020), and many more researchers as stated in **Table 2.2**. Karzunina et al. (2018) especially highlighted the ten core skills considered important by employers particularly in the Asia Pacific region along with the support of many other literatures. The Malaysia Education Blueprint annual reports from 2015, 2016, and 2018 provided the basis for the first literature review. Problem-solving, communication, language competency, and technological literacy were the most frequently highlighted attributes in those reports. The literature review was then conducted again to search for similarity between the attributes needed in an EduSC by employers for the proposal to replace leadership skills and national identity with data analysis skills and teamwork. The

reasons for these changes are related to the research problem of graduate mismatch described in Chapter 1 in that current graduates' skills differ from what employers look for in job candidates, making the problem of skills mismatch even more significant.

Table 2.2: 10 Core Skills Needed By Employers in Asia Pacific Region

| Core Skills | Literature |
|--|--------------------------------|
| Problem-solving | 2, 3, 8, 10, 18, 21, 23, 27 |
| Teamwork | 8, 10, 12, 15, 20, 22, 24 |
| Communication | 2, 3, 5, 8, 10, 12, 20, 21, 29 |
| Adaptability | 4, 5, 8, 10 |
| Data analysis | 9, 10, 14, 16, 25 |
| Subject knowledge | 22, 29, 30, 31 |
| Thinking skills (critical thinking, logical thinking, creative thinking, strategic thinking) | 9, 18, 22, 26, 27 |
| Language proficiency | 1, 2, 3, 6, 7, 13, 17, 19, 22 |
| Technology literate | 1, 2, 3, 4, 8, 18, 20, 29, 31 |
| Ethics & spirituality | 11, 28, 32, 33 |

Source: Adapted from Karzunina et al. (2018)

Note: 1=Ministry of Education Malaysia (2018); 2=Ministry of Education Malaysia (2015); 3=Ministry of Education Malaysia (2016); 4=Star Media Group Berhad (2020); 5=Abd Rahman et al. (2020); 6=Buchanan (2017); 7=Darmi (2013); 8=Hassandarvish (2020); 9=Irawan et al. (2017); 10=Karzunina et al. (2018); 11=Keaton (2017); 12=Klibi and Oussii (2013); 13=(Lee, K. L. et al., 2018); 14=Maclellan and Soden (2007); 15=Sulaiman et al. (2017); 16=Misni, Nik Mahmood, and Jamil (2020); 17=Mohd Nor et al. (2019); 18=Morrison (2006); 19=Muhamad (2020); 20=Sohaimi and Senasi (2020); 21=Sohel-Uz-Zaman and Anjalin (2016); 22=Thomas (2019); 23=Vlasic et al. (2009); 24=Volkov and Volkov (2015); 25=Zeide (2017); 26=Roslan, Ping, Sulaiman, Jalil, and Yan-Li (2020); 27=Meyer and Wurdinger (2016); 28= Mason (2016); 29= Organisation for Economic Co-operation and Development (OECD) (2009); 30= Antley (2020); 31= Barnard (2021); 32= Göçen and Özğan (2018); 33= Mohd and Jamta (2018)

2.4 Educational Supply Chain Attributes

Attributes can be defined as characteristics and features of someone or something. One of the primary purposes of an educational supply chain is to increase the end customer's social well-being (Basu, Jeyasingam, Habib, Letchmana, & Ravindran, 2017; Pathik, Chowdhury, & Habib, 2012). Due to the proposition by O'Brien and Deans in 1996 where educational supply chain can be used as a tool for strategic planning in tertiary education, therefore, the chain's attributes should be utilized by everyone

involved in the EduSC. However, Habib (2010) stated that the attributes must lean towards the stakeholders in an EduSC. The stakeholders that are distinctly noticeable in an EduSC were recognized to be students, educators, educational institutions and the society (Habib & Jungthirapanich, 2008, 2009a).

Abbas and Khan (2017) describes attributes for an EduSC should be intangibles such as good communication skills, good knowledge of the world's happenings, good command over subjects, reasonable analytic skills, and a pleasant personality. According to their findings, through the use of Analytical Hierarchy Process (AHP), communication skills come first in an EduSC, followed by analytical and decision-making skills. Lau (2007) pointed out that information synchronisation and visibility can also be features of an EduSC, and their misuse might affect the performance of an EduSC. Lau (2007), and Lin (2022) even revealed that outsourcing is also one of the important features to an EduSC as it is hard for an institution to process everything in-house and there are still no researches in the area that studies outsourcing as one of the features in EduSC.

Malaysia's Ministry of Higher Education (MOHE) recommended in a 2013 report that for graduates to be competitive in the global market, they must have the following characteristics or attributes: knowledge, thinking skills, leadership skills, bilingual proficiency, ethics and spirituality, and national identity (Ministry of Education Malaysia, 2013). However, following the 21st century working trends and environment, this study proposed that two of the Ministry of Education's (MOE) suggested attributes (national identity, and leadership skills) be replaced with data analysis skill and teamwork. The replacement was necessary due to the literature review done on the topic as other skills were deemed more important by employers particularly in the Asia Pacific region. Data analysis skill replaced national identity as it can empower students, boost success and engagement, and allow for more effective administration (Li et al., 2023; Zeide, 2017). Data-driven education was believed to have the potential to bridge success, engagement, and disciplinary gaps, allowing students to succeed in their careers. Data analysis skill also enables the identification of patterns, trends, and noteworthy information that can be used to solve problems and make business decisions (GTI Futures Ltd., 2021). Meanwhile, teamwork, that replaced leadership skills in the MOE's suggested attributes, can lead to fewer workplace errors, higher levels of satisfaction among employees and customers, and possibilities for professional development (Polega

et al., 2019). The emphasis on teamwork has the potential to transform how professionals work and one's own career success. This is consistent with the dependent variable used for this study which is professional development success. Therefore, this study proposed six attributes to represent an EduSC based on the literatures listed in **Table 2.3**. Due to the geographical scope of this study is Malaysia, not all of the attributes described in those literatures can be included in this study. As a result, the attributes specified are significantly adapted from Ministry of Education Malaysia (2013), given that the EduSC focused on in this study is Malaysian EduSC.

Table 2.3: Recognition and Demand of Attributes Chosen for This Study

| Attributes | Literature |
|-----------------------|-------------------------------|
| Ethics & spirituality | 9, 24, 28, 29 |
| Data analysis | 7, 8, 12, 14, 21 |
| Teamwork | 6, 8, 10, 13, 18, 19, 20 |
| Language proficiency | 1, 2, 3, 4, 5, 11, 15, 17, 19 |
| Thinking skills | 7, 16, 19, 22, 23 |
| Knowledge | 19, 25, 26, 27 |

Source: Adapted from Karzunina et al. (2018) and Ministry of Education Malaysia (2013, 2015)

Note: 1=Ministry of Education Malaysia (2018); 2=Ministry of Education Malaysia (2015); 3=Ministry of Education Malaysia (2016); 4=Buchanan (2017); 5=Darmi (2013); 6=Hassandarvish (2020); 7=Irawan et al. (2017); 8=Karzunina et al. (2018); 9=Keaton (2017); 10=Klibi and Oussii (2013); 11=(Lee, K. L. et al., 2018); 12=Maclellan and Soden (2007); 13=Sulaiman et al. (2017); 14=Misni et al. (2020); 15=Mohd Nor et al. (2019); 16=Morrison (2006); 17=Muhamad (2020); 18=Sohaimi and Senasi (2020); 19=Thomas (2019); 20=Volkov and Volkov (2015); 21=Zeide (2017); 22=Roslan et al. (2020); 23=Meyer and Wurdinger (2016); 24= Mason (2016); 25= Organisation for Economic Co-operation and Development (OECD) (2009); 26= Antley (2020); 27= Barnard (2021); 28= Göçen and Özğan (2018); 29= Mohd and Jamta (2018)

In a study by Lee et al. (2018), the researchers stated that student performance should be measured throughout the learning process in all aspects, including ethics and morality, as well as knowledge and abilities. Employers of graduates have indicated a need for a focus on critical skills to supplement disciplinary expertise, and educational research has shown that such skills are most effectively taught in the disciplinary setting (De La Harpe et al., 2000). According to Karzunina et al. (2018), the top five essential qualities that companies look for in their employees are problem-solving, teamwork, communication, adaptability, and interpersonal skills. Mohd and Jamta (2018), and Suib and Said (2017) emphasised the relevance of ethics and spirituality in the service industry

and workplace, while Zeide (2017) provided numerous examples of how data analysis skills empower students. According to the Ministry of Education Malaysia (2015), communication, creativity, technological literacy, and critical thinking skills are important for students' development, whereas according to the Ministry of Education Malaysia (2018), higher order thinking skills (HOTS), technical skills, and soft skills are more important in the 21st century learning environment.

Therefore, based on the above discussions, it can be concluded that attributes such as ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge are the best attributes that can be taken for measurement in this study. There is limited literature that discusses the exact EduSC attributes in which most researchers did not clarify on specific attributes that contribute to an EduSC. However, there has been a spurt in the research whether in practice or theory in the integration of management characteristics into a supply chain (Janvier-James, 2011).

2.4.1 Ethics & Spirituality

Ethics is described as the disciplined study of what is good and evil, as well as the study of morality and immorality (Mohd & Jamta, 2018). Ethics may also be defined as a person's moral judgements on what is right and wrong (Mohd & Jamta, 2018). The relevance of ethics in business and management is a growing problem and can be a controversy at every level of the supply chain. The top management is concerned with ethics in mainly legalities, policies, and regulations. The middle management is concerned with ethics in business processes and operations, while the bottom-level staff are frequently concerned with day-to-day activities. In all of the ethical standards that exists, a few of them include ensuring that no entities are harmed, keeping an eye out for any misleading facts or false reports, respecting the privacy of the person or groups concerned, transparency and honesty, informed consent required, and defending and maintain privacy, confidentiality, and anonymity (Bell, 2014).

In educating students, related personnel must also rely on knowledge, experience, and ethics for an effective education (Habib & Jungthirapanich, 2009). According to the (Ministry of Education Malaysia, 2016, 2018), the ultimate goal of education is to provide students with information and awareness, bilingual proficiency, ethics and spirituality,

and a solid national identity. According to Bell (2014), due to the hybrid characteristics and values of the service sector, sales or the end product of a service industry supply chain depends more on ethics. Vlasic et al. (2009) has put in writing that for the success of total quality management, ethics are among the first components required to be applied. Basic code of ethics must be implied and followed to ensure sensible work culture and legal activities.

Abiding ethics and righteousness produce strong professionalism skills and high moral values as well as disciplined citizens (Jamil et al., 2011; Nilugal et al., 2015). Abbas and Khan (2017), and Pathik et al. (2012) have also studied on the important intangibles or critical attributes for work forces and concluded that many literatures have listed ethics as one of the important intangibles in a workforce. Mohd Zain, Aspah, Mohmud, Abdullah, & Ebrahimi (2017) have also stressed that ethics and high personal moral values are crucial to realise the national goals. Since 1988, the Malaysian government has been mending policies focused on boosting output quality and quantity to fulfil worker demands, as well as producing disciplined individuals with high moral values and good work ethics (Jamil et al., 2011). To meet the government's requirement for a high-quality workforce, people must be trained to be ethical from an early age. On the other hand, spirituality gives the meaning of a view into a person's life and it is generally related to religion (Göçen & Özğan, 2018). According to Göçen and Özğan (2018), spirituality is described as the desire to form meaningful relationships with one's inner-self, others and the divine through faith, hope and love while McGhee and Grant (2008) expressed spirituality as the relationship between individuals and modern pluralistic places.

There are a lot of discussions and researches on the relationship between ethics and spirituality. Motlagh et al. (2016) stated that spirituality and ethics influence people's decision-making and performance. Since spiritual values affect one's attitudes, decisions, and perceptions, it has been shown that a person's behavioural characteristics, spiritual values, morals, ethical behaviour and business are significantly linked (S. E. Anderson & Burchell, 2021). As a result, since ethics is essentially the application of ordinary moral or ethical norms, people are inspired to understand, practise, and apply spiritual ideals and virtues in their daily lives (Agbim et al., 2013).

Furthermore, Mohamed, Karim, and Hussein (2014) explored the relationship between Islamic work ethics (IWE) and individuals' attitudes regarding computer use ethics, job satisfaction, and organisational commitment. Their research discovered that IWE in a university setting is related to individuals' attitudes regarding computer use ethics, job satisfaction, and organisational commitment (Suib & Said, 2017). Meanwhile, Motlagh et al. (2016) stated that components of ethics and spirituality include spiritual culture, transcendence experiences, internal excellence, and spiritual leadership. Hence, students' work and experience can be used to assess the impact of ethics and spirituality on students' social and professional lives (Anderson & Burchell, 2021; Vlastic et al., 2009). This indicator is the key measure for a high-quality education. Moreover, the code of ethics students learn at university and the spirituality trait they develop while studying can increase self-awareness and improve personal interaction, and later in life when they are working, they are able to recognise wrong from right and behave accordingly. In conclusion, to determine whether ethics and spirituality are still relevant in the workplace in 2021, indicators such as a person's performance (Motlagh et al., 2016; Vlastic et al., 2009), decision-making ability (Motlagh et al., 2016), moral conduct (Agbim et al., 2013; Currier et al., 2023; Jamil et al., 2011; Mohd Zain et al., 2017; Nilugal et al., 2015), organisational commitment (Panda, 2017; Suib & Said, 2017), and perceived code of conduct (Agbim et al., 2013; Panda, 2017) need to be considered.



2.4.2 Data Analysis Skill

Data analysis skill is the ability to explore information, facts, and statistics and many times that it is linked to one's intelligence level. With data analysis, underlying problems can be exposed and further solved to facilitate a better world. According to Lau (2007), data analysis is one of the direct services in the EduSC which shows the importance of this skill in the services sector and also in an EduSC.

Zeide (2017) showed that the application of this skill in real-world situations revealed the issue of inequitable allocation of basic education funding in Pennsylvania. At the same time, data analysis was demonstrated to have a strong ability in delivering concepts to students in learning, preparation for the learning process, and has supported the facilities in Indonesia (Irawan et al., 2017). An individual's data analysis ability can

also improve planning (McAleavy et al., 2018) when the individual analyses data and information gathered from research or observations. The knowledge would then be applied to the planning process, which would later benefit the individual. According to an article written by GTI Futures Ltd. (2021), data analysis is used in various jobs such as solicitors, marketing executives, data analysts, and insurance underwriters, where this skill is used to analyse situations and decide what type of decisions to make.

This skill can also aid in success and retention, as well as facilitation and information sharing (Zeide, 2017). According to Lin et al. (2018), data analysis helped in determining which factors have an effect on the strategic response and whether their interactions are positive or negative. This skill was even listed as one of the core skills needed in the 21st century by Karzunina et al. (2018). Even Mahmood (2012) wrote that data analysis can also reveal some interesting issues. And to support this statement, Zeide (2017) revealed that data analysis skill has exposed how minority students were disproportionately affected by the zero tolerance discipline policies.

One of the criteria that can be used to measure and determine the quality of students' data analytic skills is computer literacy skill (Currier et al., 2023; Wallace & Clariana, 2005). This is because a student's proficiency level can be judged by their ability to utilize a computer. Furthermore, student success can be utilised to evaluate the effectiveness of data analysis skills (Irawan et al., 2017; Zeide, 2017). Academic or career success, student trajectories, or better retention can all be regarded as student success (Zeide, 2017). The trajectory of students over time demonstrates how well students are prepared for the next step in the learning process.

In addition, students' academic achievement can also demonstrate their ability to apply data analysis skills in real life. This is because when students analyse facts and information in their daily lives, they increase their knowledge and have successful academic accomplishment. In addition, decision-making abilities can also be used to measure data analysis skill. Graduates who can effectively and analytically analyse data are able to make better decisions on potential challenges since they can scan and analyse the whole picture and make decisions to address the issues. Aptitude tests are normally used to assess one's ability to analyse a situation and make a judgement (GTI Futures Ltd., 2021). The tests are made to assess the ability to complete tasks and it is available online, making it relatively easy for anyone to participate.

2.4.3 Teamwork

Teamwork is defined by de Sousa Jabbour, Jabbour, Foropon, and Filho (2018) and Sulaiman et al. (2017) as a group of individuals who collaborate cooperatively and interdependently to achieve a common goal. Teamwork is not an immediate result of locating individuals together, but it is dependent on the desire to collaborate with a common purpose and therefore does not necessitate that team members work together on a continuous basis (Anderson et al., 2021; Baker et al., 2005). Baker et al. (2005) also stated that dedication is what keeps things going on.

Many researchers agreed that teamwork is one of the most important skills in the globalized world culture. Teamwork is a critical soft skill, especially for students to add values, develop creative thinking, build self-confidence and improve interactions with others (Sulaiman et al., 2017). Alrifia and Raju (2019), and Klibi and Oussii (2013) revealed that graduates must equip themselves with soft interpersonal skills (communication skills, problem solving skills, and teamwork), and also hard skills (project management skills, and computer skills). For the sake of finishing the assignments or tasks given, students need to learn on how to work well together despite any differences. Misni et al. (2020) even revealed that the most frequent employer complaints concerning fresh graduates was that they lack teamwork, decision-making, and self-learning abilities.

Therefore, a study by Sulaiman et al. (2017) revealed that teamwork skills must be combined with other necessary soft skills in order to maximise their effect on teaching and learning methods. And according to Vlasic et al. (2009), teamwork can cause the success of total quality management. This is an important point to be kept in mind that for a quality output moving out a supply chain, a tremendous amount of joint effort is needed to ensure quality products are being delivered to customers. De Sousa Jabbour et al. (2018) framed teamwork as one of the successful critical factors between the synergy of industrial revolution 4.0 (Industry 4.0) and ecologically-sustainable manufacturing. Teamwork was also revealed to be widely recognized as one of the important factors in providing healthcare (Anderson et al., 2021; Baker et al., 2005). This is because, in the process of ensuring a patient's safety, and the plan of recovery, teamwork becomes critical as professionals need to work together in a defined manner and work towards the same goal.

In light of its significance, Australian universities have frequently claimed that teamwork is a required graduate trait (Strode et al., 2022; Volkov & Volkov, 2015). More industries have required job-seekers to be equipped with notions of teamwork so that they have no problem working together in groups of people with different backgrounds and goals. For a jobseeker to be hired by employers, teamwork was placed as second in the ranking of its importance for employers to hire workers in Malaysia and teamwork is also ranked as one of the top ten most critical skills recognized by business executives in United States (US) (Ting et al., 2017).

In order for teamwork abilities to be measured and have credibility, team performance metrics must be combined with individual and team-level performance and competencies in order for the results to be trustworthy and valid (Baker et al., 2005). Other than that, communication skills can also be used to assess the value of teamwork. These skills are very crucial when working in a team (Alrifa & Raju, 2019; Klibi & Oussii, 2013; Sulaiman et al., 2017). Therefore, team members should have improved communication skills in order to communicate better and give out important information. Communication, conflict resolution, and negotiating skills are among the skills developed through teamwork to enhance adaptability (Volkov & Volkov, 2015).

Besides, the ability to solve problems through teamwork is also an important component of the educational supply chain traits (Feng, Audy, Rönnqvist, & D'Amours, 2020) that can be used to measure the value of teamwork. Students can gain additional knowledge from team members while also learning to solve HOTS challenges by incorporating team members in the supply chain. On top of that, teamwork can also be assessed by the accountability from team members. Accountability in this context includes factors such as punctuality, thorough preparation, and focus (Thompson, 2018). A greater feeling of taking responsibility allows members in a team to work better together, resulting in better outcomes. In addition, the number of goals achieved can also display teamwork performance because only by working together can more goals be accomplished, and the process of achieving those goals exhibits stronger collaboration.

2.4.4 Language Proficiency

Language proficiency is a measure of how well someone has mastered a language (Cameron School of Business, n.d.; Faez et al., 2021; Van Wonderen & Unsworth, 2020). It is divided into four areas: reading, writing, speaking, and listening. There is a lot of literature that stressed on the importance of language proficiency. The ability to read, write, speak, and listen is very important to humans and with the increase of interactions made with a variety of people, it has become crucial nowadays that each person must at least be bilingual. One must master the mother tongue and another language which at least should be English. This is because English has become the most commonly spoken language in the world, and it is primarily utilized in trade and business (Buchanan, 2017).

Ting, Marzuki, Chuah, Misieng, and Jerome (2017) revealed that an outstanding level of English proficiency is required for strong communication skills. Buchanan (2017) identified five reasons why English has become today's worldwide language which are because of the spread of the British Empire, the post-war United States of America (USA), the coolness factor, the development of technology, and the snowball effect. Ting et al. (2017) also disclosed that employers in the Malaysian private sector are more prominent to hire workers with better language proficiency and communication skills especially in customer service and marketing. In addition, language proficiency is also ranked as one of the most important skills for graduate employability (Ting et al., 2017).

However, not all people can easily learn other language besides the spoken language at home. Kalinowski et al. (2019) showed evidence that some language learners have difficulties in learning a language mostly in the academic terms of that language compared to the normally spoken language. Ting et al. (2017) has also expressed that work performance and self-esteem can be affected when people lack communication skills and language proficiency. Professional development success might also be seriously compromised, particularly for non-native English speakers, making it an urgent priority to improve educators' quality (Tabatabaee-Yazdi, Motallebzadeh, Ashraf, & Baghaei, 2018). Moreover, language proficiency was also shown to have an impact on academic success (Kalinowski et al., 2019). Therefore, it is crucial that all working personnel acquire language proficiency so that professional development is not adversely affected and success in career and life could be achieved.

To measure one's language proficiency, the understanding of the language and ability to speak, read, write, and understand the context of the language can be measured (Mohd Nor et al., 2019; Ting et al., 2017). The demonstration of knowledge and ability to use a language can show one's ability to use the language in real life (Kalinowski et al., 2019; Mohd Nor et al., 2019). Besides that, language proficiency can also be measured by acquiring certifications in certain certified organizations which shows the individual's language level.

Language competency can also be tested using the foreign language classroom anxiety scale (FLCAS), which was established by Horwitz, Horwitz, and Cope in 1986 and has been used to assess students' levels of anxiety during language learning in classrooms (Darmi, 2013; Gullifer et al., 2021). A 5-point Likert-type scale was used and further analysed using Statistical Package for Social Science (SPSS) software to calculate student's ability to absorb the lesson and language by calculating their anxiety level when learning a language (Darmi, 2013). The lower the level of anxiety among students about learning a language, the more at ease they can be in the classroom, consequently increasing engagement. Being fluent in multiple languages might also make it easier to translate one language to another. This would result in a better understanding of different languages as well as the cultures involved. It is difficult to translate languages if the language is not one's native language, hence being able to quickly translate one language to another can also reflect one's level of language proficiency.

2.4.5 Thinking Skills

Thinking skill is the ability to have an opinion that reflects and contemplates on a problem to solve it. Every human has thinking skills and each person uses it for different reasons. It is even categorised into skills such as critical thinking skill, and HOTS, as it can cause different results. It has been considered as fundamental to anyone who is learning.

According to Lai (2011), educators have long recognised the importance of thinking skills, particularly critical thinking skills, as a result of student learning. A study by Seyithan (2015) has also stated that educators with effective thinking skills can create a positive learning environment, which can contribute to student success. Quality

educators are necessary to foster critical thinking skills in students (Seyithan, 2015). Thinking skills are also important to students for them to evaluate every instruction given to them at any given time (Irawan et al., 2017). Students need to upgrade their thinking skills every time they move up one grade for them to prepare for livelihood outside of school. This skill has also been found to be a fundamental component in developing a leader despite the fact that empirical research on the relationship between critical thinking skills and leadership does not exist (Ricketts, 2005).

Critical thinking skills was argued by one side of researchers that the skills can be taught in a broad sense while the other side of researchers argued that thinking skills cannot go beyond certain subjects (Lai, 2011). As stated by Rodzalan and Saat (2012), critical thinking skills can be built up by assigning students with multiple tasks at one time during learning. And according to Lai (2011), the researchers even argued that the abilities to think critically are beneficial to everyone, instead for just the talented. Critical thinking skills are now more valuable than ever due to technological advancement and the demand for work skills changes (Irawan et al., 2017). Understanding critical thinking means acknowledging the skills that are constantly being developed (Indah et al., 2022). Improving critical thinking through learning processes is an effort to tackle problems that occur in school or in the real world (Irawan et al., 2017). The key attitude that can help with critical thinking is the exchange of ideas in small group discussions.

HOTS is another quality that students should acquire through teaching and learning (Retnawati, Djidu, Kartianom, Apino, & D. Anazifa, 2018). In addition, creative thinking skill and critical thinking skill are also included in HOTS. According to Turner (1995), some motivation research stated that difficult or hard tasks, particularly those emphasising HOTS, may be more motivating to students than easy tasks that can be completed by automatic application of a predetermined algorithm (Lai, 2011). This is due to the fact that challenging tasks need students to think critically and at different perspectives in order to tackle the difficult problems rather than simply answering the question. Moreover, according to Retnawati et al. (2018), HOTS is assessed by tasks such as analysing, evaluating, and producing conceptual and procedural knowledge, also known as metacognition. This indicates that familiarising students with HOTS activities is critical to prepare them to solve new problems, acclimate to a new environment, and make decisions about a specific topic. Employers are now also searching for employees

who have HOTS in order to be able to address any incoming problem with logical reasoning and efficient decision making (Roslan, Ping, Sulaiman, Jalil, & Yan-Li, 2020).

To measure the thinking skills, a few items can be looked at such as the ability to solve normal and HOTS problems. When it comes to testing HOTS, Bloom's taxonomy for information processing skills is one of the most often acknowledged tools for educational practitioners (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). It is structured in a hierarchical manner, with "comprehension" at the bottom and "assessment" at the top. At first, one needs to thoroughly comprehend or understand the problems and distinguish what is familiar and what is strange. The problems are then reconstructed in such a way that the individuals tackling the problems can make decisions about how to solve the problems. This is when the term "assessment" comes into the picture. After the methods for solving the problems are chosen and applied, the problems can be solved.

Aside from that, students' ability to solve HOTS challenges can also be used to assess their thinking skills. When students can solve high-level questions or problems, they may be able to tackle any level of question or problem, and it allows students to acquire metacognitive skills for learning (Pin et al., 2020). Moreover, Pin et al. (2020) also stated that it is critical that students have strong confidence in acquiring this talent in order to bridge the gap between education and the development of thinking skills. One's thinking abilities can also be judged by their level of general intelligence. It was said in an article titled "How are thinking skills tested?" by Age UK Group (2020), that certain people normally have better cognitive abilities than others, and it was confirmed that those who do well in one thinking skill would also do well in other thinking skills. It is essential that different forms of tests are applied to determine someone's thinking ability because, in general, people differ in specific thinking skills (Age UK Group, 2020).

2.4.6 Knowledge

Knowledge is the information gained through experience or education, as well as the comprehension of a certain subject. As people say, knowledge is power. Thus, acquiring knowledge would involve lots of time, energy, and money. Everything that runs and functions in this world requires knowledge. Knowledge can be acquired through

either formal or informal learning (Johnson, 2019). Formal learning is a type of education in which students follow a curriculum created by educational institutions and their progress is monitored through standardised tests or other forms of assessments. Meanwhile, informal learning refers to knowledge acquisition that occurs outside of a structured and formal classroom setting (Johnson, 2019). Knowledge can also be obtained by reading a lot of reference books and literature, or simply by exchanging thoughts and ideas (Retnawati et al., 2018). What's more, knowledge can also be learned by watching videos, self-studying, reading articles, or even playing games (Johnson, 2019).

In school, knowledge is applied when students work in groups and communicate with each other to better understand the theory (Meyer & Wurdinger, 2016). Acquiring technological knowledge allows researchers to operate machines, purchase high-tech goods, and share their knowledge with others (Lau, 2007). Even educational institutions require a certain degree of knowledge to enhance partnerships with related partners (Habib, 2014). According to Fatahi, Darijani, and Taboli (2016), depending on today's knowledge-based economy, human resources have become a precious and crucial competitive advantage in the corporate sector. Thus, relating to the context of this study, Clement and Murugavel (2018) stated that knowledge has become one of the most important aspects for employability.

For higher education, knowledge is described to be the addition in the academic and non-academic field (Lau, 2007). In the 21st century education environment, knowledge, skills, character and metacognition are stated to be the key issues (Retnawati et al., 2018). Educators must be knowledgeable about techniques, strategies, and approaches for training students to be exceptional. Students need knowledge, ability, and analysis to solve problems in everyday life (Retnawati et al., 2018). Diversity in knowledge can broaden the range of perspectives and ideas that people can use to innovate (Edmondson & Harvey, 2018). Meanwhile, boundaries for knowledge can be explained by differences in language, interpretation, or interests, as well as separation and disparity.

Knowledge learned can be tested logically through tests. Students take exams to see how well they remember and understand their school lessons, and adults take exams to see how well they perform in real life. While standardised testing of factual knowledge and practical abilities is popular, educators are increasingly aware of its limitations

(Wijnen-Meijer et al., 2013). Academic achievement can also be evaluated to test knowledge, with students' exam performance serving as a key and representation of the knowledge that they possess (Gopalakrishnan, 2014). According to Chansamut and Piriya-surawong (2014), ability and skills can also be the measurements for someone to work efficiently to produce outputs and be highly competitive. In addition, certifications, together with continuous training, can demonstrate someone's abilities and talents to acknowledge and validate knowledge learned (Wallace & Clariana, 2005) and later, illustrate their professional development success. General intelligence can also be used to demonstrate someone's knowledge. The ability to demonstrate general intelligence when required demonstrates their level of knowledge. For example, in an emergency situation, a person's swift action to save people might demonstrate their general intelligence as well as their level of general knowledge.

2.5 Industrial Experience

Industrial experience is the time and knowledge obtained from working in a specific industry or sector of the economy (Indeed, 2022). The industry can include any working industry such as automotive, food and beverages, and also medical. It may also be defined as an organised and planned programme of learning experiences aimed to enhance the development of employability skills through practical learning (Okoye & Edokpolor, 2021). Industrial experience is one of the primary requirements in job advertisements and a distinct advantage for a professional (Bolat, 2014). This is due to the fact that industrial experiences add credibility to the job seeker.

