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**BUSINESS INTELLIGENCE ON SUPPLY CHAIN RESPONSIVENESS AND AGILE
PERFORMANCE: EMPIRICAL EVIDENCE FROM MALAYSIAN LOGISTICS
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Abstract

Purpose: This study examine how BIS implementation affects the agile efficiency of the supply chain with the logistics industry's supply chain responsiveness. As a variable for assessing the relationship and effect on agile efficiency, business intelligence competence (managerial competence, technological competence and cultural competence) and supply chain responsiveness will be investigated.

Methodology: A survey questionnaire comprised of 39 questions using the purposive method of sampling used to select the target group and replied to the survey with the outcome of a total of 50 respondents, via SPSS, the data was further analysed to examine the relationship between all variables.

Findings: The study finds that (1) business intelligence competence has a significant positive impact on the response to the supply chain, (2) business intelligence competence has a significant positive impact on the supply chain's agile performance, (3) responsiveness to the supply chain has a significant positive impact on agile performance.

Unique contribution to theory, practice and policy: This study contributes to enhancing the quality and effectiveness of the business operation of the 3PL service provider, government customs and port department.

Keywords: *Business Intelligence, Agile Performance, Supply Chain Management, Business Performance, Third Party Logistics*

1. INTRODUCTION

Flexibility and speed are the key competencies for competing in this diverse and competitive market in the 21st century. Logistics has now become the first choice for businesses to improve their distribution and service flexibility and speed. For competitive purposes, many businesses chose to outsource logistics operations to third parties, which we have referred to as third-party logistics (3PL). Through 3PL, the organization will concentrate on what they do to gain a greater competitive advantage and allows both enterprises and 3PL suppliers to manufacture products or services at a lower marginal cost and opportunity cost (Jayaram & Tan, 2010). According to Sohail and Sohal (2003), the majority of users are satisfied with the use of third-party logistics services among 124 companies in Malaysia, and users are also satisfied which indicates in the future of the logistics industry, there will be a very large opportunity, more demand and greater future needs as businesses outsourcing their logistics activities will increase overtime moderately. As a result, the flow of information will be one of the main concern when the industry grew rapidly.

The industry therefore needs an agile supply chain to manage and sustain the enormous information that has generated millions to billions of data per minute. For example, Wal-Mart every hour will produce 2.5 petabytes from more than a million customer and 7 terabytes from the Radio Frequency Identification (RFID) item in Wal-Mart (Tahiduzzaman, Rahman, Dey, Rahman, & Akash, 2020). Without the implementation of RFID the speed of generated data with the old and traditional system will be lower, slow the transfer of huge data between different parties, not up-to-date report generation, and also insufficient data storage (X. Li, 2014), with RFID it can ensure flexibility and rapid reactions in large volumes and various types of products by having an agile supply chain. These modern supply chain has many integrated knowledge problems, such as the new logistics industry using a particular type of warehousing system or operating system to manage and track multiple enterprises, warehouses or transport (Christopher, 2000) which created the issue that the boss or company owner will not get the whole picture unless he spends a lot of effort. Henceforth, there is a potential solution to this problem is the Business Intelligence System (BIS). Through BIS, it could empower businesses to improve business processes and better operational efficiency. Advanced analytics are integrated with BIS, such as data mining, big data analytics and predictive analytics. According to Alzoubi, Alnazer, & Alzoubi, (2016), the adoption of BIS increased the organization's performance and provides a viable suggestion in which the goals are achieved.

According to Gartner Inc, the global spending on IT will be total US\$3.7 trillion in the year 2022, for Malaysia, compared to 2019, it forecast an increase of 5.7 percent with a value of RM65.2 billion, making Malaysia the second largest business intelligence (BI) market after Singapore in the Association of South-East Asian Nations (ASEAN). Gartner Inc. had expected this IT trend to

continue to grow in the next few years, not to mention (NST Business, 2021) which indicated that it is inevitable in the future to combine business with IT and BI. Forthwith, the logistics business struggling to gain more competitive edge due to nowadays the logistics business does not only compete locally but globally to meet four conditions as described in the theory of perfect competition, which are a broad and homogeneous market, perfect availability of knowledge, lack of controls, inexpensive and effective transport (J. Robinson, 1934) which is currently happening in logistics industry due to the globalization and the existence of the internet and technology and more obviously highly affected by the Covid-19 pandemic. Because of the logistics industry, a more open market is becoming more comparable to the goods and services offered and all logistics business players must now use the tools of the information system and the ability to evaluate data in more efficient ways to overtake or distinguish itself from other rivals.

Business Intelligence (BI) has emerged as a mechanism to resolve this issue in this scenario, described as the intensive use of information technology with reliable, fast and accessible information to respond to needs (Popovi, Coelho, & Jakliş, 2019), also became a tool to allow users with their fingertips to remove organizational information immediately. BI is becoming more common and important in the business community with its improvement in efficiency and effectiveness provided to all levels of the organization. Because of business intelligence, this new milestone in the logistics industry began to transform the supply chain into more intelligence, called the agile supply chain, by providing greater responsiveness, expertise, versatility and speed that are affecting the entire supply chain in three different dimensions which are managerial competence, technical competence and cultural competence which will be discussed in detail in the following section. The following session of this paper are structure with literature review of all variables of the study, methodology, discussion and findings and finally end with conclusion including the limitation and future research.

2. LITERATURE REVIEW

2.1 Agile Performance

Assessing and incorporating agile and plan-driven approaches has been performed by Boehm and Turner (2004) concluding the agile approach allows consumer expectations and management efficiency to be improved, but the strategies are somewhat inadequate. For an uncertain project, are small development teams with volatile specifications, the agile approach is more suitable, whereas the plan-based method is more recommended for a project with greater consistency and controllability. Hence, for either stable or chaotic programs, the mixed technique of the plan-based system with agile methods is more preferable, it could overcome the difficulties of supervising in advance with the mixed strategy, where a real-life project lies in a stable spectrum where an agile approach cannot be achieved. In addition, as a strategic development process activity, Port and Bui (2009) further explained the advantages and constraints of a plan-based approach and agile

demand. Port and Bui (2009) have mentioned that while leveraging the plan-based method, an agile approach is able to maintain flexibility and low overhead. As agility allows priority adjustment when requirement values change, this brings out the value of the overall deployment's cost-effectiveness.

The main benefit of a plan-based approach is to prioritize high leverage requirements and minimize dynamism in development progress, which is very risky in a situation of high dynamism, as well as a low chance of achieving it. The performance of the strategy was greatly impacted by the dynamism on the basis of the static analysis outcome by Port and Bui (2009). To avoid extensive up-front planning and incorporate frequent reprioritization with rapid adoption to volatile requirements, agile approach on top of plan-based strategy is important to enables the organization create an overall initial prioritization based on cost reassessments to be updated and to minimize the risk of cost leverage. Costing is one of an organization's important criteria. Therefore, the key to implement agility in detail is to choose the exit strategy in a dynamic environment where performance is undesired, such as the total marginal value is lower than the total marginal cost (Karlsson & Ryan, 1997; Port & Bui, 2009). Agility typically refers to speed and cost savings in responding to changes in market demand while maintaining or improving flexibility. The key feature of agile is to reduce waste and improve the organization's market responsiveness (Soltan & Mostafa, 2015). With this agile method, the company can enhance the ability of the company from various perspectives, such as visibility, flexibility, speed, predictability and scalability. In terms of visibility, everyone has enough visibility into project details such as production planning, promotion plan, transportation, customer demand, and supply chain to enables the business to maximize the opportunities for a project to find the most cost-effective adjustments (Fernandez & Fernandez, 2018). The materials, data and decisions make it possible to flow through with visibility to improves organization's flexibility (Sutherland, Viktorov, Blount, & Puntikov, 2007).

This flexibility applies from the end-to-end organization cycle time from manufacturing, order or demand to delivery throughout the entire logistics process that brings out the benefits of efficiency and improves the speed of an organization to market (Christopher & Towill, 2001), here the organization members or group works towards a common goal to reduce communication and coordination issues, however it is proof that the behavior of the member driven by the understanding or focusing of customer needs (Sillitti, Hazzan, Bache, & Albaladejo, 2011). Therefore, the agile process is scalable by using a different approach such as iterative management, extreme modelling, and adaptive management. These strategies can allow any process to scale and then management can make certain improvements to a low-scale process where it can help increase the efficiency of the company (Storrle, 2015), hence, in market conditions which are unpredictable and unforeseeable demand, agility is usually required. The use of the contractor and the third raises one of the agile methods to dynamic demand for spikes. Agility may be applied to preserve or

boost an organization's competitiveness, according to Ismail and Sharifi (2016). The organization needs to assess the required degree of agility and a structured approach to supply chain management in order to accomplish the new logistics industry driven by advance technology.