Graduates can gain industrial experiences either through working experience, internships, volunteering, freelance work, or a mix of all of these options (Good Universities Guide, 2017). The difference between industrial experience and work experience is that work experience refers to all jobs held in any industry, whereas industrial experience refers to the experiences of doing specific jobs in a certain industry for a specified period of time (Indeed, 2022). Internships, on the other hand, are opportunities allowing employers to provide practical experiences to motivated and capable newcomers to a profession for a set period of time (Ahmad et al., 2018). Internships are also known as practical or industrial training, and higher education

institutions are now requiring students to put their academic knowledge into practice through industrial training (Rodzalan & Saat, 2012). The training period is normally six months or longer, and if the student is fortunate and has the capabilities to be engaged as a full-time worker, they can be given permanent employment with the organisation. It is the best platform for graduates to develop generic skills like communication and teamwork skills (Rodzalan & Saat, 2012).

Volunteering has been defined as freely preferred and purposeful helpful acts that continue over time, are performed without expectation of payment or other remuneration, and are generally performed through official organizations, and are performed on behalf of causes or individuals in need of aid (Kragt & Holtrop, 2020). Meanwhile, freelance work can be defined as a sort of job that is made available to freelance workers on a task-by-task basis and the employees are self-employed (Wilkins, Muralidhar, Meijer, Lascau, & Lindley, 2022). Greater competition, low commitment between worker and employer, a lack of employment benefits, the possibility to work completely remotely, and a limited availability of jobs are some of the reasons why more individuals are preferring to work as freelancers, particularly online (Wilkins et al., 2022).

Industrial experiences can be extremely valuable for a position at a higher level, in a technical field of expertise or with a government body (Indeed, 2022). For occupations requiring complicated technical operations, specialised degrees, licences, or involving specific software or tools, and working for the government, for example, industrial experiences would be certainly required (Indeed, 2022). For graduates, knowledge learned through university education can be applied during industrial experience to gain first-hand experience of what it is like to work as an adult. Exposure to industrial practice is critical for graduates to develop employability skills through industrial experiences (Ahmad et al., 2018). It is also important as it helps in developing and preparing students for the real job market (Sohaimi & Senasi, 2020) and it can also be used by students as a learning tool. Furthermore, the level of knowledge that graduates possess prior to and after industrial training would be vastly different. Graduates will undoubtedly develop more knowledge after gaining industrial experiences, which can be easily tested by testing at the workplace or at educational institutions and as a result, would be able to make better judgments in the future. Employers can even benefit from hiring someone who already has a certain degree of expertise because it results in shorter

training sessions and a more seamless transition into the organization and business processes (BMS Performance, 2017).

The growing demand for professionals who can effectively and efficiently transfer concepts and procedures of any scientific and mathematical skill learned into the work setting requires supplementary critical evaluation in order to validate the level of professional proficiency attained through industrial experience (Azodo, 2018). To measure the values of the experiences went through by the graduates, their industrial experience can be assessed by looking at their employability (Stephen & Festus, 2022). The ability of graduates to find work incorporates skills and characteristics that allow fresh graduates to find work and those who are already working to maintain or grow in their careers (Ting et al., 2017). Furthermore, because industrial experience allows graduates to apply their acquired knowledge to do work, knowledge is extremely beneficial for industrial experience (Ahmad et al., 2018). This is because graduates with both knowledge and practical skills have an advantage in many industrial sectors when it comes to hiring (Azodo, 2018).

A study by Osman et al. (2016) revealed that industrial experience can be evaluated through knowledge, skills, and attitudes. This study adapted Osman et al.s' (2016) measurement items for industrial experience, which include problem-solving ability, applying knowledge, acquiring new knowledge, and recognising the need for lifelong learning, as well as developing their leadership, presentation skills, decision-making ability, self-confidence, teamwork, and ability to work under pressure. Bloom et al.s' Taxonomy of Educational Objectives (1956) have also been referenced to select the parameters for its justifications on loosely defined terminology used in education and educational outcomes. It was generally employed by educators mainly to apply higher order thinking abilities to learners (Osman et al., 2016). The items selected to measure industrial experience had to be modified to fit more into today's educational context, as skills are what graduates can rely on to survive and live sustainably, and they are crucial in future professions (Filho et al., 2019; García-Aracil et al., 2021; Rainie & Anderson, 2017).

2.5.1 Moderating Variable

A moderating variable is something that can affect the relationship between independent variable and dependent variable. It acts on the relationship between variables and has the ability to modify the direction, strengthen, weaken, or alter the relationship between variables (Bhandari, 2021). Moderation happens when the degree or direction of the effect of an independent variable on a dependent variable varies as a function of the values of another variable (Marsh, Hau, Wen, Nagengast, & Morin, 2013). To take this study as an example, attributes or individual traits can affect the success of the development of a person and this relationship will be stronger when a person has more experience (Basu et al., 2017; Bolat, 2014; Karzunina et al., 2018; Okoye & Edokpolor, 2021; Pathik et al., 2012).

For this study, industrial experience is selected to be the moderator between educational supply chain attributes and professional development success since industrial experience can also be considered as assets or resources for graduates. By gaining industrial experiences, individuals' entire profiles can change. This is because, besides the formal education that students receive in a usual school setting, there are also two other types of learning that offer a system of education which is informal and non-formal learning. Informal learning takes place outside of schools and colleges setting in which the learner learns from their involvement in activities that usually does not have a learning purpose (Council of Europe, 2021). This type of learning is exclusively incidental and it is considered as part of daily life.

Meanwhile, non-formal learning occurs outside of the formal learning setting but with some organizational structure or framework. Non-formal learning happens usually when people want to take up or learn a skill or a particular activity (Council of Europe, 2021). For graduates that are pursuing internship or working experiences in an organization, they will be involved in the informal learning in which there are objectives and goals to be achieved (Johnson, 2019). Therefore, for this study, industrial experience act as moderator based on its role to provide other forms of education to graduates and at the same time, organizations involved in giving the industrial experiences can also give non-formal education to graduates for them to upgrade their set of skills.

Moderating variables address crucial problems such as: under what conditions, or for what types of people, does an intervention have a stronger or lesser effect? Therefore, to calculate the strength of the relationship, independent variables and dependent variables must be able to be calculated in order to determine the overall strength of the relationship (Bhandari, 2021).

2.6 Research Hypotheses

In this part, the development of the proposed hypotheses involving the variables in the conceptual framework in this study are discussed. In accordance with Figure 2.6, the variables that are implied for this study are educational supply chain attributes comprised of ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge; professional development success, and industrial experience. There are 12 hypotheses that can be established for this study.

The components of spirituality and ethics in higher education were identified as spiritual culture, transcendence experiences, internal excellence, and spiritual leadership (Motlagh et al., 2016). Workplace spirituality components such as meaning and purpose at work, recognition of an inner life or spirit, and interconnectedness with organisational citizenship behaviours all contributed to employee job satisfaction and job satisfaction has been tested to have a positive relationship with job performance (Belwalkar, Vohra, & Pandey, 2018). Workplace spirituality is thus said to be a developing paradigm for improving the adaptability of educational organisations' workforces (Paul et al., 2019).

Mcghee and Grant (2008) produced a useful explanation that connected spiritual values to variables including perceptions, motivation, satisfaction, retention, ethics, and organisational citizenship behaviour, and according to Motlagh et al. (2016), there is a positive relationship between spirituality, ethics, and higher education quality improvement. Stimulating and encouraging spirituality leads to a better individual ethics which can improve the work culture (Mcghee & Grant, 2008). Despite that, this study was done in 2008 which is not quite relevant in 2022.

Motlagh et al. (2016) in their study stated that there was a positive link between ethics, spirituality and higher education improvement. Ethics and spirituality are the key components in the life of anyone. Without those two components, there will be no rules created in this world. Hence, ethics and spirituality highlight the development and the success of change of humans in which it should be instilled in young children to increase their morality. An article written by Hargreaves and Elhawary (2018) concludes that more mutually respectful relationships supported by ethical behaviour (Indeed, 2021) can lead to a greater sense of professional value and authority, which can serve as the foundation for major professional development. Therefore, these statement leads to the following hypothesis:

H1: Ethics & spirituality has a positive effect on professional development success.

According to Boylan (2018), professional development activities should be conducted under the influence of data analysis skills in order to emphasise the theoretical tool for complicated theories and systems. Zuo et al. (2018) have even demonstrated that soft skills such as problem solving, communication, and negotiation abilities can have a significant impact on project managers' professional development success. This demonstrates the significance of this soft skill to professionals, which will eventually contribute to their professional development success.

Zeide (2017) stated that data analysis can empower students and schools. Students must have at least basic data analysis abilities in order to collect as much information as possible and then organise it into categories that demonstrate the relevance of that information, which eventually be converted into knowledge. Students are also obliged to conduct additional data analysis in order to improve their academic performance, which will eventually come in handy in the future. Schools also analyse data in order to better allocate resources to suit the needs of their pupils.

Meanwhile, teachers use data analysis skill to study about students and their behaviour to ensure that every student received the best education. Ahmad et al. (2017) created a standard instrument for measuring HOTS ability in primary school teachers, and the study found that primary teachers who majored in high school mathematics needed data analysis skills like HOTS in order to creatively teach their students to be better in the future. Xing and Gao (2018) explored the relation between data analysis

skills and online engagement and commitment for professional learning communities and discovered that educators have a strong desire to apply data analysis skills for professional development, even if it is done online.

According to Rubens, Schoenfeld, Schaffer, and Leah (2018), university programmes such as Master of Business Administration (MBA) required students to apply data analysis skills to learn by themselves in order for them to progress while reflecting on their own identities and considering the necessary paths that they must take. Universities use data to ensure that graduates can be employed for as fast as possible after graduation. Governments use data to make better policies to improve the quality of education. Parents can find out about the schools to which they will send their children. The success of professional development is highly dependent on data analysis capabilities, in which it will strengthen thinking skills and further the individual's development. Therefore, it is believed that:

H2: Data analysis skill has a positive effect on professional development success.

The action of working in a team creates professionalism in people. The ability to identify errors and its counter actions, and having mutual understanding of procedures are the results of teamwork that can lead to the development of interpersonal skills and professionalism (Baker et al., 2005). Interdisciplinary practice and teamwork are essential in professional fields for efficiency, client satisfaction, and career success (Mosten & Traum, 2018). Mosten and Traum (2018) also mentioned that professionals in fields such as business and healthcare must work together to ensure that customers or end users receive high-quality products or services.

One of the reasons why teamwork is important to professional development success is that lack of teamwork can result in lack of development or changes which then would affect the productivity or positive outcomes that can later indirectly impact consumers (Nilugal et al., 2015). By then, any changes are not going to be effective. Polega et al. (2019) also suggested that teamwork is crucial to professionals and time restrictions, personal problems, and differences in experiences can be barriers to achieving teamwork.

Furthermore, few researches have indicated that cooperation can lead to professional development success. Collaborations and teamwork by building a flexible, open-source professional skills training programme that can contribute to resource sharing are noted by Luchini-Colbry, Colbry, Rojewski, and Briliyanti (2019) as one of the ways that teamwork is employed to achieve professional development success. According to the findings of Abramovich and Miedijensky (2019) study, professional development success can be accomplished by enabling workers to participate in professional development trainings with similar goals and self-confidence, thereby empowering their personal abilities. Therefore, the hypothesis can be developed as:

H3: Teamwork has a positive effect on professional development success.

Language becomes a medium of communication between people of different ethnicities or cultures (Darmi, 2013) and it conveys information and knowledge. Being a master and proficient in languages is required in order to develop graduates into professionals that subsequently able to provide better results that would benefit them in the future. Many researches highlighted the importance of professional development to the educators' language proficiency.

Language proficiency is the result of professional development programmes, according to a study by Kalinowski et al. (2019), and Kalinowski, Egert, Gronostaj, and Vock (2020), and it supports the notion that professional development programmes serve to transform one's way of thinking and can benefit others. According to Ravandpour and Elmer (2019), the use of English as a foreign language has been acknowledged as an important aspect for professional development achievement through programmes such as workshops, conferences, and on-the-job training courses.

Motivation has been important in determining someone's eagerness to develop their own language proficiency. Tabatabaee-Yazdi et al. (2018) specified that professional development programs, especially for teachers, have a strong predictive power on their language proficiency. This shows that by participating in programs that can help the success of professional development, can a person be proficient in other languages than their mother tongue language. Hence, the developed hypothesis for this relationship is:

H4: Language proficiency has a positive effect on professional development success.

Thinking abilities are undoubtedly the most crucial attribute required in the age of the industrial revolution and digitalization. It becomes necessary for a person's professional development to succeed in order to ensure that vital things function smoothly. According to a review from Kalinowski et al. (2019), professional development enhances the way of thinking that will benefit others along the way. The study by Mohammed Saido, Siraj, Nordin, and Al-Amedy (2015) found that almost all students need to enhance their higher order thinking skills, particularly the synthesis and assessment skills needed to increase students' creativity in science. This is due to the fact that science is at the heart of all modern technologies and evolution in the world. Even Seyithan (2015) reported that critical thinking skills often help teachers to create a positive learning environment for students. Zeide (2017) stated that recent research on retained learning argues that it is important to learn not only specific skills or information but also “deeper learning” that focuses on critical thinking, communication, teamwork, academic mind-sets, and learning how to learn.

Nonetheless, Mohd Zain et al. (2017) stated that Malaysia continues to require students and graduates with skills in independent thinking and problem solving to help the country achieve its Vision 2020 and higher education is critical in producing citizens who are well-educated for life and responsible enough to contribute to societal harmony and higher quality of life. In addition, soft skills are necessary for students to own while entering the workforce. Malaysia's MOHE has even cooperated with Malaysian Qualification Agency (MQA) to equip students with skills such as knowledge, social skills, as well as critical thinking and problem-solving skills (Ahmad et al., 2018).

HOTS is one of the abilities that students should acquire through teaching and learning, and educator's knowledge of HOTS and its teaching and learning strategies is essential for successful education (Retnawati et al., 2018). By acquiring this ability, it will directly impact the students' professional development processes where it can increase the success rate of the students to be professional. In a study conducted by Retnawati et al. (2018), the researchers discovered that educators' awareness of HOTS, ability to develop students' HOTS, solving HOTS-based problems, and evaluating students' HOTS are still missing, despite the relevance of it being demonstrated. However, this might be contrary for students after 2019 where most schools have already emphasised teaching and learning based on HOTS questions and problems.

The review from Kalinowski et al. (2019) supports the premise that if specific elements are considered in its design and implementation, professional development can assist and transform educators' thinking and practise while also benefiting students. Through these studies, it shows that thinking skills and professional development success have relations with each other, in which the hypothesis created from this statement is:

H5: Thinking skills have a positive effect on professional development success.

Knowledge is essential for those who have received education. It has become the foundation for all information available in the world. The definitions for knowledge and professional development success can be considered as directly associated with each other. For example, Jamil et al. (2011) defined professional development as a process in which a person continues to improve their knowledge and skills required for effective professional practice. Paul et al. (2019) defined professional development as activities that improve an individual's ability, knowledge and other traits. Meanwhile, Ravandpour and Elmer (2019) defined professional development as the deliberate, continuing, and systematic processes and activities aimed to improve educators' professional knowledge, abilities, and attitudes in order for them to increase students' learning. The similarities in definitions indicate that increasing knowledge prior to a certain area of job can help to enhance the success of a person's professional development. Trainings are still needed however for the person to be really good at what they are doing.

For professional careers such as accounting, knowledge and skills gained through education enable the professionals to work successfully (Klibi & Oussii, 2013). Alrifia and Raju (2019) argues with the theory that the more knowledge that people have, the more they can perform in their job which will then increases productivity and hence, the company's image. Therefore, academic education's purpose is to ensure that students acquire information in the subject of their intended job, and sophisticated skills such as communication skills, organisational abilities, and problem-solving skills might be regarded as vital for professionals (Wijnen-Meijer et al., 2013).

Knowledge can provide numerous benefits to professional development success. Necessary knowledge may be used for resolving conflicts, where training courses can be organized and necessary skills can be developed to guarantee that knowledge is used appropriately for professional development success (Dogahe, Meydanghah, & Imani,

2019). Effective professional development programmes can improve knowledge and skills in order to have a positive impact on learning processes (Ravandpour & Elmer, 2019). Extending knowledge has been said to be an outcome from collaborations between different organizations from various different domain areas or backgrounds (Luchini-Colbry et al., 2019). And according to Paul et al. (2019), expanding knowledge simultaneously with professional development programmes can be a preventive measure for academicians to resolve their life-long learning competences. Knowledge can even be synthesised for later use (Dijkstra, van Beukering, & Brouwer, 2020). Therefore, the hypothesis that can be deducted is:

H6: Knowledge has a positive effect on professional development success.

Because industrial training is primarily conducted in companies, Rodzalan and Saat (2012) stated that job scope and work environment seemed to also influence students' ethics and professional development success. Students are more likely to behave ethically when they see their supervisors conduct work ethically during industrial experience. This experience is different as in the class in the university where students can only observe the ethics conduct from their lecturer which is very much different compared to people in the working industry. On the other hand, industries that practise work ethics such as having trust and respect for one another will have an impact on students' moral and professional ethics skills development (Rodzalan & Saat, 2012).

According to a growing body of studies, incorporating ethics and spiritual principles into the workplace has resulted in increased productivity and profitability, as well as staff retention, customer loyalty, and brand reputation (Mohd & Jamta, 2018). Every aspect in the work culture from leadership, decision-making, training, codes of conduct to legislation relies heavily on ethical behaviour with a sense of spirituality (Mohd & Jamta, 2018). In addition, according to Ahmed, Arshad, Mahmood, and Akhtar (2019), spiritual values had a significant influence on employees' behavioural changes in the process of professional development and the moderation test revealed that work ethics had a considerable influence on the specific relationships between spiritual values and helping conduct. This demonstrates that industrial or working experiences can aid employees in the process of changing their behaviour.

Lata and Chaudhary (2020) validated the idea that describes how workplace spirituality can influence workers' impressions of the behaviour of their co-workers. Furthermore, a spiritual work atmosphere can be advantageous in producing workers who act ethically, which will eventually boost the worker's professional development success (Lata & Chaudhary, 2020). This study aims to demonstrate that a worker's ethical and spiritual behaviour, as well as professional development success, are influenced by his or her working environment. Usman, Ali, Ogbonnaya, and Babalola (2021) have also discovered that spiritual behaviour is positively connected with psychological empowerment in employees, which increases professional development success. Work experiences were also discovered to strengthen the positive relationship. Therefore, it can be considered that:

H7: Industrial experience moderate the effects of ethics and spirituality on professional development success.

Data analysis skill became a demand especially in the 21st century due to the fact that most organizations are loaded with big data (Müller, Fay, & vom Brocke, 2018). Müller et al. (2018) also stated that technological and human IT are one of the important moderators of organizations' values. With the rising trend of big data analytics, data analysis skills are particularly important than ever. Data analysis is usually used at school to analyse academic information, and as students enter HEIs, they mostly apply the skill to solve real-world problems. In reality, experience is required to improve data analysis skills, which subsequently can secure a person's success.

In environments characterized by high diversity, the significance of data analysis capability in driving competitive advantage and incremental innovation capability is accentuated (Mikalef et al., 2019). This underscores the importance of exposure to diverse working environments or gaining industrial experiences in fostering professional development success. Shao's (2018) study further elucidates that data analysis skills serve as a moderating factor in the relationship between work experience and professional development success. Moreover, as noted by D'Angelo and Presutti (2019), organizations possessing and effectively leveraging data analytic skills in their operations tend to experience greater international growth. This suggests that industrial experience plays a pivotal role in moderating the impact of data analysis proficiency on the professional development success of the organization.

Kafouros, Love, Ganotakis, and Konara (2020) studied how experience in collaboration with various sorts of partners influences the formation of new collaborations and how such collaborations affect company performance. This study demonstrates that data analysis skill has a moderating effect on the association between industrial experience and professional development success. As a result, the application of data analysis skills clarified how experiences play a vital part in professional development success. More and better cooperation can be acquired by combining data analysis abilities with significant industry expertise. Therefore, equipping graduates with the necessary skills through a working or industrial experience can increase the values of the graduates that is hoped to be an asset of the company in the future. Hence, it can be described that:

H8: Industrial experience moderate the effects of data analysis skill on professional development success.

Teamwork is shown to increase adaptability in graduates which is a much-needed attribute while graduates are undergoing their industrial experience (Volkov & Volkov, 2015). Sulaiman et al. (2017) explained that teamwork can enhance the added-values on students, improve communication skills, and build self-confidence that can develop students to be successful in their professional development. Meanwhile, according to Edmondson and Harvey (2018), cross-boundary teaming, both within and across organisations, while attending industrial training became a popular technique for professional development programmes.

Moreover, in many professions, teamwork is recognised as one of the most vital skills to possess, as much work nowadays requires social interaction. Lee, Bristow, and Wong (2018) discovered a significant correlation in healthcare workers' teamwork before and after getting more experience through non-traditional workshops and professional trainings. According to Howe and Goldberg (2019), team-based capstone design courses allow students to acquire teamwork and also communication skills. This suggests that through gaining industry experience, students build cooperative skills that can help them succeed in their professional development. In addition, corporate learning culture considerably increases the linkages between team building and employee empowerment on employee capabilities (Potnuru, Sahoo, & Sharma, 2019).

Using data from a World Bank study of Chinese private manufacturing businesses, Fu, Liu, Yang, Jiao, and Jin (2020) discovered that executives' experience has a considerable beneficial effect upon professional development during process innovation. This indicates that experience has a moderating influence in determining one's professional development success, and that product innovation can have a beneficial impact through teamwork. As a result, the hypothesis can be expressed as:

H9: Industrial experience moderate the effects of teamwork on professional development success.

The rate of success of graduates' employability often depends on language proficiency and communication skills instead of professional attributes (Clement & Murugavel, 2018; Ting et al., 2017). Language proficiency is one of the most necessary skills needed by graduates either in the educational system or in the working experience (Kalinowski et al., 2019). Ting et al. (2017) reported that language proficiency can generate good communication skills that can be of help in certain sectors or departments such as customer services, and marketing. When graduates go for their industrial training, it is best for them to increase their language proficiency as it will help to increase their prospects of being hired by companies due to the fact that most companies are going global. It is acknowledged in a study by Clement and Murugavel (2018) that language becomes an important skill in the workplace.

As interactions and markets grow increasingly global, firms must retain capable employees, and education must be provided so that students are qualified to meet demand (Lee, Crawford, Weber, & Dennison, 2018). As a result, industrial experience allows graduates to improve their language skills, allowing them to advance successfully and professionally. Ting et al. (2017) also stated that employers viewed language skills as one of the most important skills in the workforce. Clement and Murugavel (2018) stated that poor language skill can interfere with the outcomes of professional developments of students. Therefore, by experiencing work in companies that use different language mediums can help students to upgrade their language skills that will later help them in their professional venture. Therefore, it can be deduced that:

H10: Industrial experience moderate the effects of language proficiency on professional development success.

Thinking skills can be considered as one of the core life skills because it engages people to make decisions and plan their work (Seyithan, 2015). This skill is also regarded as the first step toward a more sustainable future (Khodeir & Othman, 2018). Therefore, industrial experience can contribute to an individual's professional development success. Boundaryless careers are emerging career patterns that are less reliant on traditional corporate career management. According to Guan, Arthur, Khapova, Hall, and Lord (2019), boundaryless careers have diverse effects on many measures of professional success, and it is dependent on factors such as motivation, skills, adaptive capacities, and career resources. This suggests that professional development programmes have varying effects on their success, and that it frequently depends on the individual's experiences and adaptive capabilities which could include thinking skills. In the perspective of employers, by going through industrial experiences or trainings can students develop their critical thinking skills that will ensure the graduates quality for their professional development success (Ahmad et al., 2018).

According to a 2016 Pew Research Centre survey, professional development success is more likely in positions that involve management and communication abilities, as well as analytical skills such as critical thinking and computer skills (Rainie & Anderson, 2017). As a result, it emphasised the necessity of having industrial or working experiences because it usually speeds up the process of employment, which will subsequently contribute to the jobseeker's professional development success. Creativity is one of the outputs of industrial experience, and it is shown that it can influence professional development success (Ogbeibu, Senadjki, & Gaskin, 2018). Hence, the hypothesis can be written as:

H11: Industrial experience moderate the effects of thinking skills on professional development success.

A sustainable education, as emphasized by Basu, Jeyasingam, and Habib (2016), is important for enabling graduates to cultivate their skills, knowledge, and viewpoint to make informed decisions that enhance their quality of life. The advent of a knowledge-based economy in the early 2000s has underscored the necessity for graduates to continually upgrade their skills and knowledge (Mohd Zain et al., 2017). Through employment or industrial experiences, graduates gain valuable insights into social, economic, and environmental dynamics, given the real-world nature of their work

environments. This exposure equips graduates with the knowledge needed to discern their options, whether in academic settings or professional contexts (Zeide, 2017).

Training for skills is expected to be the most crucial in future jobs, and fact-based knowledge is anticipated to be important at work (Rainie & Anderson, 2017). Rainie and Anderson (2017) also mentioned that it is critical for students to understand that knowledge is just as vital as other skills in order for them to be properly developed. Knowledge and ability are required to bring about real changes that could impede a greater outcome (McAleavy et al., 2018). Industrial experience has also been proved to have an impact on professional development success with the use of knowledge (Gupta, Dangayach, Singh, Meena, & Rao, 2018). Knowledge is proven to be demonstrated to eager learners, and hence the role of knowledge throughout industrial experience is critical as it ensures the success of professional development (Kalinowski et al., 2019). Hence, it can be considered that:

H12: Industrial experience moderate the effects of knowledge on professional development success.



2.7 Theoretical Framework

Among the many skills exists in this world to help students to become more capable, the skills that are mostly demanded by Malaysian employers in this era are fast adaptation and resilient, fluent in both English and Malay language, and knowledgeable in technology and have vital soft skills such as time management and organization skills, creative problem-solving, and critical and analytical thinking (Hassandarvish, 2020; Star Media Group Berhad, 2020).

However, for this study, the attributes that were chosen for producing the framework for an EduSC are ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge based on the recommendations by Karzunina et al. (2018), Ministry of Education Malaysia (2013, 2016) and other researchers as listed in Table 2.3. Among the reasons that these attributes were chosen are due to the fact that it was listed as among the top skills required by employers for a fresh graduate to be employed according to the Global Skill Gap in the 21st Century report

by Karzunina et al. (2018). In an EduSC, the performance of students can be evaluated throughout the learning process from all aspects of the education system. The evaluations of the attributes that are explained in Chapter 2.4 are defined from the two levels of processes or institutions that students go through in an EduSC which are school level, and higher education and industry level as described in **Table 2.4**.

Table 2.4: Definitions of Evaluations Used in Conceptual Framework

| Measurement | Definition | |
|-----------------------|---|---|
| | School level | Higher education & industry level |
| Ethics & Spirituality | Possesses solid moral foundation and courage to make right decisions. | Ethically and morally upright, spiritually grounded, compassionate, and caring; appreciates sustainable development and a healthy lifestyle. |
| Data Analysis Skill | Collecting information process and eventually processing it into speech and sharing with peers. | Examining, researching, and concluding process of vast information to discover useful information for decision-making. |
| Teamwork | Working together with others to achieve a common goal or finish a given task. | Collaboration between involved individuals or organizations to increase the efficiency of achieving a common goal. |
| Language proficiency | Operationally proficient in at least “Bahasa Melayu” and English. | Proficient in “Bahasa Melayu” and English, and encourages to learn one additional global language. |
| Thinking skills | Is inquisitive and innovative, can apply, create, and connect knowledge to provide solutions. | Appreciates diverse views, is able to think critically and be innovative, as problem-solving initiative, and an entrepreneurial mind-set. |
| Knowledge | Has mastery of core subjects and general knowledge about the world. | Has mastery of own discipline, is able to harness, connect and apply knowledge learnt, and has an appreciation of culture, arts, and Science, Technology, Engineering and Mathematics (STEM). |

Source: Adapted from Karzunina et al. (2018), and Ministry of Education Malaysia (2018).

Ethical behaviour and moral upright becomes an important attribute because as graduates are employed to the company, they are bound to be involved in all of the business processes and decision making processes. Vitell and Hidalgo (2006) emphasized that at that point, they must make the right decisions for the company and graduates are expected to be ethical and socially responsible for what they do for the company. McGhee and Grant (2008) noted that spiritual individuals who are also ethical in business can consequently be significant to the company and Göçen and Özğan (2018) also stated that spirituality becomes a strong factor in decision making processes. The wellbeing of a person in the coming decades now lies mainly on the roles of ethics and spirituality (Göçen & Özğan, 2018). As stated in The Global Skill Gap in the 21st Century report by Karzunina et al. (2018), the weight that employers put on data analysis skill is mainly

average. Even so, this skill is seen as vital and would be included in the framework for EduSC attributes. This is because the ability of graduates to process big data that exists in the company is becoming increasingly necessary as companies are looking for data-literate graduates who can interpret and handle large amounts of data (Hassandarvish, 2020).

Meanwhile, Karzunina et al. (2018) also stated that teamwork becomes valuable to the employers nowadays because it shows that the employees can work together with each other regardless of skills and knowledge to solve problems. In addition, the Malaysian Education Blueprint 2013-2025 emphasised successful language literacy and competency programmes and services (Ministry of Education Malaysia, 2015). Language proficiency, particularly in secondary languages such as English and Bahasa Melayu, has become increasingly prominent, particularly in Science and Mathematics, as said by former Prime Minister Tun Dr. Mahathir Mohamad (Muhamad, 2020). This is important because it ensures that graduates can communicate with those involved in the EduSC's upper and lower streams. Besides, thinking skills in this context is defined as the creative problem-solving skills of graduates that are mostly required by employers (Hassandarvish, 2020; Karzunina et al., 2018; Morrison, 2006). In the age of industrial revolution, creative problem solvers are required to understand a problem completely and then be able to solve it critically (Morrison, 2006). Ultimately, knowledge becomes the base of all of the stated attributes as it becomes immensely necessary for graduates to have knowledge for them to develop all of the other attributes.

All of the attributes described in the previous paragraphs become important for professional development success because they are among the important set of skills required for graduates to master in order to obtain better employment and, eventually, become professionals through various professional developments. The attributes are also among the important attributes that employers expect from graduates when they apply for the job. The chosen and described attributes or skills learned for graduates to obtain a place in the working industry are assumed to directly affect their professional development success.

In accordance with the Malaysia Education Blueprint 2013-2025 by Ministry of Education Malaysia (2018), professional development is described as the continuous process of gaining experience by learning through formal or informal involvement

towards any programme that was run by the MOE. Professional development success can be defined as the successful outcomes from the continuous process of gaining experience. Continuous professional development programmes are always run by MOE to ensure that the practices of professional values, skills, knowledge, and expertise of any professional personnel are continually enhanced so that they will remain relevant in their respective industry (Ministry of Education Malaysia, 2018). Therefore, the professional development success of a graduate depend on their skills, knowledge, and attributes. Constant and successful achievements become hard to be achieved as each graduate does not have the same skill set with one another and therefore, MOE always make sure that they produce and make programmes that can cater to each graduate to make them have what is required by them.

Ministry of Education Malaysia (2013, 2015, 2018) are committed to developing students holistically, which include the intellectual, spiritual, emotional, and physical dimensions, in order to successfully generate more professionals to meet the demands of the workforce in the 21st century. This is to produce individuals that are knowledgeable, competent, and balanced, have high moral standards, are responsible, have great potential talent, are lifelong learners, and can contribute to the betterment of the family, society, and the nation as a whole. Also, entrepreneurial skills are among the soft skills that the MOE expected students would learn from a variety of diverse co-curricular activities (Ministry of Education Malaysia, 2018). Furthermore, due to the demands and competitiveness of today's jobs, as well as market demands, a professional workforce with technical and vocational education is in high demand.

Therefore, characteristics like graduates' holistic, entrepreneurial, balance, and quality technical and vocational aspects, talent excellence, and lifelong learning are then chosen to quantify professional development success. This is because it is believed that in order for the Malaysian workforce to have more professionals, professional pedagogy should begin in schools. So, because the workforce must have the right attributes with the right amount of experience to ensure a highly developed workforce to be available for the country to use in the future, the selected attributes are seen to be able to represent professional development success through the input from educational supply chain attributes and industrial experiences. Therefore, the relationships between all of the

variables such as educational supply chain attributes, industrial experience and professional development success are illustrated in **Figure 2.5**.

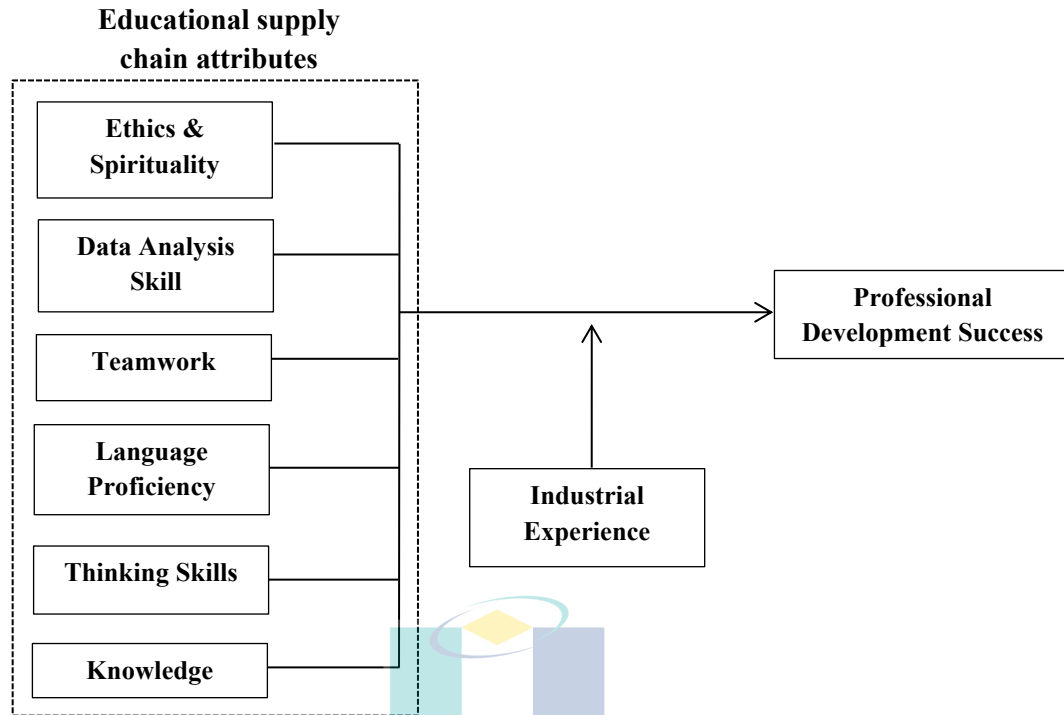


Figure 2.5: Conceptual Framework

2.8 Underpinning Theory

For more than four decades, resource-based view (RBV) theory has grown in popularity among strategy theories, yet debate over its precise nature continues (Lockett, Thompson, & Morgenstern, 2009). RBV is a theory regarding the nature of firms instead of why firms exist. As a result, RBV involves only a few limiting assumptions about the nature of strategic behaviour displayed by enterprises. According to Lockett (2005), Lockett et al. (2009), and Lockett and Thompson (2001), RBV's core beliefs are path dependence and firm diversity. RBV offers a valuable lens through which to analyse the unique attributes and skills within the educational supply chain (EduSC) context, emphasizing the role of internal resources, such as skills, knowledge, and experience, in driving professional development success (Wernerfelt, 1984 as cited in Lockett et al., 2009). By adopting RBV, this study aims to explore how the identified EduSC attributes, including ethics and spirituality, data analysis, teamwork, language proficiency, thinking skills, and knowledge, function as valuable resources that individuals can leverage to enhance their employability and career advancement prospects. Furthermore, RBV

makes it possible to examine in detail how industrial experience influences the relationship between these attributes and success in professional development, highlighting the complex relationship between internal capabilities and external market conditions (Barney, 1991 as cited in Lockett et al., 2009). Overall, RBV provides a robust theoretical framework for understanding how human capital and organizational resources contribute to individual and organizational success within the context of the Malaysian workforce and educational system.

This study draws upon foundational works in strategic management, particularly Barney's (1991) seminal paper on firm resources and sustained competitive advantage, as well as Wernerfelt (1984) as cited in Lockett et al. (2009) influential exposition of the resource-based view of the firm. Building on these theoretical underpinnings, Lee et al. (2023) focuses into the realm of educational supply chain management, offering insights into professional development success within the Malaysian context. Additionally, Wahab et al. (2024) contribute to the literature by identifying leadership skills and competencies gaps in the Malaysian supply chain management sector, shedding light on critical areas for skill development. Lebdioui (2022) examination of Malaysia's political economy in global value chains complements these perspectives, highlighting the broader context within which educational and professional development initiatives unfold. Furthermore, Ismail et al. (2022) provide a nuanced analysis of design competence attributes in Malaysia's construction sector, offering valuable insights into the specificity of skills required within distinct industries. These studies collectively enrich our understanding of the interplay between individual attributes, organizational capabilities, and broader economic dynamics in shaping professional development outcomes within the Malaysian context.

Therefore, this theory is created for enterprises to utilize their own resources as a strategy to gain competitive advantage over other enterprises (Coates & McDermott, 2002). As a result, the relevance of each resource for each firm differs from one another, and discussions rage about which resources or assets are more significant. So, in order to incorporate these perspectives, researchers had to establish the concepts of resources and core competencies, as well as the characteristics of the resources that make them strategically valuable. Wernerfelt (1984) as cited in Lockett et al. (2009) believes that the firm itself is a historically determined collection of assets or resources (Lockett et al.,

2009), while Penrose (1959) stated that assets or resources can be divided into tangible and intangible (Coates & McDermott, 2002). Coates and McDermott (2002) placed a great importance on intangible assets of a firm that was said to bring more profit than purchasable resources while Teece et al. (1997) stated that users of RBV discriminate between resources that are fully appropriable by the firm and less tangible assets (Lockett et al., 2009).

Lockett et al. (2009) stated that RBV provides an easy framework for analysing inter-firm performance variations. As such, this theory can be used across different functionality or departments in a firm to determine their own strategies. Barney (2001) placed RBV in at least three theoretical traditions: structure-conduct-performance (SCP)-based theories of industrial determinates of company performance, neoclassical microeconomics, and evolutionary economics. A number of reviews on RBV have already been published, in which either have been focused on descriptive accounts of the RBV development (e.g: Ambrosini 2007; Barney 1995; Barney 2001b; Barney and Arikan 2001; Barney et al. 2001) or have provided a summary of empirical approaches and evidence on RBV (e.g: Armstrong and Shimizu 2007; Newbert 2007) (Lockett et al., 2009). However, Coates and McDermott (2002) stated that resources change as a result of innovative managerial behaviour, because it is the use of resources that generates competitive advantage, not the resources themselves. Moreover, Kraaijenbrink, Spender, and Groen (2010) even suggested that RBV can be built into a more realistic theory of competitive advantage, particularly if it is placed inside a truly dynamic framework.

This study intends to apply the concept of RBV to individuals for them to determine their own strategies to utilize their own resources throughout the educational supply chain (EduSC) to gain competitive advantage against over other individuals, making the relevance of each resource for each individual differs from one another (Coates & McDermott, 2002). In order to keep up with the change of nature of work in organizations that is shifting towards concentrating on values for people and way of work (Rainie & Anderson, 2017), soft skills which are intangible, are more preferred in the modern labour market, that was said to bring more profit to the organization (Coates & McDermott, 2002).

The application of RBV theory in this study is shown in **Figure 2.6**. It is easier to gain a competitive advantage if internal resources are used rather than external resources. Therefore, for this study, the internal resources identified for an individual that are involved in an EduSC are parent participation and educators' quality. This is due to the fact that with the inclusion of parent participation and educators' quality, students in the EduSC can perform better and become more interested in participating in professional line of work. These resources are considered as intangible while tangible resources include funds, educators and students.

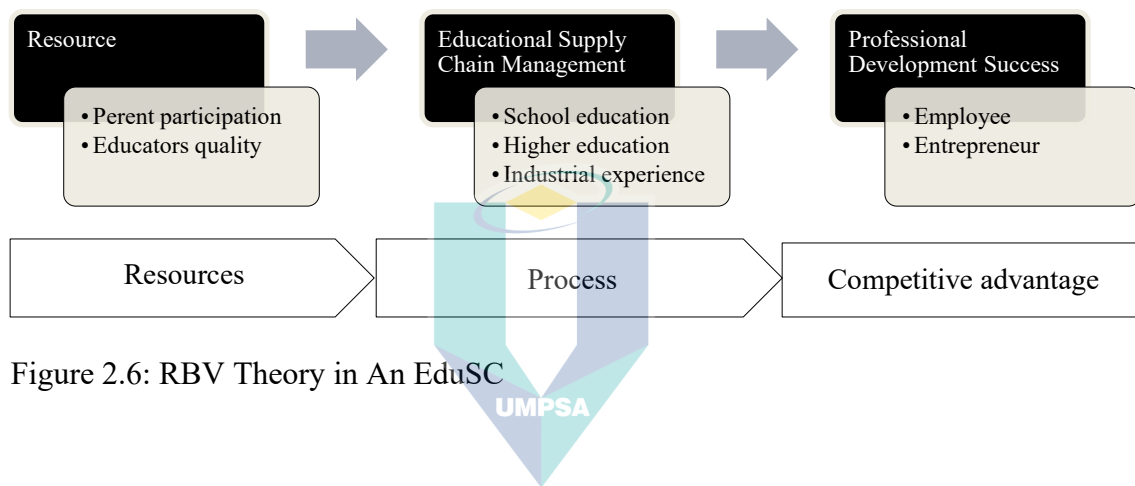


Figure 2.6: RBV Theory in An EduSC

All of the operations contained and managed in an EduSC, where the process includes the flow of students from school education to higher education and, finally, to industrial experience, are referred to as the Educational Supply Chain Management (EduSCM). Moreover, the characteristics of the resources that make them valuable in this study are identified to be the attributes from an EduSC. Graduates' professional development success would be the competitive advantage gained from applying this theory in this study, in which graduates can be employees or simply created jobs as entrepreneurs who provide job opportunities to others.

2.9 Chapter Summary

Based on the review of the literature, it is still unclear if the educational supply chain attributes outlined in this study would play a significant impact in determining someone's future. More specified studies should be made on EduSC in order to produce

more graduates with exceptional qualities and capabilities so that they can give back their talent to the country that needs it. The implementation of SCM should be applied in the education sector in order to control the performance of entities involved and the outcome of the supply chain. A lot of discussion happens to discuss the relationship between the attributes, but there has also been limited study on the implementation of those attributes to the EduSC. Each country should implement different strategies for them to produce quality graduates.



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CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter of this study's report went into detail about the processes of the research that were conducted. The following part went over the worldview philosophy, research design and methodology that was used for this study. Then, in the following part, the instrumentation used to conduct the research was stated and explored. Furthermore, unit of analysis, targeted population, and sample size were specified and explained in the next section. The data collection methods and process for this study were also described, as well as the software that was used to analyse the study's data. This study took three years to be completed starting from October 2020 with the geographical location for this study to be conducted is Malaysia.

3.2 Operational Definition

Professional development success in this study referred to employed individuals who are holistic, entrepreneurial, balanced, have excellent talent, lifelong learner, and have quality technical and vocational attributes (Boyle et al., 2015; Brusoni et al., 2014; Conceição et al., 2019; Holienka et al., 2015; Howe & Goldberg, 2019; Kumar & Garg, 2017; Laal, 2011; Ministry of Education Malaysia, 2016; Panda, 2017; Rainie & Anderson, 2017; Sarkar, 2020; Vlasic et al., 2009; Whitener, 2017). **Holistic** employees were stated to be able to complete their duties physically, analysing work-related problems from different perspectives, understand others or identify strengths and flaws, able to get along well with other employees, and more creative (Panda, 2017; Sarkar, 2020). **Entrepreneurial** employees are allegedly have more entrepreneurial skills or knowledge than the time they started working, involved in a business process, confident in their abilities in their work, and not scared to take risks (Holienka et al., 2015). Meanwhile, **balanced** employed individuals are said to be able to fulfil their own

demands, expect their future needs, able to balance their emotions, organize their priorities, and have a healthy work-life balance (Boyle et al., 2015; Kumar & Garg, 2017; Whitener, 2017).

In addition, employees who have **excellent talent** are described to be more successful academically, flexible and willing to change, confident that they are going to become more successful, able to see things from another person's point of view, and have a high level of satisfaction or experience with my work (Boyle et al., 2015; Brusoni et al., 2014). A **lifelong learner** employed individuals are said to be able to manage stress, believe that each learning process improved their work performance, have excellent academic achievement, develops creativity better with each learning process, and projecting their skills or knowledge to show the success of the lifelong learning process (Boyle et al., 2015; Conceição et al., 2019; Howe & Goldberg, 2019; Laal, 2011; Vlasic et al., 2009). Employed individuals who have **quality technical and vocational attributes** referred to employees whose accreditation or certification demonstrates their quality as an employee, their knowledge or education demonstrates their technical or vocational abilities, trustworthy or capable of defending their rights, have better communication skills, and believes that their work quality improves when they are confident in their work (Boyle et al., 2015; Ministry of Education Malaysia, 2016; Rainie & Anderson, 2017).

Educational supply chain (EduSC) attributes referred to the intangibles that is contained in the stakeholders in the Malaysian educational supply chain, applicable to working individuals. It includes intangibles such as ethics and spirituality, data analysis skills, teamwork, language proficiency, thinking skills, and knowledge. **Ethics and spirituality** in this study refers to working individuals who believed that their spiritual beliefs had impact on their work performance, application of ethics or spirituality can make them make better decisions, follow the company guidelines based on their religion, making organizational commitment to the company, and adhere to the company's policies in all times (Agbim et al., 2013; Mohd Zain et al., 2017; Motlagh et al., 2016; Panda, 2017; Suib & Said, 2017; Vlasic et al., 2009). Meanwhile, **data analysis skill** in this study refers to computer literacy skills, ability to analyse data, outstanding academic achievement, improvisation of decision-making skills, and the ability to complete a

variety of tasks (GTI Futures Ltd., 2021; Irawan et al., 2017; Wallace & Clariana, 2005; Zeide, 2017).

Teamwork in this study were measured by overall team performance that is combined with individual- and team-level performance (Baker et al., 2005). Communication skills, ability to solve problems and accountability towards the team (Alrifa & Raju, 2019; Feng et al., 2020; Klibi & Oussii, 2013; M. Sulaiman et al., 2017; Thompson, 2018; Volkov & Volkov, 2015) are among the measurement items in teamwork in this study. In results, the number of goals achieved are also measured through teamwork.

Language proficiency was demonstrated by the fluency of working individuals in Malaysia in the languages spoken in their company, their ability to talk, write, and read in both Bahasa Melayu and English, and their number of language certifications acquired (Kalinowski et al., 2019; Mohd Nor et al., 2019; Ting et al., 2017). Their eagerness to learn or understand new languages and the ability to translate one language to another are also referred to the measurement items in language proficiency for this study (Darmi, 2013).

Thinking skills in this study referred to the use of different types of thinking skills when solving problems by the working individuals in Malaysia (Roslan et al., 2020). Acquiring higher order thinking skills (HOTS), and having the ability to understand, analyse, and generate solutions to problems are also measured in thinking skills in this study (Pin et al., 2020; Retnawati et al., 2018; Roslan et al., 2020). Moreover, the level of working individuals' general intelligence and confidence gain through utilizing different thinking skills are also referred as the measurement items in this study (Age UK Group, 2020; Pin et al., 2020).

Knowledge in this study refers to the performance in standardized testing, academic achievement, and certifications of the working individuals in Malaysia (Gopalakrishnan, 2014; Wallace & Clariana, 2005; Wijnen-Meijer et al., 2013). In addition, the improvement of one's abilities or skills and enhanced general intelligence are also referred as the measurement item for knowledge in this study (Chansamut & Piriya-surawong, 2014).

3.3 Research Philosophy

Sources of information can come from intuition, experience, research, and authority. Researchers need to identify and balance out which of that information are of quality and can be used in the research. Before doing research, a declaration must be made, and philosophical perspectives are required to define the nature and goal of the study. In other words, research philosophy refers to beliefs and speculations regarding knowledge development (Purwanto et al., 2021; Saunders et al., 2009). Individuals form beliefs based on their discipline orientations and research communities, advisors and mentors, and previous research experiences, and the types of beliefs held by individual researchers frequently lead to embracing a strong qualitative, quantitative, or mixed methods approach in their research (Creswell & Creswell, 2018; Memon et al., 2021). Saunders et al. (2009) encourage researchers to reflect on their beliefs and assumptions regarding the research philosophy and research design that was used to conduct the research. Hence, the first step that researchers must take is to make assumptions about the subjects to be examined.

Furthermore, assumptions are frequently made on things that people do not know about, and this process is present at every stage of the study. The process of assumption must be present or even done first in order to begin researching. According to Saunders et al. (2009), the assumptions process can include assumptions about human knowledge, encountered realities, and the extent and manner in which one's own values impact the research process. To express the assumptions, philosophical concepts are utilized and although philosophical concepts are largely hidden in research, they still have an impact on research practice and must be identified (Creswell & Creswell, 2018; Handayani et al., 2023). There are four philosophies that are widely discussed in literatures, namely post positivism, constructivism, transformative, and pragmatism. **Table 3.1** shows the four worldviews that are being used philosophically and its highlights.

Table 3.1: Four Worldviews on Research Philosophy

| Post positivism | Constructivism |
|---|---|
| <ul style="list-style-type: none"> • Determination • Reductionism • Empirical observation and measurement • Theory verification | <ul style="list-style-type: none"> • Understanding • Multiple participant meanings • Social and historical construction • Theory generation |
| Transformative | Pragmatism |
| <ul style="list-style-type: none"> • Political • Power and justice oriented • Collaborative • Change-oriented | <ul style="list-style-type: none"> • Consequences of actions • Problem-centered • Pluralistic • Real-word practice oriented |

Source: Adopted from Creswell and Creswell (2018).

To better characterise the worldviews on the four research philosophies, a set of research paradigms must be understood to provide the researcher with philosophical, theoretical, instrumental, and methodological foundations (Žukauskas, Vveinhardt, & Andriukaitienė, 2018). Saunders et al. (2009) and Žukauskas et al. (2018) stated that there are four research assumptions or paradigms namely ontology, epistemology, axiology, and methodology, which is described in Table 3.2.

Table 3.2: Research Paradigm

| Research Paradigm | Description |
|-------------------|---|
| Ontology | Assumptions about the nature of reality |
| Epistemology | Assumptions about knowledge, what constitutes acceptable, valid, and legitimate knowledge, and how we can communicate knowledge to others |
| Axiology | Role of values and ethics within the research process |
| Methodology | Combination of different techniques used by scientist to explore different situations |

Source: Adopted from Saunders et al. (2009) and Žukauskas et al. (2018)

Ontology is described as assumptions about the nature of reality that shape how researchers see and study research objects (Saunders et al., 2009). According to Saunders et al. (2009), research objects in business and management could include organisations, management, individuals' working life, and organisational events and artefacts. However, the research objects for this study would be the research questions, which would then lead to the development of the questionnaire as the study's instrument. The nature for the research questions were classified as objective since it questioned what is the relationship between the variables and whether the moderating variable had any moderating influence on the link between the independent variables and the dependent variable. The philosophy that best fits the nature of the research questions is post positivism, which believes that causes (most likely) determine and influence effects or

outcomes (Creswell & Creswell, 2018). As a result, the problems explored by post positivists reflect the necessity to identify and evaluate the causes that can influence outcomes, such as those discovered in experiments.

Epistemology was defined as an excellent way to make assumptions to study the real-world nature in which the theory is interested in how the researcher can get knowledge about the phenomena of interest, and it is essentially a study on the difference between reasonable assurance from the opinion (Žukauskas et al., 2018). It is primarily concerned with making assumptions about knowledge, what is acceptable and valid, and how researchers spread knowledge to others (Saunders et al., 2009). The assumptions of knowledge on educational supply chain attributes, professional development success, and industrial experience would be the epistemology of this study. In terms of what counts acceptable and valid, constructs and explanations of the link between the variables were provided in Chapter 2. This knowledge can be shared to others through the distribution of research instruments and the completion of this study. With the conclusion of this study, people will be able to learn about the elements and their relationships.

Axiology, on the other hand, relates to the involvement of values and ethics in the research process (Purwanto & Sudargini, 2021; Saunders et al., 2009). It includes concerns on the values of the research as well as the ethics of the researchers. The values of this research were explained in Chapter 1, which includes the addition to neoteric knowledge about a new educational model in supply chain management in the Malaysian education context, providing a guideline to professional development success, and future improvement in the characteristics of Malaysian job seekers. Methodology refers to the research process (Creswell & Creswell, 2018) as well as a collection of research methods and rules, as well as the principles, theories, and values that underpin a particular approach to research (Žukauskas et al., 2018). This study is classified as a quantitative study because the correlations between independent, dependent, and moderating variables are investigated to answer the study's ontology, and the results will be given quantitatively to provide a better understanding to the research populations. Understanding these paradigms allows researchers to create a research design and procedure for carrying out this research, which will subsequently serve as the foundation for the researcher to begin data collection and analysis.

3.4 Research Design

A research design is a system of methods used in a particular area of study that is intended to provide a usable framework for the process of this research (Jilcha, 2019). It also provides the overall strategy for the actions and decision making that will be done for this research. Basically, research will be categorized into two categories whether they are quantitative or qualitative research. Quantitative research uses accurate and controllable measurements to examine certain situations or happening while qualitative research uses a more holistic approach that usually narrates a certain problem (Rutberg & Bouikidis, 2018).

This study employs descriptive research design as this research mainly aims to answer what and how the responses and relationships between educational supply chain attributes, professional development success, and the role of industrial experience as the moderating variable (Creswell & Creswell, 2018; McCombes, 2019). A descriptive research design is a research design that describes a phenomenon and its characteristics (Nassaji, 2015). Data may be obtained qualitatively in such research, but it is generally analysed quantitatively, using frequencies, percentages, averages, or other statistical analysis to determine relationships.

3.5 Quantitative Research Method

This study use quantitative research method approaches to achieve the research objectives, using primary research method through questionnaires. Quantitative research is described as the use and analysis of numerical data using specific statistical approaches to answer questions such as who, how much, what, where, when, how many, and how (Apuke, 2017). It also outlines the techniques for explaining an issue or event by collecting numerical data. Quantitative research typically makes use of numbers and precision, and it adopts a systematic and controlled method to investigate phenomena using accurate measurements (Rutberg & Bouikidis, 2018). One goal of quantitative research is to generalise findings by statistical inference (Kamarudin, 2017).

This method is most suitable to be employed for this study because the correlations between independent, dependent, and moderating variables are investigated to answer the developed hypotheses. The results of this study is presented numerically through statistical analysis to answer the objectives and questions of this research. Replication, direct comparisons of results, large samples, and hypothesis testing are all advantages of this kind of study, which is commonly used to standardise data collecting (Bhandari, 2020b).

3.6 Instrumentation for the Study

This study constructed a survey questionnaire to be utilised as an instrumentation to evaluate the relationship between constructs suggested in the conceptual model. This is because survey research methodology is widely utilized in many areas of research, and it is critical for researchers to closely adhere to a certain set of rules in order to achieve the research objectives (Hulland, Baumgartner, & Smith, 2017). According to Gupta et al. (2018), the goal of a survey questionnaire was to collect data suitable for empirical assessment for the proposed theoretical framework.

Therefore, in order to collect data, a survey questionnaire was distributed to respondents using a variety of procedures. The procedures served as guidance for researchers in creating a suitable survey instrument that generated reliable and valid data. The procedures for developing the survey instrument for this study involved constructs formulation and interpretation, measurement items descriptions, relevant questions designation, and measurement scale assessment. The process of formulating the constructs was outlined in Chapter 1, and the interpretation of the literature review for the constructs was explained in Chapter 2. It was discovered that the attributes required for the success of professional development included ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge, with the moderation of industrial experience.

A series of questions were then created to collect responses or data from respondents. The effectiveness of survey research was heavily dependent on the design and administration of the survey questionnaire. Therefore, the questions developed for this methodology were examined and validated by a group of experienced academicians

and industry practitioners in accordance with the standards chosen to assure its validity and reliability.

3.6.1 Measurement Items

Following the development of theoretical constructs, indicators or items for measuring the constructs were created so that abstract concepts can be transformed into a more quantifiable form in research (Hossain, 2020). The values of the items were then defined as measurable data. The justifications for the measurement items for the constructs in this study were covered in Chapter 2.

All items in this study were adapted from multiple validated instruments and then adjusted to properly measure the constructs. The wordings are kept simple in order for respondents to better understand the questions. The questionnaire was created to be clear and simple with clear instructions to follow, and the writings for the measurement items for the constructs were divided into multiple parts for easy understanding. The first section of the questionnaire featured demographic questions for the respondents. In the following section, all of the measurement items in the questionnaire were written related to the professional development success construct, and the items relating to the educational supply chain attributes and industrial experience constructs were addressed in the subsequent sections of the questions. A total of 69 indicators were chosen and used to explain all 8 constructs. Each respondent required around 15 minutes to complete the questionnaire. The list of the measuring items identified for this study, each with its own source was shown in **Appendix A**.

3.6.2 Design of Survey Questionnaire

The questionnaire for this study included closed-ended questions where the respondents were expected to tick the answer within the scale provided or the categories that they appeared to fit into. Only the geographical questions in the questionnaire that asked respondents about their position in their own company and the employment sector that they worked in had open-ended questions to obtain more geographical information

about the targeted population. The questions are made to be in the form of checklists and ranking questions, with respondents just needed to rate the variables or constructs provided, as well as selecting one or more from the options provided. Clear instructions on the details of the objectives of the study and expected outcomes were presented, allowing for a better understanding of this research problem.

While deciding and writing the question content, five major questions are posed during the survey question construction process, which are as follows (Ahmad Nizar et al., 2023; Sreejesh et al., 2014): what is the value of the information gathered, how effective is the questions at generating the data needed, is the respondent capable of accurately answering the questions, is the respondent willing to provide an accurate response to the questions, and what are the chances that external events will influence the responses. All of the questions in the questionnaire were adapted from previously validated survey questionnaires and have been adjusted to suit the contents of this study.

Following the creation of the questionnaire for this study, the questions were then sent for a pre-testing process in which expert academicians and industry professionals evaluated the questionnaire's validity and reliability. Once the pre-test feedback has been retrieved, modifications were made to address the pre-test complaints. The pre-test process were discussed in detail in Chapter 3, section 3.7.5. Following the modifications, the questionnaire were then sent to the study's supervisor one more time to confirm the quality, validity, and reliability of the questionnaire before it were distributed to respondents. **Appendix B** shows the survey questionnaire that was sent to respondents.

The biggest issue from this instrument were the ignorance and the inability to understand specific phrases or terms mentioned within the questions, as not all respondents have the same degree of understanding on certain topics. Therefore, it was necessary that the questions should be properly constructed so that everyone can read and reply with ease. This is why the questions were presented in two languages, Bahasa Melayu and English, which should help respondents to comprehend the questions better. The questionnaire was first written in English, and then the Bahasa Melayu translation was provided next to each text. This is done so that the respondents would have a better understanding and no inquiries can be asked of the researcher regarding the meaning of any term in both languages. Because of the nature of their profession and country of

residence, it was assumed that almost all of the sampled respondents can understand the questions in either language.

Other issues that arose from this instrument includes item non-response (when the respondent completes the rest of the questions excluding those questions with which the respondents is uncomfortable), refusal to complete the rest of the questionnaire, and intentional falsification, where it can all emerged from a respondent's hesitation to answer a specific question (Sreejesh et al., 2014). This reluctance can also be due to the questions being insulting, too personal and unpleasant, or because the issue is irrelevant to the respondent's interests. As a result, such questions were avoided and to be put subtly in order to avoid irritating the respondents.

3.6.2.1 Structure of Survey Questionnaire

There were 77 questions for the respondents to answer ranging from checklist questions to the ranking questions in the questionnaire. A little bit of introduction on the researcher and the research was written on top of the questionnaire as a start for the respondents to understand what the research is all about and who the researcher is. The contact information of the researcher was also provided in such a case that the respondents need any additional information on the research. The questionnaire was divided into 4 sections; Section A, B, C, and D. Section A contained the checklist questions while Section B, C, and D consists of ranking questions.

In Section A, respondents only need to tick on the conditions that fit them. This section's concerns were mostly on demographic and personal information. To ensure the anonymity and privacy of the respondents, no name, address, or contact information was required from the respondents. Questions in this section included the industry sector of the respondents' company, years of service in participant's position, and also position of respondents. In this section, open-ended questions were also included as additional information from the respondents was required for the researcher to analyse and categorise it later.

For Section B, C, and D, the questions were rather direct in which it reflected the objective of this study. The questions reflected the measurements for variables like educational supply chain attributes, industrial experience, and on the professional development success. Also in this section, the answer ranged in the scale of one to five where scale one meant that the attributes in this study seem strongly unimportant and scale five meant that the attributes for the framework of this research seem strongly important to respondents. Respondents merely need to tick the scale on which they appear to be fit without much thought. This would give accurate statistics for this study based on the respondents' honest opinions.

3.6.3 Measurement Scale

The items designed to reflect the meanings of constructs of interest were known as measurement scales (Hung & Petrick, 2010). The common types of measurement scale were called nominal, ordinal, interval and ratio. Nominal and ordinal scales were usually being used for qualitative data, while interval and ratio scales were often used for quantitative data.

For this study, nominal, ordinal and ratio scale were bound to be used due to the nature of questions in the questionnaire that was distributed to samples later. Nominal scale was normally used for identification purposes that was often looked at as a category or label. It can be illustrated as a bar chart or a pie chart. Examples of nominal scale that were used in this study included types of respondents' organization, location of their company, and the area of business of participating respondents.

Ordinal scale involved ranking or ordering the attributes that relate to the variables asked in the questionnaire. It usually measured the value or degree of the frequency of the involved variable and also the feedback on something. The ordinal scale for this study was set to be a 5-point Likert-type scale with labels such as strongly disagree, disagree, uncertain, agree, and strongly agree, with values ranging from 1 to 5. The value was used to determine which variable was more important than another. Meanwhile, ratio scales were often being used to measure examples such as weight, price, time, and length. For this study, the range of employees' number in the company and

their years of service were the most likely to use ratio scales asked from the respondents or samples.

3.7 Population and Sample

A population is a whole group of people with a specific set of characteristics (Banerjee & Chaudhury, 2010). Geographic parameters are the most commonly used in defining population. The population involved for this research is every employed individual in Malaysia's working industries. However, it is a known fact that not all of the population can be investigated as it will waste time, energy and resources. Therefore, samples are chosen to construct the research in a more structured environment to obtain authentic results (Rutberg & Bouikidis, 2018). The unit of analysis for this study is individual.

Sampling is a process of selecting a few samples from a bigger group to be the base for estimating or predicting the occurrence of an unknown piece of information and sampling technique is the scientific method of selecting samples from a population. There are two types of sampling techniques namely probability sampling and non-probability sampling. In probability sampling, there are five other types of probability sampling techniques which includes simple random sampling, stratified random sampling, systematic random sampling, cluster sampling, and multi-stage sampling. Meanwhile, there are five types of non-probability sampling for instance judgemental or purposive sampling, snowball sampling, convenience sampling, quota sampling, and voluntary response sampling.

3.7.1 Unit of analysis

A unit of analysis can be defined as the entity that becomes the focus of the study (DeCarlo, 2018). Individuals have been chosen as the unit of analysis for this study, and data will be collected through responses from individuals in the Malaysian working industries. The main reason for this is due to the study's objectives, which are to determine the relationship between the recommended attributes and the success of professional

development that working individuals have accomplished. Due to Malaysia's travel limitations during the period in which this study was conducted, the questionnaire was distributed online as shown in **Appendix C**. Data were collected and analysed after some time, and then calculated and described in chapters four and five.

3.7.2 Population

The entities involved with this study are graduates, employees, entrepreneurs, and employers who went through the processes in an EduSC (Bell, 2014; O'Brien & Deans, 1996). During this study's period, there were 5.61 million graduates, with 85 percent of them found work within six months of graduation (Department of Statistics Malaysia, 2021b, 2022a). 90 percent of the employed graduates worked as employees, while 6.4 percent were self-employed. 4.3 percent of the graduates became employers while another 1.1 percent being unpaid workers who works for their family.

Meanwhile, Malaysia has a total of 15.40 million employed individuals (Department of Statistics Malaysia, 2022b) who work in three major economic sectors: agriculture (such as agriculture, hunting, forestry), industry (such as manufacturing, electricity, gas and water, construction), and services (that includes wholesale and retail trade, transportation, communication, and financial intermediation) (Institute of Labor Market Information and Analysis (ILMIA), 2017; Ministry of Economy, 2022). The age group involved in the population targeted for this study ranges from 15 to 64 years old, accounting for 66 percent of Malaysia's overall population (Department of Statistics Malaysia, 2022b). 76.8 percent of employed individuals are employees, while 17.14 percent are self-employed.

According to the Companies Commission of Malaysia (2022), there are more than 1.48 million companies registered with the Companies Commission of Malaysia up until 2022, containing 4,961 international companies and more than 1.47 million local companies. More than 8.68 million businesses, including 33,915 limited liability partnerships, are also registered with the commission.

3.7.3 Sample Size

For the data to be reliable and relevant, all of the targeted participants in this study were set to be Malaysians or individuals who have worked in a company in Malaysia. Due to the convenience and accessibility, data was collected from samples of working personnel employed in Malaysia through voluntary response sampling technique.

After getting actual data, the geographical data for this study was described in Chapter 4. For this research to be relevant, sampling requires a few steps, including defining the population, calculating the sample size that is appropriate for this research to be reliable, carrying out the sampling technique, and pre-testing the questions for the samples chosen to answer. The following paragraphs and subsections describe each step, with the exception of the population description.

G*Power software is a type of free application for a variety of statistical tests (Faul, Erdfelder, Buchner, & Lang, 2009). It is commonly used to calculate power and sample size. According to Bartlett (2021), power is the ability to detect an effect if one exists, and if an effect is a given size, how often is it to be found? Many academicians choose this software because of its easy and clear interface, as well as its ability to do many power analyses such as priori, post hoc, and compromise (Kent State University, 2021).

According to Faul et al. (2009), this software can be applied for single-sample tetrachoric correlations, comparisons of dependent correlations, bivariate linear regression, multiple linear regression based on the random predictor model, logistic regression, and Poisson regression. Because this study is designed to be descriptive, it involves the application of multiple linear regression tests that includes power analyses for F tests of the null hypothesis (Faul et al., 2009). To calculate the minimum sample size, the input parameters required for this test is “effect size f^2 ”, “ α err prob”, “power” and “Total sample size” N . The output parameters from this test includes “non-centrality parameter λ ” of the F distribution under H_1 , the decision criterion (“Critical F ”), the degrees of freedom (“Numerator df,” “Denominator df”), and the power of the omnibus F test [“Power (1- β err prob)”] (Faul et al., 2009).

As shown in **Figure 3.1**, the minimum sample size calculated for this study with 13 predictors or factors is set to be 189 with a level of significance, α of 0.05. This is because this research is believed to be 95 percent confident to be correct with a 5 percent chance of error. The reason for the power to be set at 95 percent with a 5 percent chance of error is so that it can detect any small or big effect that were anticipated from the analysis of the sample size. The standard power was usually set to 80 percent, however some researchers argue that the power should be higher (Bartlett, 2021) for the research to be more distinct. Roscoe (1975), as cited in Sekaran and Bougie (2016), suggested that sample sizes greater than 30 and less than 500 are suitable for most studies and if the samples are to be divided into subsamples according to factors like gender, position, and working period, a sample size of 30 for each category is necessary. Based on the analysis in the G*Power software in this study, the sample size of 189 set for each category of subsamples in this study are considered appropriate for the population identified for this study.

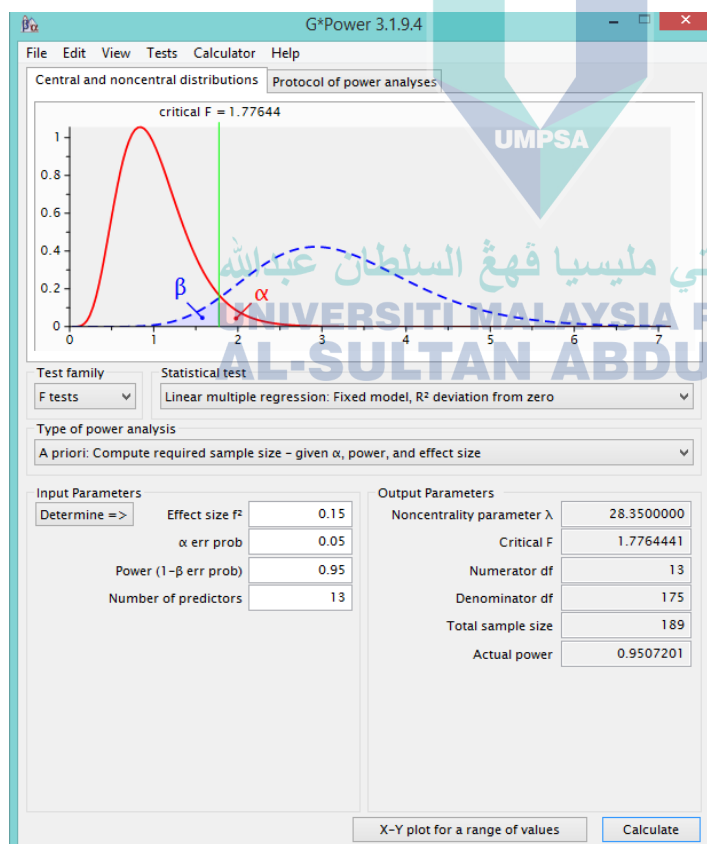


Figure 3.1: Result of Sample Size Analysis from G*Power

3.7.4 Sampling Technique

Voluntary response sampling technique was chosen to be used for this study since it is rather easy to collect data, affordable and relatively inexpensive. Normally, researchers would choose probability sampling techniques such as simple random sampling and cluster sampling. However, such sampling techniques require a complete list of all elements in the population. As a result, because it is time consuming and difficult to collect and identify all of the elements in the population in this post-pandemic environment, non-probability methods must be applied. Moreover, in terms of time and expense in non-probability techniques, voluntary response sampling is affordable, and the questionnaire can be distributed via the internet or public posts (Moss, 2019).

Voluntary response sampling is a new sampling technique in which samples are drawn from the prospective population who are willing and qualified to complete the survey questionnaire (Murairwa, 2015). This sampling technique was commonly utilized by businesses or service providers who distributed customer satisfaction surveys to customers who were willing to respond (Moss, 2019). It is also commonly utilised by hosts on radio or television, where the host usually asks participants to promote and complete a survey on specific topics, and participants have the power to volunteer or not (QuestionPro, 2019; Zach, 2021). This sampling technique was chosen for this study because of its simplicity, low cost, easiness of data collection, minimal work required, and potential to generate rich qualitative data (QuestionPro, 2019).

This method is one of the simplest for non-probability sampling, in which the researcher approaches volunteers to participate in the study (Moss & Rosenzweig, n.d.). This method can be effective for working with a huge number of potential network (LinkedIn Community, 2024), which is related to this study's population of 15.40 million employed individuals in Malaysia. This technique enables people to volunteer themselves by responding to the provided online survey (McCombes, 2023), ensuring that only those who are interested in the topic can participate in this study (K. Williams, 2023). For this reason, self-selection bias that can cause the population for this study to be underrepresented can be avoided because of the willingness of the participants themselves to be actively involved in the research process (K. Williams, 2023).

On the other hand, the disadvantage of utilizing this technique is that those that voluntarily respond will likely have stronger opinions (positively or negatively) than the rest of the population, making them an unrepresentative sample that may not be suitable to represent the entire population (QuestionPro, 2019). This technique is also susceptible to biases such as under coverage, self-selection, and non-response bias (Moss, 2019; Zach, 2021). Therefore, this sampling technique can fail to attract potential respondents who are willing to participate in the study, and researchers must be thorough in selecting potential respondents to ensure that the subject under study or survey questionnaire is of value to the respondents in order to achieve good data quality (Murairwa, 2015).

3.7.5 Pre-test

A pre-test is essential to ensure that wording is clear, the format is adequate, the length is suitable, the answer scale is thorough, missing topics are detected, and proper item sequencing (Zahari, 2019). It is preferable to involve a small group of participants in the pre-test process as a focus group because what contributes most is their overall responses to the questionnaire and how they felt about filling it out (Sekaran & Bougie, 2016). This process is helpful for pre-testing various materials created to communicate with or obtain information from survey respondents, and it can also be applied to evaluating individual survey questions (Lucchini et al., 2023). According to Zahari (2019), this method could help to improve the study's face and content validity and also delete any ambiguous words from the questionnaire.

The draft of this study's instrument was presented and sent to academicians and industrial practitioners in Malaysia. This was to ensure that the feedbacks are reliable and dependable to be distributed later. A total of six respondents were chosen for the pre-test based on their job experience and industry differences. A pre-test involving six respondents is considered sufficient for several reasons. First, the primary objective of a pre-test is to identify and rectify any issues with the questionnaire's clarity, format, length, answer scale, and sequencing (Zahari, 2019). By selecting respondents who are well-versed in the relevant field, such as academicians and industrial practitioners with diverse job experiences, the study ensures that the feedback is both reliable and insightful. These individuals are likely to provide critical and comprehensive evaluations of the

questionnaire, helping to identify ambiguous wording and other potential issues. Additionally, the feedback from these knowledgeable respondents is instrumental in improving the face and content validity of the instrument. Given that the purpose of a pre-test is not to achieve statistical representation but to refine the research tool, the insights from these six informed participants are adequate to make necessary adjustments and ensure the questionnaire's effectiveness for broader distribution. This approach aligns with the methodology suggested by Zahari (2019), emphasizing that the quality of feedback is more crucial than the quantity of respondents in a pre-test phase.

Several indicators in the questionnaire were adjusted and changed in response to the comments. **Appendix D** represents the change for the items in the questionnaire. It can be observed that the pre-test process has no effect on the previously proposed theoretical framework, and that the indicators for the variables are accepted by both academicians and industrial practitioners. More clarification on written sentences was required, and it received a lot of feedback. It is believed that the opinions by academicians and industry practitioners have improved the face and content validity, and reliability of the questionnaire.

3.8 Data Collection

There are various ways to collect data. Data tells us the story behind any operations and produce information for anyone to use it to turn it into knowledge. According to Ainsworth (2021), the top six data collection methods are questionnaires and surveys, interviews, observations, focus groups, documents and records, and oral histories. Much information can be gained from the tools, but wrong use of data collection methods can result in the information collected to be useless and wasting people's time, energy, and even money. Hence, the right use of data collection methods is a need, especially for researchers to convey important knowledge.

The data for this study was collected through the use of a survey questionnaire, which were distributed to individuals in the Malaysian working industries. This is because, according to Zahari (2019), people are more likely to provide honest responses in questionnaires rather than in interviews, which helps to lessen the potential of personal bias if sensitive questions are asked. Before sending the questionnaire to the targeted

sample, the questions need to go through a check by professionals to investigate things such as its efficiency, use of wording, and sentence arrangement. For the time being, the questionnaire were distributed online and via social media to collect the data from selected respondents as they are usually less costly, time-saving, and easily adaptable (Kamarudin, 2017). The link for the questionnaire was also distributed via WhatsApp messages, in order to acquire more respondents from more diverse age groups. The questionnaires was distributed to respondents over the course of one month. The data collected from the survey were then processed using structural equation modelling software after the specified time range.

Data is acquired based on the strategy and design, and then analysis is performed on the collected data, with the manner in which the analysis is performed being an essential and critical stage of any study (Mkhomazi & Iyamu, 2013). The data collection serves as the foundation for estimating reliability (Wohlin, Höst, Runeson, & Wesslén, 2003). As a result, a good data collection procedure is critical to ensure that the reliability estimate is valid. According to Bhandari (2020a), data collection procedures include: establishing the purpose of the research, selecting a data collection method, planning data collection methods, and collecting data. Data collection procedures, according to (Indeed Editorial Team, 2022), include identifying issues for collecting data, selecting opportunities and setting goals, planning an approach and methods, collecting data, analysing and interpreting data, and acting on results. Eventually, as stated in the table of contents for this paper, the data collection procedures for this study includes the following steps: identifying research problems, reviewing literature on the identified problems, selecting research design and data collection methods, planning data collection methods, collecting data, analysing and discussing data, and writing on the data analysis.

3.9 Data Analysis Technique

This study used structural equation modelling (SEM) technique to analyse the structural relationship of educational supply chain attributes, industrial experience, and professional development success. SEM is a multivariate statistical analysis technique that tests the proposed causal relationship (Statistics Solutions, 2021). It is a quantitative research technique that also includes qualitative research methods (Devault, 2018). While

SEM approaches allow for direct testing of unobservable hypotheses, it comes at the expense of complexity and makes it difficult to grasp exactly what the statistics determined for each hypothesis (Vinodh & Joy, 2012).

As a result, partial least squares structural equation modelling (PLS-SEM) technique is required because it is primarily concerned with the interaction of prediction and theory testing, explaining causal relationships among variables, and estimating large models with many constructs, variables, and structural paths (Hair, Risher, Sarstedt, & Ringle, 2019). PLS-SEM should be used by researchers when: the analysis is related to evaluating a theoretical framework based on assumptions, the model has a complex structure with several constructs, objects, indicators, and interactions, the sample sizes are small, and variable scores are required for another upcoming analysis in the research (Hair, Risher, et al., 2019). As a response, if the conditions for this study meet the requirements specified by Hair, Risher, et al. (2019), PLS-SEM should be utilized, as the technique has grown in importance and popularity among researchers (Zahari, 2019).

PLS-SEM is made up of two models: the measurement model and the structural model (Fan et al., 2016; Hair, Black, Babin, & Anderson, 2019). A measurement model is a component of the entire model that studies the relationship between latent variables and their measurements (Fan et al., 2016; Miles, 2015). Latent variables, also known as constructs or factors, are important features in a PLS-SEM model, although they are unobservable elements that can only be represented by observable or measurable variables (Hair, Black, et al., 2019). A structural model investigates the structure of a link by evaluating hypotheses (Hair, Black, et al., 2019; Hong, Jagani, Kim, & Youn, 2019).

Any SEM model involves a two-step approach to analysing the relationships between specified variables (J. C. Anderson & Gerbing, 1988). The two-step approach includes assessing or investigating the measurement model of the proposed study framework as well as evaluating the structural model. However, Hair, Black, et al. (2019) claimed that a three-stage approach is required for PLS-SEM to generate model solutions: initial estimates of the measurement model, initial estimates of the structural model, and final estimates of both models. Calculating the initial measurement model estimates required calculations of preliminary latent variable scores for all indicators of each construct, proxies for all latent variable constructs, and new outer weights computation reflecting the strength of the association between each latent construct and its

corresponding indicators (Hair, Black, et al., 2019). Estimating the structural model's initial estimates and the final estimates of both models requires the computation of final outer loadings or weights, as well as the final path coefficient and related elements. The related elements include the indirect and total effects, R^2 values of the endogenous latent constructs, indicator and latent variable correlations, and the f^2 effect size for each predictor construct, as well as Q^2 , an additional measure of the model's predictive power (Hair, Black, et al., 2019).

SmartPLS 4 software was used to analyse and calculate the data acquired via questionnaires in order to execute the PLS-SEM analysis. Due to financial and time constraints, all personal data collected were documented, modified, and summarised using Microsoft Excel and Google Form. Examples of questions given to respondents can be seen in Appendix B and C.

3.9.1 Data Cleaning

The process of repairing or deleting incorrect, corrupted, improperly formatted, duplicate, or incomplete data from a dataset is known as data cleaning (Tableau Software Llc., 2021). There are numerous ways for data to be duplicated or mislabelled when connecting multiple data sources. If the data comes out wrong, the research would be deemed as unreliable and invalid. This procedure is often carried out within the programme chosen for the research, with just a fraction of it carried out manually (Gimenez, 2020). Despite the fact that this procedure can be complicated, it is a vital step in managing the volume of big data in research or a firm.

According to Blue-Pencil (2021), data cleaning is a type of data management that is important in areas such as data management, data security, document and record storage, records management, data sharing, and many more. Data cleaning can also increase overall productivity and leave out the best information to be used (Blue-Pencil, 2021). According to Gimenez (2020), there are six steps in the data cleaning process, which include: monitoring errors, standardising processes, checking data accuracy, detecting duplicate data, analysing data, and communicating with people involved in the process. The data collected after the specified time range were first checked for problems such as incomplete and duplicated data. Some of the respondents were able to be

contacted about the mistakes they made in order to correct them. To avoid misleading analysis of this study, the evident errors were then deleted. The data was subsequently inputted into the SmartPLS 4 software to be analysed using the PLS-SEM technique. The report on results and findings were then written and discussed in Chapter 4 of this study.

3.9.2 Descriptive Statistics

Descriptive statistics are brief descriptive coefficients that summarise a particular data set, which might be a representation of the complete population or a sample of it (Hayes, 2021). Trochim (2021) describes that descriptive statistics simply describe what is or what the data shows, and each descriptive statistic simplifies a large amount of data into a simpler summary. Basically, it is a summarization of data in a way that people can regard as valuable and easy to read.

To describe the data, measures of central tendency and measures of variability are commonly used (Hayes, 2021; Y. Williams & Allison, 2021). Measure of central tendencies commonly shows values of mean, median, and mode for quantitative variables (Ab Hamid, 2017). The mean, or average, of a data set is calculated by adding all of the figures in the set and then dividing by the number of figures in the set; the mode of a data set is the value that appears the most frequently; and the median is the figure in the middle of the data set that separates the higher figures from the lower figures within a data set (Hayes, 2021). Hayes (2021) also describes measures of variability, also known as measures of spread, as the aid in determining how spread out a collection of data's distribution is. Due to the fact that the variables for this study would involve quantitative values, values such as mean, average, and median can be seen in the analysis of data.

3.9.3 Assessment of Measurement Model

Measurement model is also known as path analysis where its function is to show the relationships between the measured variable and its constructs (Statistics Solutions, 2021). A measurement model measures latent variables or composite variables, but a structural model tests all possible relationships using path analysis (Fan et al., 2016). The

assessment of the measurement model is conducted to determine the reliability and validity of the measurement items. The validity of the measurement items can further be measured using convergent validity and discriminant validity (Ahmed et al., 2019). Convergent validity is a measure of how far the construct begins to converge in order to explain the variation of its components and discriminant validity is described as how distinct a construct is experimentally from other constructs in the structural model (Hair, Risher, et al., 2019).

Because the measurement model comprises two separate types of assessment, the calculations for each type of assessment are likewise distinct. According to Hair, Risher, et al. (2019), the direction of the link between latent variables and their measurements can either be reflective or formative. The reflective measurement model illustrates that measurement of the latent variable does not always alter the latent variable, whereas the formative measurement model shows that measuring the latent variable can affect the latent variable. The relevant parameters for measurement model calculation are different depending on whether the measurement model is reflective or formative (Hair, Black, et al., 2019; Hair, Risher, et al., 2019). From theory, the stated constructs for the variables for the model in this study does not always affect the variable because of the many other factors that can affect the latent variables. Therefore, the subsequent assessment for the measurement model for this study focus on calculations for the reflective measurement model.

The reflective measurement model is evaluated using indicators such as indicator loadings, internal consistency reliability, convergent validity, and discriminant validity. Values of the loadings indicate that the construct of this model explains the indicator's variance (Hair, Risher, et al., 2019) and hence, proving the reliability of the acceptable item and also the relevance of the significant indicator in the model. Loadings greater than 0.708 suggests that the concept explains more than 50 per cent of the variance in the indicator (Hair, Black, et al., 2019). Internal consistency reliability is most often measured using Jöreskog's (1971) composite reliability and in general, greater values suggest better levels of reliability (Hair, Risher, et al., 2019). Values between 0.60 and 0.70 are regarded as "acceptable in exploratory study," values between 0.70 and 0.95 as "satisfying to good," and values of 0.95 and higher as "unrealistic" (Hair, Black, et al., 2019).

Another measure of internal consistency reliability is using Crohnbach's alpha. However, the numbers generated for the alpha values are substantially lower than the composite reliability values since the items are not weighted in this computation, resulting in less exact measures of the reliability. In addition, bootstrap confidence intervals can also be used to construct reliability. The metrics used to calculate the level of converges in convergent validity was demonstrated by the values of the average variance extracted (AVE) (Khan, E. A. Bakar, & Habib, 2019). AVE values of 0.50 or higher indicates that a latent variable or construct can explain at least half of its indicator's variance (Ahmed et al., 2019; Hair, Black, et al., 2019). To eliminate possibly overlapping constructs, discriminant validity analyses the link between the constructs to measure how uniquely the indicators of a construct represent that construct with each other (Ahmed et al., 2019; Hair, Black, et al., 2019). The suggested discriminant validity method is the heterotrait-monotrait (HTMT) ratio of correlations, and when its values exceed 0.90, it indicates a lack of discriminant validity, implying that the constructs are conceptually identical (Hair, Black, et al., 2019). A value of 0.85 was proposed to demonstrate that the constructs are conceptually distinct.

3.9.4 Assessment of Structural Model

A structural model represents the idea that explains how constructs are connected to one another. It can also estimate the relationships between latent variables, test overall model as well as specific pathways, and model disruptions (Şimşek & Tekeli, 2015). Among many ways to assess the structural model, coefficient of determination (R^2), the blindfolding-based cross-validated redundancy measure Q^2 , and the statistical significance and relevance of path coefficients is one of the most common in statistics studies. Coefficient of determination (R^2) describes the differences of variables when compared to each other. The R^2 value ranges from 0 to 1, with 0 representing no relationship and 1 representing a perfect relationship (Hair, Black, et al., 2019). The explanatory power of the PLS structural model increases as R^2 increases. R^2 values of 0.75, 0.50, and 0.25, respectively, are regarded as substantial, moderate, and weak (Hair, Black, et al., 2019).

Blindfolding-based cross-validated redundancy measure (Q^2) is a technique where researchers calculate the Q^2 value of latent variables in the PLS model obtained through the blindfolding procedure. It is a process that deletes data points in a systematic manner while predicting their original values (SmartPLS GmbH, 2021). Q^2 values greater than zero for a certain endogenous construct imply that the path model's predictive accuracy for that construct is acceptable, while bigger Q^2 values suggest higher predictive accuracy (Hair, Black, et al., 2019). Values less than zero, on the other hand, indicate a lack of predictive relevance.

The statistical significance and relevance of path coefficients indicates whether or not the link described in the model is statistically significant and relevant by indicating the direct effect of one variable presumed to be a cause on another variable assumed to be an effect (*Path Analysis*, n.d.). PLS-SEM is a nonparametric method, according to Hair, Risher, et al. (2019), and so bootstrapping is used to demonstrate statistical significance. At the 0.05 level, a path coefficient is considered significant if zero does not fall within the 95 percent (bias-corrected and accelerated) confidence interval (Hair, Black, et al., 2019). Path coefficients are standardized to have values ranging from +1 to -1, with +1 representing a perfect positive relationship, 0 representing no relationship, and -1 representing a perfect negative relationship.

3.10 Chapter Summary

In a nutshell, this study incorporates post positivism worldview ontologically, epistemologically, axiologically, and through methodology. This study utilised descriptive research design with quantitative research methods for the research methodology. It also involves the use of quantitative data collection methods and analysis. The instrument utilised for this research would be questionnaires, and the measurements were measured on a nominal, ordinal, and ratio scale. Academicians and industry practitioners tested and validated the instrument throughout pre-testing procedures. The population defined for this study includes all of the organizations involved in an EduSC, and 189 samples are identified to be taken into account for this study to be valid utilising a voluntary response sampling technique and G*Power analysis. The data in this study was then analysed using PLS-SEM with the tool

SmartPLS 4. This software was also used to examine indicators such as loadings, convergent validity, AVE, Crohnbach's alpha, loading values, composite reliability, and discriminant validity.



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CHAPTER 4

DATA ANALYSIS AND FINDINGS

4.1 Introduction

The fourth chapter of this thesis goes on to discuss the testing and evaluation of this study's research model using PLS-SEM. This chapter is divided into five major sections. Following the introduction, Section 4.2 presents the response rate of the respondents for this study, while Section 4.3 discusses the profile of responses for this study. Section 4.4, 4.5, and 4.6 analyses the study's findings, while Section 4.7 provides the chapter's summary.

4.2 Response Rate

To collect reliable data for this study, around 516 potential respondents were reached online (through email and social media) to participate in the study from August 2022 to November 2022. A total of 196 completed questionnaires were successfully collected from the 516 prospective respondents, resulting in 38 percent response rate. According to Hulland et al. (2017), a low response rate decreases the power of statistical tests but is not always a problem for theory testing unless there is a justifiable concern about the differences between the responding samples.

The poor response rate was caused by the fact that the respondents were only reached over a four-month period, which was well known for having slow business (Kerpen, 2017). Companies were usually already full of employees who were hired early in the year, and from August to November was when those newly hired employees became comfortable in their jobs and began to plan their next move (Clark, 2023; Kerpen, 2017). In addition, many of the respondents were most likely on leave during the months that they were reached out to, as there were several holidays in Malaysia at the time like the 15th General Election and Malaysia Day, making it difficult to get the respondents to respond.

4.3 Profile of Respondents

There were various ranges of respondents in terms of gender, position, working period, type of organization, employment sector, lifetime of company, location, and number of employees. The population involved for this study would be 15.40 million employed individuals in Malaysia that were later sampled based on their employment status in their companies, and economic groups of their companies.

Samples for this study comprised a total 196 respondents. The demographic profile of the respondents reveals that 54.6 percent of the respondents were male and the rest of the respondents consisted of females (45.4 percent). A significant majority for over 50 percent are occupying the positions at the entry level and intermediate or associates' level. Specifically, 36.7 percent respondents are at the entry level, while 34.2 percent are at the intermediate or associates' level, totalling 70.9 percent. Meanwhile, 13.8 percent of them are executives or chief officers while 12.8 percent of the respondents were working at the level of senior management. Only 1.5 percent of respondents are directors, demonstrating the tiny proportion of employers that participated in this study. Meanwhile, 1.0 percent identified themselves as others that includes positions such as drivers, and working on their own.

This occurrence can be attributed to a variety of factors. First of all, the high percentage of entry-level positions reflects the natural movement of new graduates and early-career professionals into the workforce, who are initially hired for these roles to gain practical experience and develop essential skills (Bramley & McKenna, 2021). Furthermore, the intermediate or associates' level is likely includes individuals who have progressed from entry-level roles but have not yet advanced to senior management or executive positions, representing a common career progression (Avidov-Ungar & Herscu, 2020). According to this distribution, the majority of the workforce appears to be in the early to mid-stages of their careers (Gansemer-Topf & Ryder, 2017). This is consistent with the majority of organizational structures, which have lower- and mid-level positions than higher-level positions (Bramley & McKenna, 2021). The significant representation of these groups emphasizes how critical it is to attend to their professional development needs in order to guarantee a future workforce that is competent and well-prepared (Gansemer-Topf & Ryder, 2017).

Furthermore, more than half of the respondents (66.8 percent) have been working at their current position for less than three years, and 13.8 percent of them have only been working for three to five years. This suggests that many of the respondents have recently started their careers and have achieved professional development success through self-improving through learning, training, gaining new skills, and keeping up with current trends (Antley, 2020; Indeed Editorial Team, 2023). 7.1 percent of the respondents have been working for 6 to 8 years, while 12.2 percent have worked for more than 8 years. In terms of types of organization, around 100 respondents (51.0 percent) work in private limited companies (Sdn. Bhd.) whereas the other 23.0 percent work in public limited companies (Bhd.), which suggests that many of them worked for small and midsize companies (Banton, 2020). A significant number of them (11.2 percent) work for foreign companies, while 7.7 percent work in sole proprietorships. 4.1 percent of respondents work in partnership companies, 2.0 percent work in unlimited companies, and 1.0 percent work for limited liability partnership businesses.

Majority of the respondents (54.1 percent) work in industries such as manufacturing, technology, and the oil and gas industry, while 38.3 percent work in services such as education, food and beverages, and banking and finance. Only 3.1 percent of them worked in agriculture, indicating a lack of reach to those working in that sector to participate in this study. The majority of respondents (28.1 percent) lived in Selangor, followed by Kuala Lumpur (24.5 percent), Pulau Pinang (11.2 percent), and Johor and Pahang (8.7 percent respectively). This illustrates that many of the respondents lived in cities rather than rural areas. 2.6 percent of the respondents are in Kedah, 3.6 percent are in Melaka, and 5.1 percent are in Perak. Meanwhile, 0.5 percent of respondents lived in Kelantan, Perlis, and Putrajaya, while 1.5 percent lived in Negeri Sembilan, Terengganu, Sabah, and Sarawak. On the other hand, 61.2 percent of respondents work in companies with more than 200 employees, 18.9 percent work in companies with 5 to 75 employees, 14.3 percent work in companies with 76 to 200 employees, and 5.6 percent work in a company with less than 5 employees. **Table 4.1** displayed the summary of the demographic profile of the respondents.

Table 4.1: Demographic Profile of Respondents

| Demographic Profile | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Gender | | |
| Male | 107 | 54.6% |
| Female | 89 | 45.4% |
| Position | | |
| Entry level | 72 | 36.7% |
| Intermediate / Associates | 67 | 34.2% |
| Senior Management | 25 | 12.8% |
| Directors | 3 | 1.5% |
| Executives / Chief Officers | 27 | 13.8% |
| Others | 2 | 1.0% |
| Working Period | | |
| Less than 3 years | 131 | 66.8% |
| Between 3 to 5 years | 27 | 13.8% |
| Between 6 to 8 years | 14 | 7.1% |
| More than 8 years | 24 | 12.2% |
| Type of organization | | |
| Sole proprietorship | 15 | 7.7% |
| Partnership | 8 | 4.1% |
| Private limited company (Sdn Bhd) | 100 | 51.0% |
| Public limited company (Bhd) | 45 | 23.0% |
| Unlimited company | 4 | 2.0% |
| Foreign company | 22 | 11.2% |
| Limited liability partnership | 2 | 1.0% |
| Employment sector | | |
| Agriculture | 6 | 3.1% |
| Industrial sector | 106 | 54.1% |
| Services | 75 | 38.3% |
| Company's Lifetime | | |
| Less than 3 years | 23 | 11.7% |
| Between 3 to 5 years | 15 | 7.7% |
| Between 6 to 10 years | 16 | 8.2% |
| More than 10 years | 142 | 72.4% |
| Location | | |
| Johor | 17 | 8.7% |
| Kedah | 5 | 2.6% |
| Kelantan | 1 | 0.5% |
| Melaka | 7 | 3.6% |
| Negeri Sembilan | 3 | 1.5% |
| Pahang | 17 | 8.7% |
| Pulau Pinang | 22 | 11.2% |
| Perak | 10 | 5.1% |
| Perlis | 1 | 0.5% |
| Selangor | 55 | 28.1% |
| Terengganu | 3 | 1.5% |
| Sabah | 3 | 1.5% |
| Sarawak | 3 | 1.5% |

Table 4.1: Continued

| Demographic Profile | Frequency | Percentage |
|-----------------------------|-----------|------------|
| Kuala Lumpur | 48 | 24.5% |
| Putrajaya | 1 | 0.5% |
| Number of Employees | | |
| Less than 5 employees | 11 | 5.6% |
| Between 5 to 75 employees | 37 | 18.9% |
| Between 76 to 200 employees | 28 | 14.3% |
| More than 200 employees | 120 | 61.2% |
| Grand Total | 196 | 100% |

4.4 Descriptive and Normality Statistics

This study used a multivariate data analysis to look for patterns in multidimensional data and to assess multiple variables at the same time. In multivariate data analysis, the structural equation modelling (SEM) technique explores multiple relationships between sets of variables at the same time. This study requires the partial least square structural equation modelling (PLS-SEM) technique to analyse the theoretical framework based on assumptions with a complex structure, small sample size, and estimating large models with many constructs, variables, and structural paths (Hair, Risher, et al., 2019). PLS-SEM used a two-step approach, the assessment of the measurement model and structural model, to analyse the relationships of the theoretical framework with a complex structure, small sample size, and to estimate large models with many constructs, variables, and structural paths. Figure 4.1 below shows the initial PLS-Path model constructed for this study each with their own measurement items. The measurement and structural model were then evaluated, as stated in detail in Chapter 4.4, to study the connection between the variables described in Chapter 2.7. Finally, as a result of the calculations for the assessment of measurement and structural model, as discussed in Chapters 4.5 and 4.6, the PLS path model developed in **Figure 4.1** was modified and then represented in **Figure 4.2**.

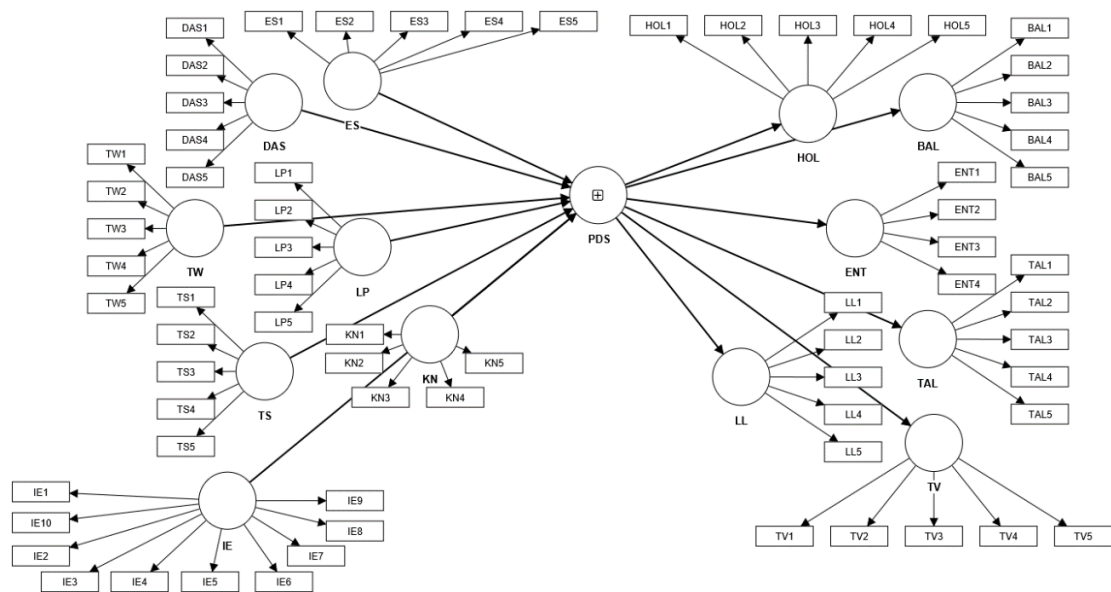


Figure 4.1: Initial PLS-Path Model

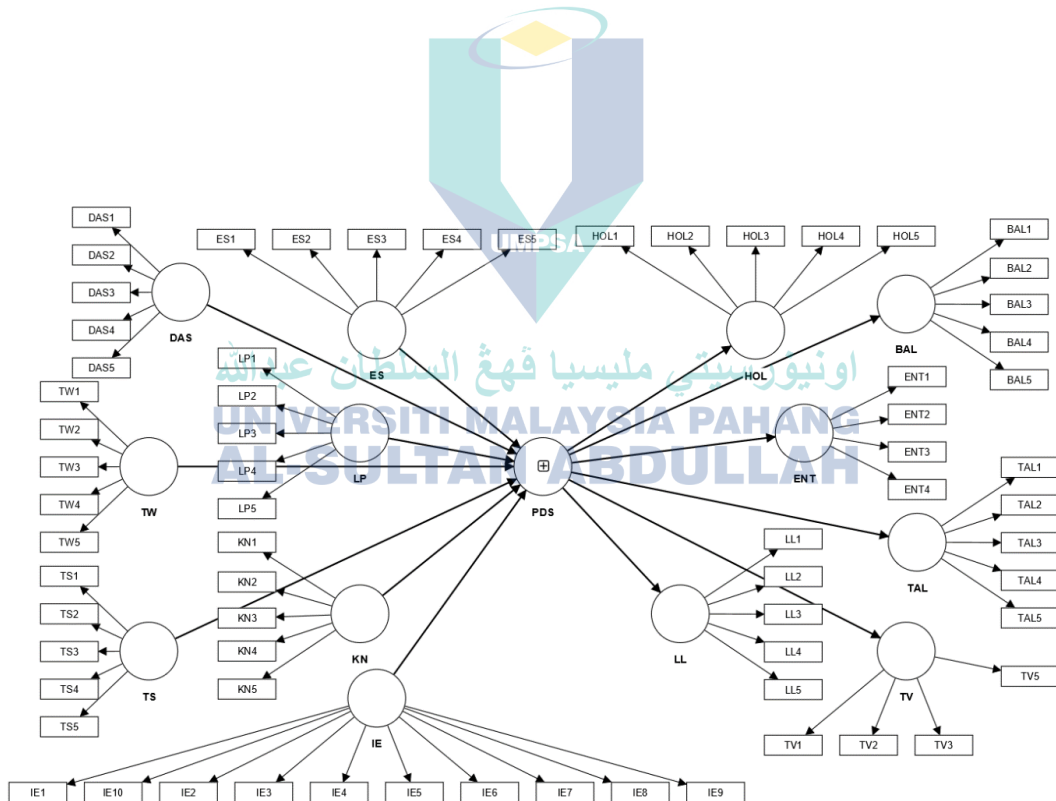


Figure 4.2: Modified PLS-Path Model

Following the theoretical framework developed and explained in Chapter 2, the constructs and measurement items were labelled in abbreviations. **Appendix A** displays a list of measurement items, each with its own label. From the analysis, the variation of the data from normal distribution is medium, resulting in valid statistical tests. This is mainly due to the sample sizes to be less than 200 which diminished the impact of normality. From **Table 4.2**, the standard deviation values range from 0.552 to 1.102, indicating that the data's variations from a normal distribution is moderate. Looking at the skewness values, all of the data are negatively skewed, as all of the skewness values are less than 0, and the values of excess kurtosis shows that the data has low degree of peakness and is platykurtic distributed.

Table 4.2: Descriptive Statistics and Normality Statistics

| Constructs | Item Code | Minimum | Maximum | Mean | Standard deviation | Excess kurtosis | Skewness |
|------------|-----------|---------|---------|-------|--------------------|-----------------|----------|
| HOL | HOL1 | 3 | 5 | 4.588 | 0.561 | -0.060 | -0.970 |
| | HOL2 | 3 | 5 | 4.413 | 0.578 | -0.733 | -0.374 |
| | HOL3 | 2 | 5 | 4.163 | 0.752 | -0.408 | -0.497 |
| | HOL4 | 2 | 5 | 4.531 | 0.626 | 0.783 | -1.122 |
| | HOL5 | 2 | 5 | 4.332 | 0.690 | 0.579 | -0.830 |
| BAL | BAL1 | 2 | 5 | 4.235 | 0.719 | 0.381 | -0.718 |
| | BAL2 | 2 | 5 | 4.153 | 0.813 | -0.307 | -0.634 |
| | BAL3 | 1 | 5 | 4.087 | 0.844 | 0.553 | -0.834 |
| | BAL4 | 3 | 5 | 4.296 | 0.642 | -0.698 | -0.366 |
| | BAL5 | 1 | 5 | 3.902 | 1.013 | 0.28 | -0.851 |
| ENT | ENT1 | 1 | 5 | 4.005 | 0.966 | 1.246 | -1.105 |
| | ENT2 | 1 | 5 | 3.918 | 0.955 | 0.411 | -0.792 |
| | ENT3 | 3 | 5 | 4.361 | 0.645 | -0.668 | -0.513 |
| | ENT4 | 2 | 5 | 4.128 | 0.826 | -0.15 | -0.680 |
| TAL | TAL1 | 1 | 5 | 3.856 | 0.961 | -0.263 | -0.477 |
| | TAL2 | 3 | 5 | 4.434 | 0.607 | -0.583 | -0.572 |
| | TAL3 | 1 | 5 | 4.515 | 0.651 | 3.438 | -1.458 |
| | TAL4 | 2 | 5 | 4.173 | 0.743 | 0.245 | -0.669 |
| | TAL5 | 1 | 5 | 4.128 | 0.865 | 0.585 | -0.923 |
| LL | LL1 | 1 | 5 | 4.107 | 0.829 | 1.104 | -0.907 |
| | LL2 | 1 | 5 | 4.536 | 0.609 | 4.595 | -1.502 |
| | LL3 | 1 | 5 | 3.949 | 0.862 | 0.767 | -0.721 |
| | LL4 | 2 | 5 | 4.338 | 0.639 | -0.045 | -0.563 |

Table 4.2: Continued

| Constructs | Item Code | Minimum | Maximum | Mean | Standard deviation | Excess kurtosis | Skewness |
|------------|-----------|---------|---------|-------|--------------------|-----------------|----------|
| TV | LL5 | 3 | 5 | 4.372 | 0.638 | -0.648 | -0.520 |
| | TV1 | 1 | 5 | 4.087 | 0.832 | 0.569 | -0.808 |
| | TV2 | 1 | 5 | 4.184 | 0.774 | 0.999 | -0.864 |
| | TV3 | 2 | 5 | 4.333 | 0.646 | 0.516 | -0.682 |
| | TV4 | 2 | 5 | 4.357 | 0.643 | -0.039 | -0.614 |
| ES | TV5 | 3 | 5 | 4.579 | 0.552 | -0.282 | -0.871 |
| | ES1 | 1 | 5 | 4.485 | 0.681 | 3.167 | -1.457 |
| | ES2 | 3 | 5 | 4.48 | 0.610 | -0.422 | -0.737 |
| | ES3 | 1 | 5 | 4.357 | 0.792 | 2.615 | -1.414 |
| | ES4 | 3 | 5 | 4.327 | 0.643 | -0.693 | -0.430 |
| DAS | ES5 | 2 | 5 | 4.291 | 0.716 | 0.199 | -0.749 |
| | DAS1 | 2 | 5 | 4.214 | 0.773 | 0.026 | -0.726 |
| | DAS2 | 2 | 5 | 4.200 | 0.755 | -0.092 | -0.639 |
| | DAS3 | 1 | 5 | 4.026 | 0.920 | 0.193 | -0.769 |
| | DAS4 | 2 | 5 | 4.323 | 0.711 | -0.060 | -0.735 |
| TW | DAS5 | 2 | 5 | 4.240 | 0.734 | -0.423 | -0.568 |
| | TW1 | 3 | 5 | 4.513 | 0.585 | -0.413 | -0.747 |
| | TW2 | 3 | 5 | 4.531 | 0.557 | -0.621 | -0.657 |
| | TW3 | 2 | 5 | 4.408 | 0.697 | -0.153 | -0.850 |
| | TW4 | 3 | 5 | 4.585 | 0.570 | 0.027 | -1.007 |
| LP | TW5 | 3 | 5 | 4.480 | 0.658 | -0.315 | -0.898 |
| | LP1 | 2 | 5 | 4.398 | 0.681 | 0.408 | -0.894 |
| | LP2 | 2 | 5 | 4.520 | 0.643 | 0.663 | -1.123 |
| | LP3 | 1 | 5 | 3.862 | 1.023 | -0.264 | -0.612 |
| | LP4 | 2 | 5 | 4.093 | 0.926 | -0.698 | -0.618 |
| TS | LP5 | 1 | 5 | 3.728 | 1.102 | -0.62 | -0.534 |
| | TS1 | 2 | 5 | 4.332 | 0.733 | 0.522 | -0.926 |
| | TS2 | 1 | 5 | 4.398 | 0.772 | 3.345 | -1.561 |
| | TS3 | 3 | 5 | 4.421 | 0.622 | -0.574 | -0.595 |
| | TS4 | 3 | 5 | 4.429 | 0.623 | -0.554 | -0.621 |
| KN | TS5 | 3 | 5 | 4.383 | 0.616 | -0.639 | -0.469 |
| | KN1 | 2 | 5 | 4.276 | 0.667 | -0.287 | -0.488 |
| | KN2 | 1 | 5 | 4.051 | 0.946 | 1.049 | -1.013 |
| | KN3 | 3 | 5 | 4.378 | 0.663 | -0.663 | -0.601 |
| | KN4 | 1 | 5 | 4.010 | 0.892 | 0.360 | -0.759 |
| | KN5 | 3 | 5 | 4.474 | 0.618 | -0.412 | -0.752 |

Table 4.2: Continued

| Constructs | Item Code | Minimum | Maximum | Mean | Standard deviation | Excess kurtosis | Skewness |
|------------|-----------|---------|---------|-------|--------------------|-----------------|----------|
| IE | IE1 | 1 | 5 | 4.487 | 0.712 | 3.590 | -1.633 |
| | IE2 | 2 | 5 | 4.513 | 0.667 | 1.178 | -1.250 |
| | IE3 | 3 | 5 | 4.579 | 0.571 | -0.021 | -0.983 |
| | IE4 | 3 | 5 | 4.541 | 0.600 | -0.107 | -0.942 |
| | IE5 | 2 | 5 | 4.520 | 0.643 | 1.415 | -1.240 |
| | IE6 | 1 | 5 | 4.510 | 0.696 | 3.631 | -1.637 |
| | IE7 | 2 | 5 | 4.520 | 0.650 | 0.639 | -1.141 |
| | IE8 | 2 | 5 | 4.536 | 0.650 | 1.494 | -1.314 |
| | IE9 | 2 | 5 | 4.551 | 0.641 | 0.927 | -1.247 |
| | IE10 | 3 | 5 | 4.628 | 0.562 | 0.506 | -1.214 |

4.5 Assessment of the Measurement Model

The first step in data analysis for this study is the assessment of the measurement model, which includes proving the relationships between the measured variable and its constructs. (Statistics Solutions, 2021). The procedures in analysing the measurement model include calculating the validity and reliability values of the measurement items. In this study, the indicator for convergent validity are outer loadings and average variance extracted. Meanwhile, the indicator for internal consistency reliability lies on the composite reliability of this study, and moving on to the discriminant validity, the indicators are Heterotrait-Monotrait Ratio (HTMT). Once the measurement model considered satisfactory through these steps, they can therefore be utilized for hypothesis testing and research model verification. The measurement model included 14 constructs: ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, knowledge, industrial experience, professional development success, holistic, entrepreneurial, balanced graduates, talent excellence, lifelong learner, and quality technical and vocational graduates.

4.5.1 Convergent Validity and Internal Consistency Reliability

According to the rule of thumb for measuring reflective measurement models, the measurement items must first be validated and reliable for the analysis of the constructs to be continued. The first step in reflective measurement model assessment involves examining the outer loadings. **Table 4.3** shows how the values of outer loadings for this study all lies in between values of 0.581 to 0.901, confirming that the indicators are all significant to this study and it explains more than 50 percent of the indicators' variance, proving acceptable item reliability (Hair, Risher, et al., 2019). According to Hair, Risher, et al. (2019), outer loadings values above 0.40, 0.50, 0.60, and 0.70 can be remained. For this study, the threshold value of outer loadings above 0.50 are remained for further assessment.

Furthermore, the average variance extracted (AVE) values should be greater than 0.50 for the constructs to be acceptable and all of the AVE values appear to be greater than 0.50, as illustrated in **Table 4.3**. This signifies that the model's constructs explain the variance of its own indicator, and are acceptable for the next analysis.

The second step in assessing reflective measurement model is assessing the internal consistency reliability (Hair, Risher, et al., 2019), by looking at composite reliability values, ρ_c , which is often measured using Joereskog's composite reliability. The preliminary calculations for the reflective measurement model assessments for this study revealed that composite reliability values in the range of 0.60 to 0.95 or higher were found, as displayed in **Table 4.3**, indicating that the reliability of the data for this study are satisfying to good (Hair, Black, et al., 2019).

Meanwhile, Cronbach's alpha, and ρ_a values are also another measure of internal consistency reliability of the data in measurement model (Hair, Risher, et al., 2019). Cronbach's alpha values are significantly lower than composite reliability values since it is sensitive to the number of items on the scale and often underestimates internal consistency. Meanwhile, the values of ρ_a are observed to be between Cronbach's alpha and composite reliability, indicating reliable measurement item.

Table 4.3: Convergent Validity and Internal Consistency Reliability

| Constructs | Item Code | Item | Outer Loadings | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|------------|-----------|---|----------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| BAL | BAL1 | I am able to fulfil my current demands. | 0.773 | 0.803 | 0.824 | 0.864 | 0.563 |
| | BAL2 | I am able to expect my future needs. | 0.764 | | | | |
| | BAL3 | I am capable of balancing my emotions. | 0.851 | | | | |
| | BAL4 | I am able to organize my priorities. | 0.754 | | | | |
| | BAL5 | I have a healthy work-life balance. | 0.581 | | | | |
| DAS | DAS1 | My data analysis skill can be reflected through my computer literacy skills. | 0.773 | 0.879 | 0.887 | 0.912 | 0.675 |
| | DAS2 | My talents reflect my ability to analyse data. | 0.840 | | | | |
| | DAS3 | My outstanding academic achievement proves my ability to analyse data. | 0.756 | | | | |
| | DAS4 | The ability to analyse data helps me to improve my decision-making skills. | 0.858 | | | | |
| | DAS5 | I am capable of completing a variety of tasks through the use of data analysis. | 0.875 | | | | |

Table 4.3: Continued

| Constructs | Item Code | Item | Outer Loadings | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|------------|-----------|--|----------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| ENT | ENT1 | I have more entrepreneurial skills or knowledge than when I first started working. | 0.734 | 0.753 | 0.762 | 0.843 | 0.575 |
| | ENT2 | Being involved in a business allowed me to successfully demonstrate my entrepreneurial skills. | 0.812 | | | | |
| | ENT3 | I am very confident in my abilities to do my work. | 0.794 | | | | |
| | ENT4 | I am not scared to take risks. | 0.687 | | | | |
| ES | ES1 | I believed that my spiritual beliefs had an impact on my work performance. | 0.736 | 0.757 | 0.769 | 0.836 | 0.506 |
| | ES2 | I made better decisions with the application of ethics or spirituality. | 0.770 | | | | |
| | ES3 | I follow the company's guidelines depending on my religion. | 0.637 | | | | |
| | ES4 | Organizational commitment reflects my commitment to the company. | 0.764 | | | | |

Table 4.3: Continued

| Constructs | Item Code | Item | Outer Loadings | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|------------|-----------|--|----------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| | ES5 | I adhere to the company's policies all the time. | 0.638 | | | | |
| HOL | HOL1 | I am capable of completing my duties physically. | 0.703 | 0.760 | 0.768 | 0.838 | 0.511 |
| | HOL2 | I am capable of analysing work-related problems from different perspectives. | 0.781 | | | | |
| | HOL3 | I am able to understand others or identify their strengths or flaws. | 0.713 | | | | |
| | HOL4 | I am able to get along well with my co-workers. | 0.628 | | | | |
| | HOL5 | I become more creative. | 0.739 | | | | |
| IE | IE1 | Ability to solve problems | 0.743 | 0.950 | 0.953 | 0.957 | 0.692 |
| | IE2 | Ability to use knowledge | 0.817 | | | | |
| | IE3 | Ability to learn new things | 0.885 | | | | |
| | IE4 | Appreciate the importance of lifelong learning | 0.857 | | | | |
| | IE5 | Leadership | 0.849 | | | | |
| | IE6 | Presentation skills | 0.742 | | | | |
| | IE7 | Decision-making ability | 0.892 | | | | |

Table 4.3: Continued

| Constructs | Item Code | Item | Outer Loadings | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|------------|-----------|--|----------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| | IE8 | Self-confidence | 0.880 | | | | |
| | IE9 | Teamwork | 0.788 | | | | |
| | IE10 | Ability to work under pressure | 0.853 | | | | |
| KN | KN1 | My performance in standardized testing demonstrates my knowledge of the work that I performed. | 0.826 | 0.853 | 0.874 | 0.893 | 0.627 |
| | KN2 | My academic achievement reflects my level of knowledge. | 0.752 | | | | |
| | KN3 | My level of knowledge helps me improve my abilities or skills. | 0.860 | | | | |
| | KN4 | My certifications indicate my level of knowledge. | 0.708 | | | | |
| | KN5 | My general intelligence can be enhanced as my knowledge increases. | 0.805 | | | | |
| LL | LL1 | I am able to manage stress. | 0.701 | 0.812 | 0.821 | 0.870 | 0.574 |
| | LL2 | Each learning process improved my work performance. | 0.783 | | | | |

Table 4.3: Continued

| Constructs | Item Code | Item | Outer Loadings | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|------------|-----------|---|----------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| LP | LL3 | My academic achievement is excellent. | 0.661 | 0.779 | 0.800 | 0.846 | 0.525 |
| | LL4 | My creativity develops better with each learning process. | 0.853 | | | | |
| | LL5 | My skills or knowledge indicate the success of the lifelong learning process. | 0.776 | | | | |
| | LP1 | My language proficiency can be demonstrated by my fluency in the languages | 0.750 | | | | |
| | LP2 | I can talk, write, and read in both Bahasa Melayu and English. | 0.708 | | | | |
| PDS | LP3 | The number of language certifications can reflect my language proficiency. | 0.771 | 0.909 | 0.914 | 0.929 | 0.686 |
| | LP4 | I am eager to learn or understand new languages. | 0.623 | | | | |
| | LP5 | I can easily translate one language to another. | 0.760 | | | | |
| ENT | ENT | Entrepreneurial | 0.793 | | | | |

Table 4.3: Continued

| Constructs | Item Code | Item | Outer Loadings | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|------------|-----------|---|----------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| | HOL | Holistic | 0.815 | | | | |
| | LL | Lifelong Learner | 0.860 | | | | |
| | TAL | Talent Excellence | 0.873 | | | | |
| | TV | Quality Technical and Vocational Graduates | 0.832 | | | | |
| TAL | TAL1 | I am more successful academically. | 0.589 | 0.773 | 0.784 | 0.847 | 0.527 |
| | TAL2 | I am flexible and willing to change. | 0.776 | | | | |
| | TAL3 | I am confident that I am becoming more successful. | 0.748 | | | | |
| | TAL4 | I have the ability to see things from another person's point of view. | 0.736 | | | | |
| | TAL5 | I have a high level of satisfaction or experience with my work. | 0.764 | | | | |
| TS | TS1 | I use different types of thinking skills when solving problems. | 0.807 | 0.875 | 0.888 | 0.910 | 0.670 |
| | TS2 | I believe that higher order thinking skills (HOTS) are important for my career. | 0.703 | | | | |

Table 4.3: Continued

| Constructs | Item Code | Item | Outer Loadings | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|------------|-----------|---|----------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| | TS3 | My thinking skills can be demonstrated through my ability to understand, analyse, and generate solutions to problems. | 0.888 | | | | |
| | TS4 | I gain more confidence when utilizing different thinking skills. | 0.901 | | | | |
| | TS5 | My thinking skills are reflected through the level of my general intelligence. | 0.779 | | | | |
| TV | TV1 | My accreditation or certification demonstrate my quality as a worker. | 0.722 | 0.821 | 0.824 | 0.875 | 0.583 |
| | TV2 | My knowledge or education demonstrate my technical or vocational abilities. | 0.734 | | | | |
| | TV3 | I am trustworthy or capable of defending my rights. | 0.815 | | | | |
| | TV4 | I have better communication skills now. | 0.769 | | | | |

Table 4.3: Continued

| Constr ucts | Item Code | Item | Outer Loadings | Cronb ach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|----------------|--------------|--|-------------------|-------------------------|-------------------------------------|-------------------------------------|---|
| | TV5 | I believe that my work quality improves when I feel confident in my work. | 0.773 | | | | |
| TW | TW1 | The performance of teams or departments in my company can be reflected through the ability of team members to work together. | 0.803 | 0.889 | 0.896 | 0.918 | 0.692 |
| | TW2 | My communication skills improved after I work in a group. | 0.852 | | | | |
| | TW3 | I solve problems better when I am working in a team. | 0.816 | | | | |
| | TW4 | I am aware of my responsibilities towards the team. | 0.861 | | | | |
| | TW5 | I achieve more goals when working in a team. | 0.827 | | | | |

4.5.2 Discriminant Validity

The third step of the reflective measurement model assessment involves examining the discriminant validity, which is used to find the uniqueness of a construct from one another (Hair, Risher, et al., 2019). The heterotrait-monotrait (HTMT) values should have values of less than 0.90, suggesting that the constructs are conceptually different from one another (Hair, Black, et al., 2019). However, as displayed **Table 4.4**, there are HTMT values shown to be more than or equal to 0.906 in my study, which indicates that my study lacks discriminant validity. Except for the TAL and TV values, all of the HTMT values displayed are below the recommended HTMT value of 0.85. The values of more than or equal to 0.906 indicated that the constructs are conceptually identical, showing that this study lacks discriminant validity and implying that the constructs are conceptually similar (Hair, Black, et al., 2019). This is because HTMT values cannot exceed 0.90, which indicates that the constructs are conceptually identical to one another. Cross loading assessment of HTMT confidence intervals was required to address the problem of conceptually identical constructs to determine which items should be eliminated in order to maintain internal consistency reliability.

The confidence interval shown by the values of the TAL and TV constructs in **Table 4.5** is the confidence interval that has undergone cross loading assessment where bootstrapping was performed to determine whether HTMT confidence interval values do not include the value of 1. When the value 1 is displayed, it indicates that the measurement items for the constructs are similar. The initial bootstrapping resulted in the deletion of item TV4, which had the lowest cross loading value, indicating that the measurement item was not related with its constructs and should so be deleted. Following the deletion of item TV4, the process was repeated according to the rule of thumb until the end results shown in **Table 4.4** were obtained. The analysis of this model was then allowed to continue since the constructs were proved to be conceptually significant from one another. **Figure 4.2** illustrates the modified PLS path model for this study, with item TV4 removed from the initial model.

Table 4.4: Discriminant Validity: HTMT Results

| | BAL | DAS | ENT | ES | HOL | IE | KN | LL | LP | TAL | TS | TV | TW |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|
| BAL | | | | | | | | | | | | | |
| DAS | 0.599 | | | | | | | | | | | | |
| ENT | 0.733 | 0.564 | | | | | | | | | | | |
| ES | 0.697 | 0.689 | 0.590 | | | | | | | | | | |
| HOL | 0.762 | 0.666 | 0.784 | 0.641 | | | | | | | | | |
| IE | 0.404 | 0.458 | 0.382 | 0.544 | 0.519 | | | | | | | | |
| KN | 0.544 | 0.784 | 0.545 | 0.657 | 0.667 | 0.563 | | | | | | | |
| LL | 0.766 | 0.699 | 0.748 | 0.758 | 0.812 | 0.491 | 0.687 | | | | | | |
| LP | 0.451 | 0.738 | 0.558 | 0.585 | 0.611 | 0.486 | 0.841 | 0.632 | | | | | |
| TAL | 0.742 | 0.761 | 0.817 | 0.721 | 0.797 | 0.520 | 0.739 | 0.911 | 0.703 | | | | |
| TS | 0.619 | 0.775 | 0.640 | 0.723 | 0.711 | 0.564 | 0.844 | 0.803 | 0.777 | 0.812 | | | |
| TV | 0.692 | 0.668 | 0.743 | 0.791 | 0.735 | 0.562 | 0.721 | 0.801 | 0.679 | 0.906 | 0.716 | | |
| TW | 0.542 | 0.671 | 0.540 | 0.776 | 0.596 | 0.614 | 0.654 | 0.678 | 0.625 | 0.641 | 0.691 | 0.653 | |

Table 4.5: Confidence Interval of HTMT

| Path | HTMT | Confidence Interval | |
|------------|-------|---------------------|--------|
| | | 5.00% | 95.00% |
| TAL <-> LL | 0.911 | 0.836 | 0.996 |
| TV <-> TAL | 0.906 | 0.837 | 0.968 |

4.6 Assessment of the Structural Model

The assessment of the structural model, which describes how constructs are related to one another, is the next step in the data analysis for this study. Collinearity assessment, obtaining structural model path coefficients, evaluating coefficients of determination (R^2) and effect size (f^2), and assessing predictive relevance are all procedures in structural model analysis.

4.6.1 Collinearity Assessment

Traditionally, variance inflation factor (VIF) values above 5 in variable IExKN <-> PDS as stated in **Table 4.6** is regarded as indications of problematic multicollinearity as it can lead to insignificant estimates and unexpected signs of weights (Benitez, Henseler, Castillo, & Schuberth, 2020). Multicollinearity refers to predictors that are correlated with other predictors (Minitab Blog Editor, 2013). To deal with the multicollinearity, Minitab Blog Editor (2013) suggested removing highly correlated predictors from the model or using PLS regression methods that cut the number of predictors to a smaller set of uncorrelated components.

Table 4.6: Collinearity Assessment

| Variable | Inner VIF |
|-------------|-----------|
| ES <-> PDS | 2.321 |
| DAS <-> PDS | 2.592 |
| TW <-> PDS | 2.595 |
| LP <-> PDS | 2.441 |
| TS <-> PDS | 3.117 |
| KN <-> PDS | 3.141 |
| IE <-> PDS | 1.848 |

Table 4.6: Continued

| Variable | Inner VIF |
|----------------|-----------|
| IExES <-> PDS | 2.647 |
| IExDAS <-> PDS | 4.902 |
| IExTW <-> PDS | 2.862 |
| IExLP <-> PDS | 4.900 |
| IExTS <-> PDS | 3.740 |
| IExKN <-> PDS | 5.353 |

As shown in **Table 4.6**, VIF values between IE, KN, and PDS have a value of more than 5, indicating problematic multicollinearity. Therefore, the path of the highly correlated predictors was removed as it indicates that the predictors may be problematic and the coefficients are unstable and difficult to be interpreted (Frost, 2017; Minitab Blog Editor, 2013), which proved that the path of IExKN <-> PDS cannot be calculated in the analysis of structural model in the next step. This step may correspondingly reduce the other VIF values as shown in **Table 4.7**.

Table 4.7: Collinearity Assessment - After Deleting IExKN

| Variable | Inner VIF |
|----------------|-----------|
| ES <-> PDS | 2.277 |
| DAS <-> PDS | 2.573 |
| TW <-> PDS | 2.592 |
| LP <-> PDS | 2.403 |
| TS <-> PDS | 3.117 |
| KN <-> PDS | 3.048 |
| IE <-> PDS | 1.818 |
| IExES <-> PDS | 2.642 |
| IExDAS <-> PDS | 4.534 |
| IExTW <-> PDS | 2.772 |
| IExLP <-> PDS | 4.149 |
| IExTS <-> PDS | 3.475 |

4.6.2 Structural Model Path Coefficients

Moving on, the structural model analysis results, as shown in Table 4.8, revealed that only H1, H2, and H5 are supported, with P values less than 0.05 and t-values more than 1.645, indicating that these hypotheses are the only ones meaningful to the study. Other hypotheses that have P values of more than 0.05 were shown to be not supported by this study. Meanwhile, all moderating effects, as seen by the P values between IE and other constructs in **Table 4.8**, were greater than 0.05, showing that the relationship between H7 until H11 is insignificant. The calculations for H12 was not included in structural model path coefficient analysis as it indicated problematic multicollinearity that causes the hypothesis to be removed from the collinearity assessment. Therefore, the calculation for H12 was not displayed in **Table 4.8**. This proved that between EduSC attributes and PDS, there are no moderating effect of IE. IE does not moderate the effect of all EduSC attributes on all of PDS. The significant relationship between PDS and its constructs, as shown in H1, H2, and H5, were proven by a t-value greater or equal to 1.645.

The results of the hypotheses testing indicate that a majority of the hypotheses are not supported, as evidenced by the high P values, which is greater than 0.05. This outcome can be attributed to several factors. Firstly, the complex and diverse nature of the constructs being tested may have caused variability in the responses, decreasing the statistical significance of the findings. Secondly, the sample size and framework might have influenced the results, where a larger or more diverse sample could potentially yield different findings. Additionally, the presence of selection bias could contribute to inconsistencies in the data. Another critical concern is the possibility of interrupting factors that were not accounted for in the model, which could have confused the relationships between the variables. Lastly, the contextual factors specific to the study setting, such as cultural, organizational, or industry-specific influences, might have played a role in the lack of significant support for many of the hypotheses.

Table 4.8: Results of Hypotheses Testing

| Hypotheses | Path | Std Beta | Std Error | T-Value | P values | Bias | Confidence Interval | | Result |
|------------|-----------------|----------|-----------|---------|----------|--------|---------------------|--------|---------------|
| | | | | | | | 5.00% | 95.00% | |
| H1 | ES -> PDS | 0.224 | 0.063 | 3.541 | 0.000 | -0.007 | 0.126 | 0.331 | Supported |
| H2 | DAS -> PDS | 0.159 | 0.079 | 2.004 | 0.023 | 0.012 | 0.022 | 0.272 | Supported |
| H3 | TW -> PDS | 0.073 | 0.073 | -0.999 | 0.159 | -0.010 | -0.040 | 0.197 | Not supported |
| H4 | LP -> PDS | 0.058 | 0.070 | 0.831 | 0.203 | 0.005 | -0.071 | 0.161 | Not supported |
| H5 | TS -> PDS | 0.314 | 0.074 | 4.246 | 0.000 | 0.010 | 0.184 | 0.417 | Supported |
| H6 | KN -> PDS | 0.079 | 0.080 | 0.984 | 0.163 | -0.007 | -0.055 | 0.207 | Not supported |
| H7 | IE x ES -> PDS | -0.021 | 0.063 | 0.338 | 0.368 | 0.020 | -0.124 | 0.067 | Not supported |
| H8 | IE x DAS -> PDS | -0.047 | 0.080 | -0.591 | 0.278 | 0.000 | -0.184 | 0.084 | Not supported |
| H9 | IE x TW -> PDS | -0.003 | 0.065 | 0.045 | 0.482 | -0.001 | -0.108 | 0.107 | Not supported |
| H10 | IE x LP -> PDS | -0.081 | 0.068 | -1.200 | 0.115 | 0.006 | -0.204 | 0.017 | Not supported |
| H11 | IE x TS -> PDS | 0.098 | 0.077 | 1.272 | 0.102 | -0.023 | -0.013 | 0.222 | Not supported |
| H12 | IE x KN -> PDS | - | - | - | - | - | - | - | Not supported |

4.6.3 Coefficients of Determination (R^2) And Effect Size (f^2)

R^2 values shows the amount of variation in the variables when compared to one another, with 0 representing no relationship and 1 representing a perfect relationship (Hair, Black, et al., 2019). **Table 4.9** revealed that all of the values are near to one, indicating that the variables differ significantly and considerably from one another. Since this study has multiple independent variables, R^2 adjusted values were used instead. In structural model, f^2 values explain a dependent construct. According to **Table 4.9**, construct TAL has the most effect on PDS when compared to other constructs, whereas ENT has the least effect on PDS.

Table 4.9: Adjusted Coefficients of Determination (R^2) and Effect Size (f^2)

| Construct | R-square adjusted | F^2 |
|-----------|-------------------|-------|
| BAL | 0.638 | 1.774 |
| ENT | 0.630 | 1.720 |
| HOL | 0.662 | 1.976 |
| LL | 0.738 | 2.830 |
| PDS | 0.648 | |
| TAL | 0.758 | 3.156 |
| TV | 0.676 | 2.100 |

4.6.4 Predictive Relevance

To predict the path model's predictive accuracy, Q^2 value is calculated based on the blindfolding procedure that removes single points in the data matrix, imputes the removed points with the mean and estimates the model parameters (Hair, Risher, et al., 2019). Q^2 values should be larger than zero for the constructs to indicate predictive accuracy of the structural model for that construct. As shown in Table 4.10, Q^2 values of this study depict large predictive relevance of the PLS-path model.

According to Shmueli et al. (2019), this model has high predictive power as shown in **Table 4.10**, as the values for all of the PLS-SEM are lower than the linear regression model (LM) (Hair, Risher, et al., 2019). Mean absolute error (MAE) is the more appropriate prediction statistic to assess this model's degree of prediction error as the prediction error distribution, Q^2_{predict} is highly asymmetrical.

Table 4.10: PLS Predict (Q^2)

| Construct | $Q^2_{predict}$ | PLS-SEM_MAE | LM_MAE |
|-----------|-----------------|-------------|--------|
| BAL | 0.350 | 0.642 | 0.692 |
| ENT | 0.289 | 0.653 | 0.743 |
| HOL | 0.387 | 0.624 | 0.743 |
| LL | 0.517 | 0.514 | 0.634 |
| TAL | 0.504 | 0.530 | 0.630 |
| TV | 0.476 | 0.558 | 0.632 |

4.7 Chapter Summary

The main goal of this chapter was to validate the research model by verifying measurement and structural model parameters. Furthermore, the study attempted to examine the effect of moderation (industrial experience) on the research model. To achieve these goals, the study utilized PLS-SEM path modelling to determine the parameters of the research model. To begin, the measurement model generated satisfactory measurements of reliability and validity. Despite the fact that the loadings of the indicators ranged between 0.40 to 0.70, only one measurement item from the quality technical and vocational construct was eliminated due to low cross loading values. All of the constructs' internal consistency achieved composite reliability values greater than 0.70, confirming construct reliability. Even if one of the constructs does not achieve composite reliability greater than 0.70, the model can still be measured using the rule of thumb. Additionally, by obtaining AVE values greater than 0.50, the measurement model exhibited reliable and validated convergent validity. Furthermore, a few of the HTMT values were discovered to have values greater than 0.90, requiring a cross loading assessment to determine the lowest value of the confidence interval between the affected HTMT values.

Subsequently, collinearity assessment through VIF calculations resulted in problematic multicollinearity, which was solved by eliminating highly correlated predictors, IE and KN. This cause other VIF values to be reduced as a result of this approach. In addition, the structural model validation yielded satisfactory findings. The R^2 in this study significantly explains variations in graduates' holistic, entrepreneurial, balance, and quality technical and vocational aspects, talent excellence, and lifelong learning from 63.0 percent to 75.8 percent (R^2 between 0.630 and 0.758). Moreover, the

study's analysis supported three of the twelve hypotheses in the structural model, as evidenced by t-values greater or equal to 1.645. Other proposed relationships have P values more than 0.05 based on the path coefficient assessment, indicating that the relationship is insignificant.

Finally, no moderating relationships were found in the structural model, indicating that industrial experience did not moderate the influence of all EduSC attributes on professional development success. Overall, the findings on hypothesized relationships among constructs were validated by using f^2 effect size, predictive relevance, and Q^2_{predict} , which demonstrated the model's large predictive relevance in this study. The following chapter provides a summary for the above results in an attempt to draw conclusions, provide limitations for this study and recommendation for future research.



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CHAPTER 5

CONCLUSION

5.1 Introduction

This is the final chapter of the thesis, and it discusses the study's summary and conclusions. This chapter will also reflect and discuss on the findings from Chapter 4, as well as draw conclusions from those findings. This chapter also analyses the study's limitations, and theoretical and practical implications to society, as well as recommendations for future research.

5.2 Recapitulations of Research

To summarize, the purpose of this study was to determine whether educational supply chain (EduSC) attributes with the moderation of industrial experience affect the professional development success of working individuals in Malaysia. In Chapter 2, a PLS-SEM model consisting of six EduSC attributes (ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge) and moderation from industrial experience was proposed to investigate the relationship between professional development success among working individuals in Malaysia.

Previous studies have revealed that these are among the most significant attributes that a working individual must possess in order to achieve success in professional development. Yet, there has been limited reference of those attributes applied in the Malaysian working environment, making this research significant for graduates looking for jobs and professional development success in Malaysia. The research was conducted through voluntary response sampling technique, utilizing a survey questionnaire instrument to 196 respondents and data was collected online. SmartPLS 4 software was then used for analysing the data collected from respondents, and multivariate data analysis was conducted to study the relationships between the proposed constructs.

Table 5.1 displayed the recapitulations of this study, starting with the research problem statement. In Malaysia, there was a 2.5 percent loss in skilled occupation category, especially in the categories of professional, associate professional, and technicians (The Edge Market, 2021). This was due to lack of involvement in professional occupations as there were fewer job openings and higher competition for the available jobs (Department of Statistics Malaysia, 2021a). Shortages of qualified personnel were the challenges for employers as more job seekers lack the exact skills and expertise that they desired which cause graduate mismatch phenomenon to happen (Naeem, 2022). Graduates would accept any job that sometimes does not match their qualifications and skills set, which causes mismatch skills to happen (Meyer & Wurdinger, 2016). The working experience would be increased, but it limits graduates from their further abilities and capabilities. This would cost the nation a substantial amount of money as number of unemployment increases due to the mismatched skills of individuals (Star Media Group Berhad, 2020).

It brings the study to RO1 and RO2 as EduSC in Malaysia must equipped students with certain attributes to enable the students in the supply chain to meet the industry's current needs. Following that, research questions and hypotheses were developed. In the end, the research findings ultimately conclude that:

- A) Professional development success is influenced by ethics and spirituality.
- B) Professional development success is influenced by data analysis skill.
- C) Professional development success is influenced by thinking skills.
- D) Industrial experiences does not moderate the relationship between EduSC attributes and professional development success.

Other hypotheses (H3, H4, H6 – H12) were not accepted in this study for the reasons that were already explained in Chapter 4 and further explained in the next section. Further studies are required to investigate the importance of the unaccepted hypotheses and also their relevance at the time period of the study.

Table 5.1: Table of Recapitulation

| No. | Problem Statement | Research Objective | Research Question | Statement of Hypotheses | Remark |
|-----|---|--|--|---|---------------|
| 1. | There was 2.5 percent loss in occupational categories of professional, associate | RO1: To examine the relationship between EduSC attributes and PDS | RQ1: What is the relationship between EduSC attributes and PDS? | H1: ES has a positive effect on PDS | Supported |
| 2. | professional, and technician due to fewer job openings and higher competition for jobs. | | | H2: DAS has a positive effect on PDS | Supported |
| 3. | Graduate mismatch phenomenon happen when | | | H3: TW has a positive effect on PDS | Not supported |
| 4. | today's current graduates' strengths differ from what employers look for in job candidates. | | | H4: LP has a positive effect on PDS | Not supported |
| 5. | The mismatched skills between graduates and employers' needs have become one of the critical issues to address that cost the nation a substantial lot of money. | | | H5: TS have a positive effect on PDS | Supported |
| 6. | | RO2: To analyse the moderating effect of IE in the relationship between EduSC attributes and PDS | RQ2: Does IE moderate the relationship between EduSC attributes and PDS? | H6: KN has a positive effect on PDS | Not supported |
| 7. | | | | H7: IE moderate the effects of ES on PDS | Not supported |
| 8. | | | | H8: IE moderate the effects of DAS on PDS | Not supported |
| 9. | | | | H9: IE moderate the effects of TW on PDS | Not supported |
| 10. | | | | H10: IE moderate the effects of LP on PDS | Not supported |
| 11. | | | | H11: IE moderate the effects of TS on PDS | Not supported |
| 12. | | | | H12: IE moderate the effects of KN on PDS | Not supported |

Note: EduSC (educational supply chain), PDS (professional development success), ES (ethics and spirituality), DAS (data analysis skill), TW (teamwork), LP (language proficiency), TS (thinking skills), KN (knowledge), IE (industrial experience)

5.3 Discussion of Findings

The objective of this research is to examine the relationship between the six EduSC attributes and professional development success according to RBV theory, with the moderating influence of industrial experiences. The outcomes of this research demonstrated that most of Malaysian workforce within the sample size believe that ethics and spirituality, data analysis skill, and thinking skills are the most significant aspects to their professional development success. This study's analysis found that just these hypotheses were accepted:

H1: Ethics & spirituality has a positive effect on professional development success.

H2: Data analysis skill has a positive effect on professional development success.

H5: Thinking skills have a positive effect on professional development success.

The findings of this study supported Bell's (2014) statement that the end product of a service industry supply chain is highly dependent on ethics. **Figure 2.3** illustrates EduSC's final product: employee and entrepreneur, and this study found that ethics are among the first aspects to be undertaken, especially for employees who are successful in their professional development. The findings also supported prior studies (Abbas & Khan, 2017; Pathik et al., 2012) that ethics are a key intangible in the workforce. Ethical behaviour and business, spiritual values, and morals have also been proven to be highly associated (Agbim et al., 2013), and in conclusion, ethics and spirituality continue to remain relevant in the workplace in 2022.

Previous study by Lau (2007) and Karzunina et al. (2018) revealed that data analysis abilities are still highly significant in an EduSC and in the core competencies needed in the 21st century. Supported in this study, and by researchers like Kalinowski et al. (2019), Mohammed Saido et al. (2015), Retnawati et al. (2018), Seyithan (2015), and Zeide (2017), data analysis can be applied in various jobs and by everyone involved in an EduSC, as indicated in the demographic profile of this study in **Table 4.1**. On the other hand, thinking skills were also proved to be supported in this study, which reinforces Lai's (2011) findings that thinking skills are essential, particularly in learning processes, and useful to everyone. Thinking skills are becoming increasingly valuable than ever due to technological advancements and a shift in the demand for work skills, as proven by

Irawan et al. (2017). This study's findings also supported the perception that exchanges of ideas in small group discussions may occur often (Irawan et al., 2017), particularly in today's dynamic work environment. Because this study validated the hypothesis that thinking skills have a positive impact on professional development success, it also supported the theory that people who perform well in one thinking skill are likely to perform well in others, despite differences in individual thinking skills (Age UK Group, 2020). Meanwhile, the following hypotheses were revealed to be unsupported by this study:

H3: Teamwork has a positive effect on professional development success.

H4: Language proficiency has a positive effect on professional development success.

H6: Knowledge has a positive effect on professional development success.

H7 – H12: Industrial experience moderate the effects of ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge on professional development success.

The unsupported hypotheses was caused by the insignificant relationship as per the calculation of the structural model from the framework for this study. The findings proved that it is hard to evaluate teamwork since it does not demonstrate who is doing what on the team or how the members cooperated to achieve their goals (Thompson, 2018). This is also reinforced by Baker et al. (2005), who stated that teamwork does not guarantee that any process would operate effectively. Communications, conflict resolution, and negotiating skills are among the skills required for teamwork (Volkov & Volkov, 2015), but they may not be necessary in the post-COVID 19 work environment, where all work was done online (ReportLinker, 2021).

Surprisingly, language proficiency was found to not be crucial for professional development success, despite the fact that language ability is required in trade and business (Buchanan, 2017). This could be caused by language proficiency was not the only medium that can be used for the exchange of information between people (Mohd Nor et al., 2019) as there are many reliable translator technologies that exists that can help people with languages. Perhaps, because it is not easy to learn languages (Kalinowski et al., 2019) and employers mostly require their employees to be able to at

least be proficient in English, as English is the most commonly spoken language in the world (Buchanan, 2017), language proficiency was seen not important in professional development success. These findings contradict the findings of Ting et al. (2017) which suggest that Malaysian private employers prefer to hire workers with better language proficiency and communication skills. The findings of this study also contradict the fact that language proficiency was ranked as one of the most important skills for graduate employability (Ting et al., 2017), and it has also been demonstrated that it will not have an impact on academic success (Kalinowski et al., 2019) since it has been proved that it is not important for professional development success.

Data from several studies has identified that knowledge is needed and has a positive effect on professional development success (Jamil et al., 2011; Paul et al., 2019; Ravandpour & Elmer, 2019). By contrast to earlier findings, this study was unable to support H6 in that knowledge has a positive effect on professional development success. The possible reason for this is that demonstration of only knowledge are not enough to show one's ability (Kalinowski et al., 2019) especially in today's modern times. Acquiring knowledge would costs a lot of time, energy, and money, which means that people would rather look for knowledge in the informal way, outside of a structured and formal classroom setting or by themselves through video-watching, self-studying, and video games (Johnson, 2019). Knowledge was deemed less important as the most used way to test knowledge is through standardised testing in educational institutions (Wijnen-Meijer et al., 2013), when in fact each individual differ from one another. Diversity in knowledge broaden the perspectives and ideas that people have (Edmondson & Harvey, 2018), causing boundaryless of knowledge obtained differently for each individual.

Undoubtedly, industrial experience was regarded as an asset or resource for individuals as explained in Chapter 2. Many studies have highlighted industrial experience's effect on the attributes and skills of individuals to the success of their professional development (Ahmad et al., 2018; Azodo, 2018; BMS Performance, 2017; Rodzalan & Saat, 2012; Sohaimi & Senasi, 2020; Ting et al., 2017). Even though many past studies have mentioned that industrial experience moderate the relationship between EduSC attributes and professional development success, this study has been unable to prove that industrial experience moderate the effects of EduSC attributes on professional development success. The possible reason could be that in today's working environment,

employers does not have to hire someone who already has industrial expertise (BMS Performance, 2017), due to the many variations of work exists in the working environment.

As displayed in **Table 5.1**, this study was unable to support H7 that industrial experience moderate the effects of ethics and spirituality on professional development success. The results were inconsistent with the statement made by Rodzalan and Saat (2012), Ahmed et al. (2019) and Mohd and Jamta (2018) that students' ethical conduct and professional development success are influenced by their industrial experience, and also individual's ethical behaviours and spiritual values are not necessary for professional development and experience in the workplace cannot influence an employee's changing behaviour. The results were also found to be in conflict with Lata and Chaudharys' (2020) description of the idea that spirituality values might impact the production of employees who act more ethically, which can enhance one's success in professional development. The possible reason for this could be caused by each individual are different from each other and everyone lives in different school environment and work atmosphere (Lata & Chaudhary, 2020; Rodzalan & Saat, 2012). Every aspect in the work culture from leadership, decision-making, training, codes of conduct to legislation relies heavily on each individual (Mohd & Jamta, 2018).

This study was also not be able to support H8 in that industrial experience moderate the effects of data analysis skill on professional development success. The analysis and results from this study revealed that, despite past studies showed that data analysis skill is in high demand in the workforce of the 21st century (Müller et al., 2018), experience is not necessary for improving one's professional development success in terms of data analysis skill (Mikalef et al., 2019). The possible reason for this could be caused by the rising trend of big data analytics (Müller et al., 2018), where none can have the same experience when working with the constantly evolving technologies. The lack of newly emerging trends of technologies in the past could be the cause of past studies that supported the fact that data analysis skill could help to moderate the relationship between successful professional development and job experiences. Back then, companies do not necessarily need data analytics skills for better growth as claimed by D'Angelo and Presutti in 2019. Low number of respondents for this study who are working for

foreign companies, as stated in **Table 4.1** could contribute to the lack of agreement that experience is needed for professional development success of a working individual

Previous studies by researchers like Sulaiman et al. (2017), Volkov and Volkov (2015), and Fu et al. (2020) have revealed that industrial experience can regulate or alter the relationship between teamwork and professional development success. Furthermore, teamwork was even recognized as one of the most important skills to have in many professions (Lee et al., 2018). However, by contrast to earlier studies, this study was unable to prove that industrial experience moderates the relationship between teamwork and professional development success. This study demonstrated that prior industrial experience is not always necessary for success in professional development when working in a team, despite the fact that cross-boundary teaming during industrial training has become a common strategy for professional development programs (Edmondson & Harvey, 2018). This could be related to the research problem where wrong people are working for the wrong job, leading working individuals to believe that teamwork is not necessary for professional development success due to a lack of motivation and readiness for personal development (Puckett et al., 2020).

On the other hand, Clement and Murugavel (2018) and Ting et al. (2017) have pointed out in previous studies that the rate of success of graduates' employability is frequently dependent on language proficiency and communication skills rather than professional attributes. Language proficiency was proven to be one of the most important abilities required by graduates in their working lives (Kalinowski et al., 2019), and it can produce helpful communication skills that benefit graduates in their working lives. However, this study has been unable to support the hypothesis that industrial experience moderates the effects of language proficiency on professional development success, despite with the claims that language is an important skill in the workplace as explained in Chapter 2. The reason for this could be caused by most of the respondents were working for a local company where industrial experience might not be needed to be proficient in languages for the professional development success of working individuals.

Previous study by Khodeir and Othman (2018) showed that thinking skills were seen as the first step towards a more sustainable future and they were utilised as people made decisions and planned their lives ahead (Seyithan, 2015). Boundaryless careers that have diverse effects on many measures of professional success was found to frequently

depended on the individual's experiences and adaptive capabilities that could include thinking skills (Guan et al., 2019). A study by Rainie and Anderson (2017) even stated that thinking skills and professional development success is likely to be achieved in working environment. However, this study was unable to prove that industrial experience moderate the effects of thinking skills on professional development success, despite the fact that employers frequently believe that graduates must go through industrial experiences or trainings to strengthen their critical thinking skills in order to be successful in their professional development (Ahmad et al., 2018). The possible reason for this could be caused by the variations of people's thinking skills, and because the majority of respondents have only worked for less than three years, as shown in Table 4.1, their industrial experience is unlikely to affect their thinking skills for professional development success because they have only recently begun working.

In addition, this study was also unable to support H12 where industrial experience was stated to moderate the effects of knowledge on professional development success. McAleavy et al. (2018) stated that knowledge and ability are essential to make real changes in the world. Previous studies by Zeide (2017), Gupta et al. (2018) and Kalinowski et al. (2019) demonstrated that industrial experience influence the relationship between knowledge and professional development success and Mohd Zain et al. (2017) revealed that skills and knowledge were prioritized in the rise of a knowledge-based economy back in the 2000s. Rainie and Anderson (2017) pointed out that training for skills and fact-based knowledge is crucial at work, but it is not necessary for students to learn and understand knowledge in order to be successfully developed. Every individual has different competitive advantage (Fatahi et al., 2016) and experiences as illustrated by the different working sector that the respondents are working in and this could be the main reason of why this hypothesis was not supported.

5.4 Implications of Study

This study adds to the understanding of the pathways to measuring professional development success by analysing its EduSC attributes among Malaysian working individuals. The six EduSC attributes proposed in this study are ethics and spirituality, data analysis skill, teamwork, language proficiency, thinking skills, and knowledge. The

role of industrial experience in moderating the relationship between EduSC and professional development success was also evaluated. This section presents two significant implications of this study in terms of theory and practice.

5.4.1 Theoretical implication

This research provided several significant implications for the theory. To begin with, the outcomes of this study significantly contribute to neoteric knowledge regarding a new educational model in SCM in the Malaysian education setting, which has only been presented by scholars such as Lau (2007) and Habib and Jungthirapanich (2008). This study also presented a set of characteristics that included indicators of competencies and professional development success, as stated in Chapter 2 and illustrated in **Figure 2.6**.

Job seekers can significantly benefit from this study as it provides a comprehensive framework of essential attributes and competencies that are crucial for achieving professional development success in the Malaysian working environment. By understanding and incorporating these attributes (such as ethics and spirituality, data analysis skills, teamwork, language proficiency, thinking skills, and knowledge), job seekers can better match their personal development efforts with the demands of the modern job market. This matching effort enhances their employability, making them more attractive to potential employers who prioritize these skills. Furthermore, the study's analysing into the educational supply chain (EduSC) offer practical guidelines for job seekers to identify and pursue relevant training and educational opportunities that foster these attributes. By strategically focusing on the attributes highlighted in this research, job seekers can navigate their career paths more effectively, increase their chances of securing preferred positions, and ultimately achieve greater professional success. This focused strategy not only improves their current job prospects but also position them for a long-term career growth and adaptability in a constantly changing economic environment.

This study also expanded the boundaries of knowledge for the study of EduSCM by clarifying and examining the characteristics that the individuals involved in the EduSC needed to have in order to be successful in professional development for them to be what the industry needed, such as employee or entrepreneur, as presented in **Figure 2.3** at the

end of the EduSC. This study also presented a developed model of a portion of EduSCM that may be used by other researchers to conduct additional research from this study, as the EduSC attributes mentioned in this study are the most important variables for this study as they are constantly changing over time. Furthermore, because the study was conducted in Malaysia, this study adds to the literature on EduSCM, particularly in the Malaysian setting. The variables analysed in this study also highlighted the significant skills required by Malaysian graduates to achieve professional development success by examining the six EduSC attributes derived from Karzunina et al. (2018), and Ministry of Education Malaysia (2015, 2018).

5.4.2 Practical implication

This study's findings reveal significant consequences for graduates, educators, and employers in EduSC. The findings suggest that employers can utilize the model developed from this research to fulfil company needs for recruiting people that have the same qualities as the attributes supported in this study. The findings also provide an understanding and awareness of the qualities and types of graduates that employers require, allowing employers to address and resolve the issue of mismatched skills between graduates and jobs available.

Moreover, this study has the potential to trigger changes in educational institutions and working industries by highlighting the attributes that were previously regarded as vital that are no longer so, and attributes that were previously deemed unimportant are now regarded as important. This can result in graduates being hired for positions that they are skilled at, which could lead to more efficient business operations since the graduates hired are a match for their abilities. It can later increase the success of professional development, which would enhance the nation's reputation and international credibility.

MOHE can also use this study to resolve the issue of mismatched skills by using the findings as a guide in reconstructing the educational process so that graduates have the necessary attributes before they go out looking for work. Employers developed a better understanding of the operational impact of their supply chain and why they need to hire employees with matched skills. Educators can prepare students to implement the

attributes highlighted in this study to meet the required job offers, resulting in greater professional development success. The outcomes of this study can be used by educational institutions and other related associates along the EduSC to improve educational services. Academicians can also carry out additional research on this topic to help lessen unemployment rate.

5.5 Limitations of Study

This study has several limitations, including the nature of limited data access, the lack of prior research on the subject for this study, and the limited timeframe of study. To begin with, this study was done in Malaysia's working environment where just 38 percent of the 516 possible respondents approached replied to this study, resulting in limited data access. Despite the fact that the survey questionnaire for this study was distributed to over 500 individuals, only around 40 percent replied, indicating that this research lacks generalizability because only a small percentage of the samples responded to it. Although this is not a problem for theory testing because there was reasonable concern about variations between responding samples (Hulland et al., 2017), this study is still considered reliable and valid looking at the validity and the variance of the items to its own indicator.

Secondly, there are only a few researches and theories on this topic, and many of the relevant literatures are relatively out of date. Citing and referencing previous research papers is the essential foundation of this study, as it is the foundation of the literature review (Wordvice Hj, 2022). There was not much from previous researches, therefore references from Habib and Jungthirapanich (2008, 2009b), and Lee et al. (2018) are heavily used. It also leads to the development of a totally new research typology, which requires further development for the topic of this research.

Finally, the main drawback of this research is that the process of creating this study is limited to a specific point in time, which means that more EduSC attributes might be incorporated if this research is done at a different period. It could affect the relevance of this study to real-time issues, which could have several variances during the different years it took to be done. It may also prevent researchers from determining the precise

nature of the relationships studied, that could potentially be applied to anyone working anywhere in the world and in any position at any time of the year.

5.6 Recommendation for Future Study

Based on the analysis and findings supported by the literature review, as well as the study's limitations, the following recommendations for future study are made to improve knowledge in the literature in EduSC and professional development success. This study has the potential to obtain a large number of samples and could be replicated in a different location. With a larger sample size, this research has the potential to have high generalizability, allowing it to be used and applied to a much larger portion of the population. More variables would exist, and a more reliable study might be developed.

Furthermore, further research can be conducted on more focused elements of the EduSC, such as its EduSCM and other EduSC activities. There could also be more references to rely on when relating EduSC to supply chain (SC) and SCM. Hence, more development from the topic of this study can be developed, as well as more knowledge that can increase the neoteric knowledge of EduSCM. Moreover, future research referencing this study can also use a longitudinal study strategy to study the subjects over time. This can lead to more precise data on the factors of professional development success, especially if the variables of this study change over time.

In addition, researches on how EduSC attributes affect professional development performance in Malaysia or other countries would be an interesting subject to study. It would allow researchers to compare various practices in the workplace in Malaysia and other nations that would be beneficial for developing a functional and efficient workforce that would benefit the country. The whole building theory processes developed in this research can be adapted to various environments, such as different industries of the working population, for the theoretical structure to be applied to a wider sample of the population. To add to that, while the current study focused solely on the moderating effects of industrial experience on the relationship between EduSC attributes and professional development success, the role of other mediating effects of variables such as gender, family background, race, and religion can be useful for future research to address to more specific problems.

5.7 Conclusion

The primary purpose of this study is to determine which qualities are most significant to a person who has success in professional development, and which of those qualities are perceived most relevant in an educational supply chain. In short, the goal of this study is to establish which attributes are most relevant to professional development success and whether having industrial experience affects the attributes and success of professional development. It was discovered that only ethics and spirituality, data analysis skill, and thinking skills are considered the most significant for professional development success, while industrial experiences have no moderating influence between EduSC attributes and professional development success. This suggests that ethics and spirituality are important in the EduSC. Data analysis skill are also proven to be required in a variety of industries, and thinking skills are essential for improving one's quality. Even though today's employers place a great value on industrial experience, it turns out that it has no moderating effect on one's qualities or professional development success.



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APPENDICES

Appendix A: List of Measurement Items

| Label | Item | Sources |
|---|--|--|
| Professional Development Success | | |
| Holistic, Entrepreneurial and Balanced Graduates | | |
| HOL1 | I am capable of completing my duties physically. | Sarkar (2020), Panda (2017) |
| HOL2 | I am capable of analysing work-related problems from different perspectives. | Sarkar (2020), Panda (2017) |
| HOL3 | I am able to understand others or identify their strengths or flaws. | Sarkar (2020) |
| HOL4 | I am able to get along well with my co-workers. | Sarkar (2020) |
| HOL5 | I become more creative. | Sarkar (2020) |
| ENT1 | I have more entrepreneurial skills or knowledge than when I first started working. | Holienka et al. (2015) |
| ENT2 | Being involved in a business allowed me to successfully demonstrate my entrepreneurial skills. | Holienka et al. (2015) |
| ENT3 | I am very confident in my abilities to do my work. | Holienka et al. (2015) |
| ENT4 | I am not scared to take risks. | Holienka et al. (2015) |
| BAL1 | I am able to fulfil my current demands. | Kumar and Garg (2017), Boyle et al. (2015) |
| BAL2 | I am able to expect my future needs. | Kumar and Garg (2017), Boyle et al. (2015) |
| BAL3 | I am capable of balancing my emotions. | Boyle et al. (2015) |
| BAL4 | I am able to organize my priorities. | Whitener (2017) |
| BAL5 | I have a healthy work-life balance. | Whitener (2017) |
| Talent Excellence | | |
| TAL1 | I am more successful academically. | Brusoni et al. (2014) |
| TAL2 | I am flexible and willing to change. | Boyle et al. (2015) |
| TAL3 | I am confident that I am becoming more successful. | Boyle et al. (2015) |
| TAL4 | I have the ability to see things from another person's point of view. | Boyle et al. (2015) |
| TAL5 | I have a high level of satisfaction or experience with my work. | Brusoni et al. (2014) |
| Lifelong Learner | | |
| LL1 | I am able to manage stress. | Boyle et al. (2015) |
| LL2 | Each learning process improved my work performance. | Howe and Goldberg (2019) |
| LL3 | My academic achievement is excellent. | Conceição et al. (2019) |
| LL4 | My creativity develops better with each learning process. | Vlasic et al. (2009) |
| LL5 | My skills or knowledge indicate the success of the lifelong learning process. | Laal (2011) |
| Quality Technical and Vocational Graduates | | |
| TV1 | My accreditation or certification demonstrate my quality as a worker. | MOE Malaysia (2016) |

| Label | Item | Sources |
|--|--|---|
| TV2 | My knowledge or education demonstrate my technical or vocational abilities. | MOE Malaysia (2016) |
| TV3 | I am trustworthy or capable of defending my rights. | Boyle et al. (2015) |
| TV4 | I have better communication skills now. | Rainie and Anderson (2017) |
| TV5 | I believe that my work quality improves when I feel confident in my work. | Boyle et al. (2015) |
| Educational Supply Chain (EduSC) Attributes | | |
| Ethics & Spirituality | | |
| ES1 | I believed that my spiritual beliefs had an impact on my work performance. | Vlasic et al. (2009), Motlagh et al. (2016) |
| ES2 | I made better decisions with the application of ethics or spirituality. | Motlagh et al. (2016) |
| ES3 | I follow the company's guidelines depending on my religion. | Agbim et al. (2013), Mohd Zain et al. (2017), Nilugal et al. (2015) |
| ES4 | Organizational commitment reflects my commitment to the company. | Suib and Said (2017), Panda (2017) |
| ES5 | I adhere to the company's policies all the time. | Agbim et al. (2013), Panda (2017) |
| Data Analysis Skill | | |
| DAS1 | My data analysis skill can be reflected through my computer literacy skills. | Wallace and Clariana (2005) |
| DAS2 | My talents reflect my ability to analyse data. | Irawan et al. (2017), Zeide (2017) |
| DAS3 | My outstanding academic achievement proves my ability to analyse data. | Irawan et al. (2017), Zeide (2017) |
| DAS4 | The ability to analyse data helps me to improve my decision-making skills. | |
| DAS5 | I am capable of completing a variety of tasks through the use of data analysis. | GTI Futures Ltd. (2021) |
| Teamwork | | |
| TW1 | The performance of teams or departments in my company can be reflected through the ability of team members to work together. | Baker et al. (2005), Panda (2017) |
| TW2 | My communication skills improved after I work in a group. | Alrifa and Raju (2019), Klibi and Oussii (2013), Sulaiman et al. (2017) |
| TW3 | I solve problems better when I am working in a team. | Volkov and Volkov (2015), Feng et al. (2020) |
| TW4 | I am aware of my responsibilities towards the team. | Thompson (2018) |
| TW5 | I achieve more goals when working in a team. | |
| Language Proficiency | | |
| LP1 | My language proficiency can be demonstrated by my fluency in the languages spoken in the company. | Ting et al. (2017), Mohd Nor et al. (2019) |
| LP2 | I can talk, write, and read in both Bahasa Melayu and English. | Kalinowski et al. (2019), Mohd Nor et al. (2019) |

| Label | Item | Sources |
|------------------------------|---|---|
| LP3 | The number of language certifications can reflect my language proficiency. | Kalinowski et al. (2019), Mohd Nor et al. (2019) |
| LP4 | I am eager to learn or understand new languages. | Darmi (2013) |
| LP5 | I can easily translate one language to another. | |
| Thinking Skills | | |
| TS1 | I use different types of thinking skills when solving problems. | Roslan et al. (2020) |
| TS2 | I believe that higher order thinking skills (HOTS) are important for my career. | Roslan et al. (2020), Retnawati et al. (2018) |
| TS3 | My thinking skills can be demonstrated through my ability to understand, analyse, and generate solutions to problems. | Pin et al. (2020) |
| TS4 | I gain more confidence when utilizing different thinking skills. | Pin et al. (2020) |
| TS5 | My thinking skills are reflected through the level of my general intelligence. | Age UK Group (2020) |
| Knowledge | | |
| KN1 | My performance in standardized testing demonstrates my knowledge of the work that I performed. | Wijnen-Meijer et al. (2013) |
| KN2 | My academic achievement reflects my level of knowledge. | Gopalakrishnan (2014) |
| KN3 | My level of knowledge helps me improve my abilities or skills. | Chansamut and Piriyasurawong (2014) |
| KN4 | My certifications indicate my level of knowledge. | Wallace and Clariana (2005) |
| KN5 | My general intelligence can be enhanced as my knowledge increases. | |
| Industrial Experience | | |
| IE1 | Ability to solve problems | Osman et al. (2016) |
| IE2 | Ability to use knowledge | Osman et al. (2016) |
| IE3 | Ability to learn new things | Osman et al. (2016) |
| IE4 | Appreciate the importance of lifelong learning | Osman et al. (2016) |
| IE5 | Leadership | Osman et al. (2016) |
| IE6 | Presentation skills | Osman et al. (2016) |
| IE7 | Decision-making ability | Osman et al. (2016) |
| IE8 | Self-confidence | Osman et al. (2016) |
| IE9 | Teamwork | Osman et al. (2016) |
| IE10 | Ability to work under pressure | Osman et al. (2016) |



SURVEY QUESTIONNAIRE / SOAL SELIDIK

Dear respondents,

My name is Nur Shahida Binti Mat Ishah and I am a postgraduate student at **Universiti Malaysia Pahang**. The purpose of this questionnaire is to identify the **important educational supply chain attributes that can influence graduates' professional development success with the moderating effect of industrial experience**. Basically, the aim of this study is to determine what characteristics are considered vital for working individuals who have successfully undergone professional development in order for graduates to imply for their employment prospects. Did you know, professional development is described as the continuing of education and career training after a person has begun working to enhance their career!

Your ideas, thoughts, and experience are highly valuable to the study. Your input will help providing useful information regarding **Malaysia's educational supply chain**. The questionnaire should only take **10 – 20 minutes**, and your responses are completely anonymous and confidential. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you have any questions about the questionnaire, please contact me at the email listed below. Thank you for your assistance and precious time!

Responden yang dihormati,

*Nama saya Nur Shahida Binti Mat Ishah dan saya adalah seorang pelajar pascasiswazah di **Universiti Malaysia Pahang**. Tujuan soal selidik ini dibuat adalah untuk mengenal pasti **atribut rantaian bekalan pendidikan yang penting yang boleh mempengaruhi kejayaan pembangunan profesional graduan dengan kesan penyederhanaan pengalaman industri**. Pada asasnya, tujuan kajian ini dijalankan adalah untuk menentukan ciri-ciri yang dianggap penting bagi individu yang bekerja yang telah berjaya menjalani pembangunan profesional agar graduan dapat mengamalkan ciri-ciri*

tersebut untuk prospek kerjaya mereka. Tahukah anda, pembangunan profesional dihuraikan sebagai pendidikan dan latihan kerjaya yang berterusan selepas seseorang itu mula berusaha untuk mempertingkatkan kerjayanya!

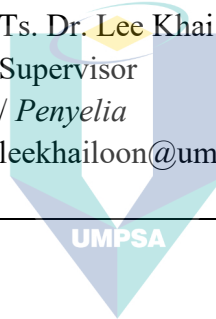
*Idea, pemikiran dan pengalaman anda adalah sangat berharga bagi kajian ini. Input anda akan membantu menyediakan maklumat berguna mengenai **rantaian bekalan pendidikan Malaysia**. Soal selidik ini hanya perlu mengambil masa **10 – 20 minit**, dan jawapan anda adalah tanpa nama dan sulit. Pengisian dan pengembalian soal selidik akan menunjukkan kesediaan anda untuk mengambil bahagian dalam kajian ini. Jika anda mempunyai sebarang pertanyaan tentang soal selidik, sila hubungi saya di emel yang tertera di bawah. Terima kasih atas bantuan dan masa berharga anda!*

Yours sincerely, / Yang benar,

Nur Shahida Binti Mat Ishah
Student / Pelajar
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Section A / Seksyen A

Please complete the following questionnaire by ticking a cross in the box that most relevant to you. / Sila lengkapkan soal selidik berikut dengan menanda pangkah dalam kotak yang paling berkaitan dengan anda.

1. What is your gender? / Apakah jantina anda?
☐ Male / Lelaki ☐ Female / Perempuan
2. What position are you holding in the company? / Apakah jawatan yang anda pegang di dalam syarikat?
☐ Entry-level / Peringkat permulaan ☐ Directors / Pengarah
☐ Intermediate or Associates / Pertengahan atau Rakan Sekutu ☐ Executives or Chief Officers / Eksekutif atau Ketua Pegawai
☐ Senior Management / Pengurusan Kanan ☐ Others. Please state. / Lain-lain. Sila nyatakan. _____
3. How long have you been in your current position? / Berapa lamakah anda berada dalam kedudukan anda sekarang?
☐ Less than 3 years / Kurang dari 3 tahun ☐ Between 6 to 8 years / Antara 6 hingga 7 tahun
☐ Between 3 to 5 years / Antara 3 hingga 5 tahun ☐ More than 8 years / Lebih dari 8 tahun
4. What is your company's type of organization? / Apakah jenis organisasi syarikat anda?
☐ Sole proprietorship / Perniagaan tunggal ☐ Unlimited company (Sdn.) / Syarikat tanpa had
☐ Partnership / Perkongsian ☐ Foreign company / Syarikat asing
☐ Private limited company (Sdn. Bhd.) / Syarikat sendirian berhad ☐ Limited liability partnership / Perkongsian liability terhad
☐ Public limited company (Bhd.) / Syarikat awam

5. What economic sector does your company belong to? / *Apakah sektor ekonomi yang syarikat anda tergolong?*
- ☐ Agriculture / *Pertanian* ☐ Industry / *Industri*
- ☐ Services / *Perkhidmatan*
6. How long has your company been in business? / *Berapa lama syarikat anda telah beroperasi?*
- ☐ Less than 3 years / *Kurang dari 3 tahun* ☐ Between 6 to 10 years / *Antara 6 hingga 10 tahun*
- ☐ Between 3 to 5 years / *Antara 3 hingga 5 tahun* ☐ More than 10 years / *Lebih dari 10 tahun*
7. Where is your company located? / *Dimanakah lokasi syarikat anda?*
- | | |
|--|---------------------------------------|
| <input type="checkbox"/> Johor | <input type="checkbox"/> Perlis |
| <input type="checkbox"/> Kedah | <input type="checkbox"/> Selangor |
| <input type="checkbox"/> Kelantan | <input type="checkbox"/> Terengganu |
| <input type="checkbox"/> Melaka | <input type="checkbox"/> Sabah |
| <input type="checkbox"/> Negeri Sembilan | <input type="checkbox"/> Sarawak |
| <input type="checkbox"/> Pahang | <input type="checkbox"/> Kuala Lumpur |
| <input type="checkbox"/> Pulau Pinang | <input type="checkbox"/> Labuan |
| <input type="checkbox"/> Perak | <input type="checkbox"/> Putrajaya |
8. How many people are employed in your company? / *Berapa ramai orang yang bekerja di syarikat anda?*
- ☐ Less than 5 employees / *Kurang dari 5 pekerja* ☐ Between 76 to 200 employees / *Antara 76 hingga 200 pekerja*
- ☐ Between 5 to 75 employees / *Antara 5 hingga 75 pekerja* ☐ More than 200 employees / *Lebih dari 200 pekerja*

General instructions: Please complete the following questionnaire by ticking a cross in the box that seems relevant. To help understanding the contents of the questions following, a statement will be provided on top of each section. / *Arahan am:* Sila lengkapkan soal selidik berikut dengan menanda pangkah dalam kotak yang kelihatan relevan. Untuk membantu memahami kandungan soalan yang berikut, satu pernyataan akan disediakan di atas setiap bahagian.

Section B / Seksyen B

The goal of the questions in this section is to determine what aspects of professional development success apply directly to the respondents' career progression. The grading scale is from (1) to (5) as follows: / *Matlamat untuk soalan dalam bahagian ini adalah untuk menentukan aspek kejayaan pembangunan profesional yang terpakai secara langsung kepada perkembangan kerjaya responden. Skala penggredan adalah dari (1) hingga (5) seperti berikut:*

| 1 | 2 | 3 | 4 | 5 |
|---|---------------------------------|---------------------------------|------------------------|--|
| Strongly Disagree (SD) / Sangat Tidak Setuju (SD) | Disagree (D) / Tidak setuju (D) | Uncertain (U) / Tidak Pasti (U) | Agree (A) / Setuju (A) | Strongly Agree (SA) / Sangat Setuju (SA) |

| Statement / Kenyataan | | SD 1 | D 2 | U 3 | A 4 | SA 5 |
|--|--|---------|--------|--------|--------|---------|
| After reaching professional development success, I become more holistic, which means that... / Selepas mencapai kejayaan pembangunan profesional, saya menjadi lebih holistik, yang bermaksud bahawa... | | | | | | |
| 1 | I am capable of completing my duties physically. / Saya mampu menyelesaikan tugas saya secara fizikal. | | | | | |
| 2 | I am capable of analysing work-related problems from different perspectives. / Saya mampu menganalisis masalah berkaitan kerja dari perspektif yang berbeza. | | | | | |
| 3 | I am able to understand others or identify their strengths or flaws. / Saya dapat memahami orang lain atau mengenal pasti kekuatan atau kelemahan mereka. | | | | | |
| 4 | I am able to get along well with my co-workers. / Saya dapat bergaul dengan baik dengan rakan sekerja. | | | | | |
| 5 | I become more creative. / Saya menjadi lebih kreatif. | | | | | |
| After reaching professional development success, I become more balanced, which means that... / Selepas mencapai kejayaan pembangunan profesional, saya menjadi lebih seimbang, yang bermaksud bahawa... | | | | | | |
| 1 | I can fulfil my current demands. / Saya boleh memenuhi permintaan semasa saya. | | | | | |
| 2 | I am able to expect my future needs. / Saya dapat menjangkakan keperluan masa depan saya. | | | | | |

| Statement / Kenyataan | | SD 1 | D 2 | U 3 | A 4 | SA 5 |
|---|---|---------|--------|--------|--------|---------|
| 3 | I am capable of balancing my emotions. / <i>Saya mampu mengimbangi emosi saya.</i> | | | | | |
| 4 | I am able to organize my priorities. / <i>Saya boleh mengatur keutamaan saya.</i> | | | | | |
| 5 | I have a healthy work-life balance. / <i>Saya mempunyai keseimbangan kerja dan kehidupan yang sihat.</i> | | | | | |
| After reaching professional development success, I have more entrepreneurial spirit, which means that... / <i>Selepas mencapai kejayaan pembangunan profesional, saya mempunyai lebih sifat keusahawanan, yang bermaksud bahawa...</i> | | | | | | |
| 1 | I now have more entrepreneurial skills or knowledge than when I first started working. / <i>Saya kini mempunyai lebih banyak kemahiran atau pengetahuan keusahawanan berbanding ketika saya mula bekerja.</i> | | | | | |
| 2 | Being involved in a business allowed me to successfully demonstrate my entrepreneurial skills. / <i>Melibatkan diri dalam perniagaan membolehkan saya dengan jayanya menunjukkan kemahiran keusahawanan saya.</i> | | | | | |
| 3 | I am very confident in my abilities to do my work. / <i>Saya sangat yakin dengan kebolehan saya untuk melakukan kerja saya.</i> | | | | | |
| 4 | I am not scared to take risks. / <i>Saya tidak takut untuk mengambil risiko.</i> | | | | | |
| After reaching professional development success, I excel more in my talents, which means that... / <i>Selepas mencapai kejayaan pembangunan profesional, saya lebih cemerlang dalam bakat saya, yang bermaksud bahawa...</i> | | | | | | |
| 1 | I am more successful academically. / <i>Saya lebih berjaya dari segi akademik.</i> | | | | | |
| 2 | I am flexible and willing to change. / <i>Saya fleksibel dan bersedia untuk berubah.</i> | | | | | |
| 3 | I am confident that I am becoming more successful. / <i>Saya yakin yang saya akan menjadi lebih berjaya.</i> | | | | | |
| 4 | I have the ability to see things from another person's point of view. / <i>Saya mempunyai keupayaan untuk melihat sesuatu dari sudut pandangan orang lain.</i> | | | | | |
| 5 | I have a high level of satisfaction or experience with my work. / <i>Saya mempunyai tahap kepuasan atau pengalaman yang tinggi dengan kerja saya.</i> | | | | | |
| After reaching professional development success, I become a lifelong learner, which means that... / <i>Selepas mencapai kejayaan pembangunan profesional, saya menjadi pelajar sepanjang hayat, yang bermaksud bahawa...</i> | | | | | | |
| 1 | I am able to manage stress. / <i>Saya mampu untuk mengurus tekanan.</i> | | | | | |

| Statement / Kenyataan | | SD 1 | D 2 | U 3 | A 4 | SA 5 |
|--|---|---------|--------|--------|--------|---------|
| 2 | Each learning process improved my work performance. / <i>Setiap proses pembelajaran meningkatkan prestasi kerja saya.</i> | | | | | |
| 3 | My academic achievement is excellent. / <i>Pencapaian akademik saya adalah cemerlang.</i> | | | | | |
| 4 | My creativity develops better with each learning process. / <i>Kreativiti saya berkembang dengan lebih baik dengan setiap proses pembelajaran.</i> | | | | | |
| 5 | My skills or knowledge indicate the success of the lifelong learning process. / <i>Kemahiran atau pengetahuan saya menunjukkan kejayaan proses pembelajaran sepanjang hayat.</i> | | | | | |
| After reaching professional development success, a quality technical and vocational graduates can be produced, which means that... / <i>Selepas mencapai kejayaan pembangunan profesional, graduan teknikal dan vokasional yang berkualiti dapat dihasilkan, yang bermaksud bahawa...</i> | | | | | | |
| 1 | My accreditation or certification demonstrate my quality as a worker. / <i>Akreditasi atau pensijilan saya menunjukkan kualiti saya sebagai pekerja.</i> | | | | | |
| 2 | My knowledge or education demonstrate my technical or vocational abilities. / <i>Pengetahuan atau pendidikan saya menunjukkan kebolehan teknikal atau vokasional saya.</i> | | | | | |
| 3 | I am trustworthy or capable of defending my rights. / <i>Saya boleh dipercayai atau mampu mempertahankan hak saya.</i> | | | | | |
| 4 | I have better communication skills now. / <i>Saya mempunyai kemahiran komunikasi yang lebih baik sekarang.</i> | | | | | |
| 5 | I believe that my work quality improves when I feel confident in my work. / <i>Saya percaya bahawa kualiti kerja saya bertambah baik apabila saya rasa yakin dengan kerja saya.</i> | | | | | |

Section C / Seksyen C

The purpose of the questions in this part is to assess which attributes of the educational supply chain respondents believe are important for a working individual. The grading scale is from (1) to (5) as follows: / Tujuan untuk soalan dalam bahagian ini adalah untuk menilai atribut-atribut rantaian bekalan pendidikan yang responden percaya penting untuk individu yang bekerja. Skala penggredan adalah dari (1) hingga (5) seperti berikut:

| 1 | 2 | 3 | 4 | 5 |
|---|---------------------------------|---------------------------------|------------------------|--|
| Strongly Disagree (SD) / Sangat Tidak Setuju (SD) | Disagree (D) / Tidak setuju (D) | Uncertain (U) / Tidak Pasti (U) | Agree (A) / Setuju (A) | Strongly Agree (SA) / Sangat Setuju (SA) |

| Statement / Kenyataan | | SD 1 | D 2 | U 3 | A 4 | SA 5 |
|---|---|---------|--------|--------|--------|---------|
| Ethics & Spirituality / Etika & Kerohanian | | | | | | |
| 1 | I believed that my spiritual beliefs had an impact on my work performance. / Saya percaya bahawa kepercayaan rohani saya mempunyai kesan ke atas prestasi kerja saya. | | | | | |
| 2 | I made better decisions with the application of ethics or spirituality. / Saya membuat keputusan yang lebih baik dengan penerapan etika atau kerohanian. | | | | | |
| 3 | I follow the company's guidelines depending on my religion. / Saya mengikut garis panduan syarikat bergantung kepada agama saya. | | | | | |
| 4 | Organizational commitment reflects my commitment to the company. / Komitmen organisasi mencerminkan komitmen saya kepada syarikat. | | | | | |
| 5 | I adhere to the company's policies all the time. / Saya mematuhi dasar syarikat sepanjang masa. | | | | | |
| Data Analysis Skill / Kemahiran Menganalisis Data | | | | | | |
| 1 | My data analysis skill can be reflected through my computer literacy skills. / Kemahiran menganalisis data saya boleh dicerminkan melalui kemahiran literasi komputer saya. | | | | | |
| 2 | My talents reflect my ability to analyze data. / Bakat saya mencerminkan keupayaan saya untuk menganalisis data. | | | | | |
| 3 | My outstanding academic achievement proves my ability to analyse data. / Pencapaian akademik saya yang cemerlang membuktikan kebolehan saya untuk menganalisis data. | | | | | |
| 4 | The ability to analyse data helps me to improve my decision-making skills. / Keupayaan menganalisis data membantu saya meningkatkan kemahiran membuat keputusan saya. | | | | | |

| Statement / Kenyataan | | SD 1 | D 2 | U 3 | A 4 | SA 5 |
|---|---|---------|--------|--------|--------|---------|
| 5 | I am capable of completing a variety of tasks through the use of data analysis. / <i>Saya mampu menyelesaikan pelbagai tugas melalui penggunaan analisis data.</i> | | | | | |
| Teamwork / Kerja Berpasukan | | | | | | |
| 1 | The performance of teams or departments in my company can be reflected through the ability of team members to work together. / <i>Prestasi pasukan atau jabatan dalam syarikat saya boleh dicerminkan melalui keupayaan ahli pasukan untuk bekerjasama.</i> | | | | | |
| 2 | My communication skills improved after I work in a group. / <i>Kemahiran berkomunikasi saya bertambah baik selepas saya bekerja dalam kumpulan.</i> | | | | | |
| 3 | I solve problems better when I am working in a team. / <i>Saya menyelesaikan masalah dengan lebih baik apabila saya bekerja dalam satu pasukan.</i> | | | | | |
| 4 | I am aware of my responsibilities towards the team. / <i>Saya sedar akan tanggungjawab saya terhadap pasukan.</i> | | | | | |
| 5 | I achieve more goals when working in a team. / <i>Saya mencapai lebih banyak matlamat apabila bekerja dalam satu pasukan.</i> | | | | | |
| Language Proficiency / Kecekapan Berbahasa | | | | | | |
| 1 | My language proficiency can be demonstrated by my fluency in the languages spoken in the company. / <i>Kecekapan berbahasa saya boleh ditunjukkan dengan kefasihan saya dalam bahasa yang dituturkan dalam syarikat.</i> | | | | | |
| 2 | I can talk, write, or read in both Bahasa Melayu and English. / <i>Saya boleh bercakap, menulis atau membaca dalam kedua-dua Bahasa Melayu dan Bahasa Inggeris.</i> | | | | | |
| 3 | The number of language certifications can reflect my language proficiency. / <i>Bilangan sijil bahasa yang saya miliki boleh mencerminkan kecekapan berbahasa saya.</i> | | | | | |
| 4 | I am eager to learn or understand new languages. / <i>Saya tidak sabar untuk belajar atau memahami bahasa baru.</i> | | | | | |
| 5 | I can easily translate one language to another. / <i>Saya boleh menterjemah satu bahasa ke bahasa lain dengan mudah.</i> | | | | | |
| Thinking Skills / Kemahiran Berfikir | | | | | | |
| 1 | I use different types of thinking skills when solving problems. / <i>Saya menggunakan pelbagai jenis kemahiran berfikir semasa menyelesaikan masalah.</i> | | | | | |
| 2 | I believe that higher order thinking skills (HOTS) are important for my career. / <i>Saya percaya bahawa kemahiran berfikir aras tinggi (KBAT) adalah penting untuk kerjaya saya.</i> | | | | | |

| Statement / Kenyataan | | SD 1 | D 2 | U 3 | A 4 | SA 5 |
|--------------------------------|---|---------|--------|--------|--------|---------|
| 3 | My thinking skills can be demonstrated through my ability to understand, analyze, or generate solutions to problems. / <i>Kemahiran berfikir saya boleh ditunjukkan melalui kebolehan saya untuk memahami, menganalisis atau menjana penyelesaian kepada masalah.</i> | | | | | |
| 4 | I gain more confidence when utilizing different thinking skills. / <i>Saya mendapat lebih keyakinan apabila menggunakan kemahiran berfikir yang berbeza.</i> | | | | | |
| 5 | My thinking skills are reflected through the level of my general intelligence. / <i>Kemahiran berfikir saya dicerminkan melalui tahap kecerdasan am saya.</i> | | | | | |
| Knowledge / Pengetahuan | | | | | | |
| 1 | My performance in standardized testing demonstrates my knowledge of the work that I performed. / <i>Prestasi saya dalam ujian standard menunjukkan pengetahuan saya tentang kerja yang saya lakukan.</i> | | | | | |
| 2 | My academic achievement reflects my level of knowledge. / <i>Pencapaian akademik saya mencerminkan tahap pengetahuan saya.</i> | | | | | |
| 3 | My level of knowledge helps me improve my abilities or skills. / <i>Tahap pengetahuan saya membantu saya meningkatkan kebolehan atau kemahiran saya.</i> | | | | | |
| 4 | My certifications indicate my level of knowledge. / <i>Pensijilan saya menunjukkan tahap pengetahuan saya.</i> | | | | | |
| 5 | My general intelligence can be enhanced as my knowledge increases. / <i>Kecerdasan am saya boleh dipertingkatkan apabila pengetahuan saya bertambah.</i> | | | | | |

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Section D / Seksyen D

The goal of the questions in this section is to rate the aspects of industrial experience that apply to respondents personally. The grading scale is from (1) to (5) as follows: / *Matlamat untuk soalan dalam bahagian ini adalah untuk menilai aspek pengalaman industri yang terpakai untuk responden secara langsung. Skala penggredan adalah dari (1) hingga (5) seperti berikut:*

| 1 | 2 | 3 | 4 | 5 |
|---|---------------------------------|---------------------------------|------------------------|--|
| Strongly Disagree (SD) / Sangat Tidak Setuju (SD) | Disagree (D) / Tidak setuju (D) | Uncertain (U) / Tidak Pasti (U) | Agree (A) / Setuju (A) | Strongly Agree (SA) / Sangat Setuju (SA) |

| Statement / Kenyataan | | SD 1 | D 2 | U 3 | A 4 | SA 5 |
|-----------------------|---|---------|--------|--------|--------|---------|
| 1 | Having industrial experience allows me to solve problems. / Mempunyai pengalaman industri membolehkan saya untuk menyelesaikan masalah. | | | | | |
| 2 | Having industrial experience allows me to use my knowledge. / Mempunyai pengalaman industri membolehkan saya untuk menggunakan pengetahuan saya. | | | | | |
| 3 | Having industrial experience allows me to learn new things. / Mempunyai pengalaman industri membolehkan saya untuk belajar perkara baru. | | | | | |
| 4 | Having industrial experience allows me to appreciate the importance of lifelong learning. / Mempunyai pengalaman industri membolehkan saya untuk menghargai kepentingan pembelajaran sepanjang hayat. | | | | | |
| 5 | Having industrial experience allows me to improve leadership. / Mempunyai pengalaman industri membolehkan saya menambah baik kepimpinan. | | | | | |
| 6 | Having industrial experience allows me to improve presentation skills. / Mempunyai pengalaman industri membolehkan saya menambah baik kemahiran-kemahiran pembentangan. | | | | | |
| 7 | Having industrial experience allows me to improve decision-making ability. / Mempunyai pengalaman industri membolehkan saya menambah baik keupayaan membuat keputusan. | | | | | |
| 8 | Having industrial experience allows me to acquire self-confidence. / Mempunyai pengalaman industri membolehkan saya memperoleh keyakinan diri. | | | | | |
| 9 | Having industrial experience allows me to acquire better teamwork. / Mempunyai pengalaman industri | | | | | |

| | | | | | | |
|----|---|--|--|--|--|--|
| | <i>membolehkan saya memperoleh kerja berpasukan yang lebih baik.</i> | | | | | |
| 10 | Having industrial experience allows me to acquire the ability to work under pressure. / Mempunyai pengalaman industri membolehkan saya memperoleh keupayaan untuk bekerja di bawah tekanan. | | | | | |

Thank you. / Terima kasih.

Appendix C: Online Survey Questionnaire



SURVEY QUESTIONNAIRE / SOAL SELIDIK

Dear respondents,
My name is Nur Shahida Binti Mat Ishah and I am a postgraduate student at Universiti Malaysia Pahang. The purpose of this questionnaire is to identify the important educational supply chain attributes that can influence graduates' professional development success with the moderating effect of industrial experience. Basically, the aim of this study is to determine what characteristics are considered vital for working individuals who have successfully undergone professional development in order for graduates to imply for their employment prospects. Did you know, professional development is described as the continuing of education and career training after a person has begun working to enhance their career!

Your ideas, thoughts, and experience are highly valuable to the study. Your input will help providing useful information regarding Malaysia's educational supply chain. The questionnaire should only take 10 – 20 minutes, and your responses are completely anonymous and confidential. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you have any questions about the questionnaire, please contact me at the email listed below. Thank you for your assistance and precious time!

Responden yang dihormati,
Nama saya Nur Shahida Binti Mat Ishah dan saya adalah seorang pelajar pascasiswazah di Universiti Malaysia Pahang. Tujuan soal selidik ini dibuat adalah untuk mengenal pasti atribut rantaian bekalan pendidikan yang penting yang boleh mempengaruhi kejayaan pembangunan profesional graduan dengan kesan penyederhanaan pengalaman industri. Pada asasnya, tujuan kajian ini dijalankan adalah untuk menentukan ciri-ciri yang dianggap penting bagi individu yang bekerja yang telah berjaya menjalani pembangunan profesional agar graduan dapat mengamalkan ciri-ciri tersebut untuk prospek kerjaya mereka. Tahukah anda, pembangunan profesional diuraikan sebagai pendidikan dan latihan kerjaya yang berterusan selepas seseorang itu mula berusaha untuk mempertingkatkan kerjayanya!

Idea, pemikiran dan pengalaman anda adalah sangat berharga bagi kajian ini. Input anda akan membantu menyediakan maklumat berguna mengenai rantaian bekalan pendidikan Malaysia. Soal selidik ini hanya perlu mengambil masa 10 – 20 minit, dan jawapan anda adalah tanpa nama dan sulit. Pengisian dan pengembalian soal selidik akan menunjukkan kesediaan anda untuk mengambil bahagian dalam kajian ini. Jika anda mempunyai sebarang pertanyaan tentang soal selidik, sila hubungi saya di emel yang tertera di bawah. Terima kasih atas bantuan dan masa berharga anda!

Yours sincerely, / Yang benar,
Nur Shahida Binti Mat Ishah
Student / Pelajar
nurshahidamatishah@gmail.com

nurshahidamatishah@gmail.com (not shared) [Switch account](#)

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Section A / Seksyen A

Please complete the following questionnaire by ticking a cross in the box that most relevant to you. / Sila lengkapkan soal selidik berikut dengan menanda pangkah dalam kotak yang paling berkaitan dengan anda.

What is your gender? / Apakah jantina anda?

☐ Male

☐ Female

What position are you holding in the company? / Apakah jawatan yang anda pegang di dalam syarikat?

☐ Entry-level / Peringkat permulaan

☐ Intermediate or Associates / Pertengahan atau Rakan Sekutu

☐ Senior Management / Pengurusan Kanan

☐ Directors / Pengarah

☐ Executives or Chief Officers / Eksekutif atau Ketua Pegawai

☐ Other: _____

How long have you been in your current position? / Berapa lamakah anda berada dalam kedudukan anda sekarang?

☐ Less than 3 years / Kurang dari 3 tahun

☐ Between 3 to 5 years / Antara 3 hingga 5 tahun

☐ Between 6 to 8 years / Antara 6 hingga 7 tahun

☐ More than 8 years / Lebih dari 8 tahun

What is your company's type of organization? / Apakah jenis organisasi syarikat anda?

☐ Sole proprietorship / Perniagaan tunggal

☐ Partnership / Perkongsian

☐ Private limited company (Sdn. Bhd.) / Syarikat sendirian berhad

- ☐ Public limited company (Bhd.) / Syarikat awam
- ☐ Unlimited company (Sdn.) / Syarikat tanpa had
- ☐ Foreign company / Syarikat asing
- ☐ Limited liability partnership / Perkongsian liability terhad

What economic sector does your company belong to? / Apakah sektor ekonomi yang syarikat anda tergolong?

- ☐ Agriculture / Pertanian
- ☐ Services / Perkhidmatan
- ☐ Industry / Industri

How long has your company been in business? / Berapa lama syarikat anda telah beroperasi?

- ☐ Less than 3 years / Kurang dari 3 tahun
- ☐ Between 3 to 5 years / Antara 3 hingga 5 tahun
- ☐ Between 6 to 10 years / Antara 6 hingga 10 tahun
- ☐ More than 10 years / Lebih dari 10 tahun

Where is your company located? / Dimanakah lokasi syarikat anda?

- ☐ Johor
- ☐ Kedah
- ☐ Kelantan
- ☐ Melaka
- ☐ Negeri Sembilan
- ☐ Pahang
- ☐ Pulau Pinang
- ☐ Perak
- ☐ Perlis
- ☐ Selangor
- ☐ Terengganu
- ☐ Sabah
- ☐ Sarawak
- ☐ Kuala Lumpur
- ☐ Labuan
- ☐ Putrajaya

Section B / Seksyen B

General instructions: Please complete the following questionnaire by ticking a cross in the box that seems relevant. To help understanding the contents of the questions following, a statement will be provided on top of each section. / Arahan am: Sila lengkapkan soal selidik berikut dengan menanda pangkah dalam kotak yang kelihatan relevan. Untuk membantu memahami kandungan soalan yang berikut, satu pernyataan akan disediakan di atas setiap bahagian.

The goal of the questions in this section is to determine what aspects of professional development success apply directly to the respondents' career progression. The grading scale is from (1) Strongly Disagree, (2) Disagree, (3) Uncertain, (4) Agree, to (5) Strongly Agree. / Matlamat untuk soalan dalam bahagian ini adalah untuk menentukan aspek kejayaan pembangunan profesional yang terpakai secara langsung kepada perkembangan kerjaya responden. Skala penggredan adalah dari (1) Sangat Tidak Setuju, (2) Tidak Setuju, (3) Tidak Pasti, (4) Setuju, hingga (5) Sangat Setuju.

How many people are employed in your company? / Berapa ramai orang yang bekerja di syarikat anda?

- ☐ Less than 5 employees / Kurang dari 5 pekerja
- ☐ Between 5 to 75 employees / Antara 5 hingga 75 pekerja
- ☐ Between 76 to 200 employees / Antara 76 hingga 200 pekerja
- ☐ More than 200 employees / Lebih dari 200 pekerja

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I am capable of completing my duties physically. / Saya mampu menyelesaikan tugas saya secara fizikal.

- 1 2 3 4 5
- Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I become more creative. / Saya menjadi lebih kreatif.

- 1 2 3 4 5
- Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I can fulfill my current demands. / Saya boleh memenuhi permintaan semasa saya.

- 1 2 3 4 5
- Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I am able to expect my future needs. / Saya dapat menjangkakan keperluan masa depan saya.

- 1 2 3 4 5
- Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I am capable of balancing my emotions. / Saya mampu mengimbangi emosi saya.

I am capable of analyzing work-related problems from different perspectives. / Saya mampu menganalisis masalah berkaitan kerja dari perspektif yang berbeza.

- 1 2 3 4 5
- Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I am able to understand others or identify their strengths or flaws. / Saya dapat memahami orang lain atau mengenal pasti kekuatan atau kelemahan mereka.

- 1 2 3 4 5
- Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I am able to get along well with my co-workers. / Saya dapat bergaul dengan baik dengan rakan sekerja.

- 1 2 3 4 5
- Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

| | |
|---|---|
| <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>1 2 3 4 5</p> <p>Strongly Agree / Sangat Setuju</p> | <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>1 2 3 4 5</p> <p>Strongly Agree / Sangat Setuju</p> |
| <p>I am able to organize my priorities. / Saya boleh mengatur keutamaan saya.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> | <p>Being involved in a business allowed me to successfully demonstrate my entrepreneurial skills. / Melibatkan diri dalam perniagaan membolehkan saya dengan jayanya menunjukkan kemahiran keusahawanan saya.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> |
| <p>I have a healthy work-life balance. / Saya mempunyai keseimbangan kerja dan kehidupan yang sihat.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> | <p>I am very confident in my abilities to do my work. / Saya sangat yakin dengan kebolehan saya untuk melakukan kerja saya.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> |
| <p>I now have more entrepreneurial skills or knowledge than when I first started working. / Saya kini mempunyai lebih banyak kemahiran dan pengetahuan keusahawanan berbanding ketika saya mula bekerja.</p> <p>1 2 3 4 5</p> | <p>I am not scared to take risks. / Saya tidak takut untuk mengambil risiko.</p> |

| | |
|--|--|
| <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>1 2 3 4 5</p> <p>Strongly Agree / Sangat Setuju</p> | <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>1 2 3 4 5</p> <p>Strongly Agree / Sangat Setuju</p> |
| <p>I am more successful academically. / Saya lebih berjaya dari segi akademik.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> | <p>I have the ability to see things from another person's point of view. / Saya mempunyai keupayaan untuk melihat sesuatu dari sudut pandangan orang lain.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> |
| <p>I am flexible and willing to change. / Saya fleksibel dan bersedia untuk berubah.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> | <p>I have the ability to see things from another person's point of view. / Saya mempunyai keupayaan untuk melihat sesuatu dari sudut pandangan orang lain.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> |
| <p>I am confident that I am becoming more successful. / Saya yakin yang saya akan menjadi lebih berjaya.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> | <p>I am able to manage stress. / Saya mampu untuk mengurus tekanan.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> |

| | |
|--|--|
| <p>Each learning process improved my work performance. / Setiap proses pembelajaran meningkatkan prestasi kerja saya.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> | <p>My skills or knowledge indicate the success of the lifelong learning process. / Kemahiran atau pengetahuan saya menunjukkan kejayaan proses pembelajaran sepanjang hayat.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> |
| <p>My academic achievement is excellent. / Pencapaian akademik saya adalah cemerlang.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> | <p>My accreditation or certification demonstrate my quality as a worker. / Akreditasi atau pensijilan saya menunjukkan kualiti saya sebagai pekerja.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> |
| <p>My creativity develops better with each learning process. / Kreativiti saya berkembang dengan lebih baik dengan setiap proses pembelajaran.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> | <p>My knowledge or education demonstrate my technical or vocational abilities. / Pengetahuan atau pendidikan saya menunjukkan kebolehan teknikal atau vokasional saya.</p> <p>1 2 3 4 5</p> <p>Strongly Disagree / Sangat Tidak Setuju</p> <p>Strongly Agree / Sangat Setuju</p> |

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I achieve more goals when working in a team. / Saya mencapai lebih banyak matlamat apabila bekerja dalam satu pasukan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My language proficiency can be demonstrated by my fluency in the languages spoken in the company. / Kecekapan berbahasa saya boleh ditunjukkan dengan kefasihan saya dalam bahasa yang dituturkan dalam syarikat.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Tidak Setuju Setuju

Section C / Seksyen C

The purpose of the questions in this part is to assess which attributes of the educational supply chain respondents believe are important for a working individual. The grading scale is from (1) Strongly Disagree, (2) Disagree, (3) Uncertain, (4) Agree, to (5) Strongly Agree. / Tujuan untuk soalan dalam bahagian ini adalah untuk menilai atribut-atribut rantaian bekalan pendidikan yang responden percaya penting untuk individu yang bekerja. Skala pengagredan adalah dari (1) Sangat Tidak Setuju, (2) Tidak Setuju, (3) Tidak Pasti, (4) Setuju, hingga (5) Sangat Setuju.

I believed that my spiritual beliefs had an impact on my work performance. / Saya percaya bahawa kepercayaan rohani saya mempunyai kesan ke atas prestasi kerja saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I made better decisions with the application of ethics or spirituality. / Saya membuat keputusan yang lebih baik dengan penerapan etika atau kerohanian.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I follow the company's guidelines depending on my religion. / Saya mengikut garis panduan syarikat bergantung kepada agama saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Organizational commitment reflects my commitment to the company. / Komitmen organisasi mencerminkan komitmen saya kepada syarikat.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I adhere to the company's policies all the time. / Saya mematuhi dasar syarikat sepanjang masa.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My data analysis skill can be reflected through my computer literacy skills. / Kemahiran menganalisis data saya boleh dicerminkan melalui kemahiran literasi komputer saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My talents reflect my ability to analyze data. / Bakat saya mencerminkan keupayaan saya untuk menganalisis data.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My outstanding academic achievement proves my ability to analyse data. / Pencapaian akademik saya yang cemerlang membuktikan kebolehan saya untuk menganalisis data.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

The ability to analyze data helps me to improve my decision-making skills. / Keupayaan menganalisis data membantu saya meningkatkan kemahiran membuat keputusan saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I am capable of completing a variety of tasks through the use of data analysis. / Saya mampu menyelesaikan pelbagai tugas melalui penggunaan analisis data.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

The performance of teams or departments in my company can be reflected through the ability of team members to work together. / Prestasi pasukan atau jabatan dalam syarikat saya boleh dicerminkan melalui keupayaan ahli pasukan

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My communication skills improved after I work in a group. / Kemahiran berkomunikasi saya bertambah baik selepas saya bekerja dalam kumpulan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I solve problems better when I am working in a team. / Saya menyelesaikan masalah dengan lebih baik apabila saya bekerja dalam satu pasukan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I am aware of my responsibilities towards the team. / Saya sedar akan tanggungjawab saya terhadap pasukan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I achieve more goals when working in a team. / Saya mencapai lebih banyak matlamat apabila bekerja dalam satu pasukan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My language proficiency can be demonstrated by my fluency in the languages spoken in the company. / Kecekapan berbahasa saya boleh ditunjukkan dengan kefasihan saya dalam bahasa yang dituturkan dalam syarikat.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I can talk, write, or read in both Bahasa Melayu and English. / Saya boleh bercakap, menulis atau membaca dalam kedua-dua Bahasa Melayu dan Bahasa Inggeris.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

The number of language certifications can reflect my language proficiency. / Bilangan sijil bahasa yang saya miliki boleh mencerminkan kecekapan berbahasa saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I am eager to learn or understand new languages. / Saya tidak sabar untuk belajar atau memahami bahasa baru.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I can easily translate one language to another. / Saya boleh menterjemah satu bahasa ke bahasa lain dengan mudah.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I use different types of thinking skills when solving problems. / Saya menggunakan pelbagai jenis kemahiran berfikir semasa menyelesaikan masalah.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I believe that higher order thinking skills (HOTS) are important for my career. / Saya percaya bahawa kemahiran berfikir aras tinggi (KBAT) adalah penting untuk kerjaya saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My thinking skills can be demonstrated through my ability to understand, analyze, or generate solutions to problems. / Kemahiran berfikir saya boleh ditunjukkan melalui kebolehan saya untuk memahami, menganalisis atau menjana penyelesaian kepada masalah.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

I gain more confidence when utilizing different thinking skills. / Saya mendapat lebih keyakinan apabila menggunakan kemahiran berfikir yang berbeza.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My thinking skills are reflected through the level of my general intelligence. / Kemahiran berfikir saya dicerminkan melalui tahap kecerdasan am saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My performance in standardized testing demonstrates my knowledge of the work that I performed. / Prestasi saya dalam ujian standard menunjukkan pengetahuan saya tentang kerja yang saya lakukan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My academic achievement reflects my level of knowledge. / Pencapaian akademik saya mencerminkan tahap pengetahuan saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My level of knowledge helps me improve my abilities or skills. / Tahap pengetahuan saya membantu saya meningkatkan kebolehan atau kemahiran saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My certifications indicate my level of knowledge. / Pensijilan saya menunjukkan tahap pengetahuan saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

My general intelligence can be enhanced as my knowledge increases. / Kecerdasan am saya boleh dipertingkatkan apabila pengetahuan saya bertambah.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

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Clear form

Section D / Seksyen D

The goal of the questions in this section is to rate the aspects of industrial experiences that apply to respondents personally. The grading scale is from (1) Strongly Disagree, (2) Disagree, (3) Uncertain, (4) Agree, to (5) Strongly Agree. / Matlamat untuk soalan dalam bahagian ini adalah untuk menilai aspek pengalaman industri yang terpakai untuk responden secara langsung. Skala pengagredan adalah dari (1) Sangat Tidak Setuju, (2) Tidak Setuju, (3) Tidak Pasti, (4) Setuju, hingga (5) Sangat Setuju.

Having industrial experience allows me to solve problems. / Mempunyai pengalaman industri membolehkan saya untuk menyelesaikan masalah.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to use my knowledge. / Mempunyai pengalaman industri membolehkan saya untuk gunakan pengetahuan saya.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to learn new things. / Mempunyai pengalaman industri membolehkan saya untuk belajar perkara baru.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to appreciate the importance of lifelong learning. / Mempunyai pengalaman industri membolehkan saya untuk menghargai kepentingan pembelajaran sepanjang hayat.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to improve leadership. / Mempunyai pengalaman industri membolehkan saya menambah baik kepimpinan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to improve presentation skills. / Mempunyai pengalaman industri membolehkan saya menambah baik kemahiran-kemahiran pembentangan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to improve decision-making ability. / Mempunyai pengalaman industri membolehkan saya menambah baik keupayaan membuat keputusan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to acquire self-confidence. / Mempunyai pengalaman industri membolehkan saya memperoleh keyakinan diri.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to acquire better teamwork. / Mempunyai pengalaman industri membolehkan saya memperoleh kerja berpasukan yang lebih baik.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

Having industrial experience allows me to acquire the ability to work under pressure. / Mempunyai pengalaman industri membolehkan saya memperoleh keupayaan untuk bekerja di bawah tekanan.

1 2 3 4 5

Strongly Disagree / Sangat Tidak Setuju ☐ ☐ ☐ ☐ ☐ Strongly Agree / Sangat Setuju

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SURVEY QUESTIONNAIRE / SOAL SELIDIK

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Appendix D: Pre-test Results

| No. | Original Items | Updated Items |
|---|--|---|
| Professional Development Success | | |
| Holistic, Entrepreneurial and Balanced Graduates | | |
| 1 | Co-workers are capable of completing all duties. | |
| 2 | Co-workers are capable of analysing work-related problems from different perspectives. | |
| 3 | After professional development, emotions can be regulated, and the feelings and emotions of others become more understandable. | Emotional ability improves after professional development. |
| 4 | Co-workers get along well with one another. | |
| 5 | Employees become more creative when developing professionally. | People becomes more creative when developing professionally. |
| 6 | Professional development contributes to the formation of entrepreneurial skills and knowledge. | |
| 7 | Employees' entrepreneurial skills are demonstrated when they successfully create a business. | Employees' entrepreneurial skills are demonstrated when they successfully involved in a business. |
| 8 | The company strongly believes in employees' ability to complete a task successfully. | Employees with a high entrepreneurial attribute have a strong sense of self. |
| 9 | Employees of this company are not afraid to take risks. | Employees with entrepreneurial characteristics are not scared to take risks. |
| 10 | Professional development results in increased self-confidence. | Professional development enables people to meet their essential needs. |
| 11 | Co-workers are conscious of their own and others' emotions. | Professional development enables people to expect their future requirements. |
| 12 | Emotions are manageable. | Emotions are capable of being balanced. |
| 13 | Workplace activities must be prioritized. | Priorities must be organized. |
| 14 | The company promotes a healthy work-life balance. | |
| Talent Excellence | | |
| 1 | Academic achievement is the result from professional development success. | |
| 2 | The employees in this company are flexible and willing to change. | |
| 3 | This company's employees are successful and self-assured. | |
| 4 | The ability to see things from another person's point of view helps in professional development. | |
| 5 | Professional development success leads to a high level of satisfaction and experience. | Professional development success leads to a high level of satisfaction or experience. |
| Lifelong Learner | | |
| 1 | Stress management is essential for lifelong learning. | |
| 2 | Improved work performance indicates that the learning process was successful. | Improved work performance indicates that lifelong learning process was successful. |
| 3 | Educational achievement is important for professional development success. | |

| No. | Original Items | Updated Items |
|--|---|---|
| 4 | The success of professional development can contribute to developing creativity. | |
| 5 | The success of the learning process is demonstrated by skills and knowledge. | The success of lifelong learning process is demonstrated by skills or knowledge. |
| Quality Technical and Vocational Graduates | | |
| 1 | The company believes that accreditation demonstrates the quality of its staff. | The company believes that accreditation and certification demonstrate the quality of its staff. |
| 2 | The quality of vocational graduates is demonstrated by their knowledge and education. | The quality of vocational graduates is demonstrated by their knowledge or education. |
| 3 | Quality employees are trustworthy and capable of defending their rights. | Quality employees are trustworthy or capable of defending their rights. |
| 4 | Good communication skills reflect professional development success. | |
| 5 | This company's employees are very confident in their work. | Work quality improves when employees feel confident in their work. |
| Educational Supply Chain (EduSC) Attributes | | |
| Ethics & Spirituality | | |
| 1 | Employees' work performance is influenced by their spiritual beliefs. | |
| 2 | With the use of ethics and spirituality, better decisions are made. | Better decisions are made with the use of ethics or spirituality. |
| 3 | Employees at this company follow the guidelines provided by their religions. | Employees in this company follow the guidelines according to their religions. |
| 4 | Organizational commitment is an important characteristic for the company. | Organizational commitment demonstrates employees' commitment to the company. |
| 5 | Employees of this company adhere to the company's policies. | |
| Data Analysis Skill | | |
| 1 | Employees' data analysis skill is reflected through their computer literacy skills. | |
| 2 | Employees' success demonstrates the ability to analyse data. | The talents of employees indicate their ability to analyse data. |
| 3 | Data analysis skill can be proven by higher academic achievement. | |
| 4 | Data analysis skill enables employees to improve decision making skill. | |
| 5 | Co-workers are capable of completing a variety of tasks through the use of data analysis. | |
| Teamwork | | |
| 1 | The performance of teams and departments are monitored in the organization. | |
| 2 | Communication skills can be improved after working in a group. | |
| 3 | Problems can be solved better when working in a team. | |
| 4 | Co-workers are aware of their responsibilities. | Co-workers are aware of their responsibilities towards the team. |
| 5 | More goals can be achieved when working in a team. | |
| Language Proficiency | | |

| No. | Original Items | Updated Items |
|------------------------------|---|--|
| 1 | Employees' language proficiency is demonstrated by their fluency in the languages spoken in the company. | |
| 2 | Co-workers can talk, write, and read in both Bahasa Melayu and English. | |
| 3 | Language certifications can demonstrate employees' language proficiency. | |
| 4 | Co-workers are eager to learn and understand new languages. | |
| 5 | Co-workers can easily translate one language to another. | |
| Thinking Skills | | |
| 1 | Different types of thinking skills should be used to solve problems. | |
| 2 | The company believes higher order thinking skills (HOTS) are important. | |
| 3 | Co-workers' thinking skills can be demonstrated by their ability to understand, analyse, and generate solutions to problem. | |
| 4 | Co-workers gains more confidence when utilizing different thinking skills. | |
| 5 | A higher level of general intelligence demonstrates the level of thinking skills. | |
| Knowledge | | |
| 1 | Standardized tests can demonstrate the knowledge of employees. | |
| 2 | Academic achievement can demonstrate an employee's level of knowledge. | |
| 3 | Acquiring knowledge improves employees' abilities and skills. | Acquiring knowledge improves employees' abilities or skills. |
| 4 | Certifications show the employees' level of knowledge. | |
| 5 | General intelligence can be enhanced as knowledge increase. | |
| Industrial Experience | | |
| 1 | Ability to solve problems | |
| 2 | Ability to apply knowledge | |
| 3 | Ability to acquire new knowledge | |
| 4 | Recognize the need for lifelong learning | |
| 5 | Leadership | |
| 6 | Presentation skills | |
| 7 | Decision-making ability | |
| 8 | Self-confidence | |
| 9 | Teamwork | |
| 10 | Ability to work under pressure | |