2.2 Business Intelligence

For the organization to provide better decision-making, business intelligence is a collection of tools or systems to turn data into meaningful knowledge. In other words, business intelligence is used by a series of analytical methods to discover valuable information and insight from the data collected (Olszak & Ziembra, 2017), the support structure that integrates the various Business Intelligence Systems (BIS). A business intelligence framework that involves intelligent discovery, integration, aggregation and multidimensional analysis of data from different knowledge resources is the main focus. Through business intelligence method, implied in this concept, is intended to provide accurate and sufficient information on various activities carried out by an organization (Olszak & Ziembra, 2007). Reporting, analytics, online analytical processing, data mining, benchmarking, predictive analytics and benchmarking are business intelligence features (Wang, 2016). Data is viewed as a highly valuable organizational resource from the organization's perspective and can be converted from quantity to quality (Yeoh & Koronios, 2010).

Huge data from a large organization's various resources can be converted or interpreted into a cohesive body to provide a complete view of its market (Najafabadi et al., 2015). Data mining is one of the important instruments for business intelligence. Data mining acts as a link between business intelligence and the management of information. Business intelligence can illustrate the importance of data as data mining can show the interest and purchasing habits of customers with the sales database, such as goods, sales results and location (Qi & Zhang, 2002). Information management may be incorporated into successful decision making and improvement for business intelligence with the analysis result of data generated by business intelligence which complies with the study of J. Wang, Hu, and Zhu (2017), the findings enable the company to recognize the business challenge, identify potential opportunities and make better decisions, showing the data mining used in business intelligence. Wang and Wang (2008), however, noted that these advantages need to be met by certain requirements, such as the quality of the results. Organization apply unique data collection and analytical analysis to establish web and internet data opportunities (Ram, Zhang, & Koronios, 2016). The e-commerce and web search engines enable organizations to generate user data and may consist of web analytics tools that help on consumer transaction analysis, market structure analysis, and product recommendations which eventually enhance the purpose of moving the logistics industry to intelligence concept (Chen, Chiang, & Storey, 2020).

2.3 Business Competence

2.3.1 Managerial Competence

Managerial competence relates to the quality and efficacy of the method of searching and generating appropriate management level knowledge and data to make a more precise decision based on existing data (Petrini & Pozzebon, 2009). Data collection involves transferring data to an automated data warehouse from a variety of source systems and converting it into a coherent data set. It is capable of providing value to an organization through data transformation, where business users can manipulate and use it effectively. It helped the company to change how it competes in the market through an innovative business intelligence-enabled strategy (Watson & Wixom, 2007). The essential business performance factor for management consists of policy, success, and culture (Mathi, 2004). The combination of intelligence principles and business intelligence's principle of competition will benefit companies from the management side. Business intelligence incorporates internal and external information, so it serves as a forum for creativity that helps the company find innovative solutions to any challenges faced by the organization. The current methodology used by companies such as strategic intelligence will evolve to business intelligence as it increases the business strategy's efficiency and effectiveness. The business intelligence strategy leads to the organization's competitive role in the industry (Chen et al., 2012). Business intelligence, for example, has a series of tools called Business Activity Monitoring (BAM) that allow the user to control and track business metrics such as KPI (Key Performance Indicators). These tools provide one-to-one insight into business-related procedures, effects of different events, detailed information on status transactions and recognition processes with is suitable for managerial competencies.

2.3.2 Technical Competence

In order to support business intelligence processes such as data warehousing software, data mining, analytical software and reporting tools, technological expertise relates to the availability and reliability of the information system to compile and produce a report using all these resources in a time-consuming and more detailed information shortening (Herschel & Jones, 2005). Business intelligence systems consist of operational data and analytical methods to provide planners and decision-makers with strategic and dynamic knowledge. On the other side, market intelligence helps to rank the approach as the following order based on the Gartner survey in strategic terms (Tan, Sim, & Yeoh, 2011). Corporate performance management was ranked highest, followed by business activity tracking, customer relationship optimization, and conventional decision support. In particular plans or processes, kit standalone business intelligence applications on business intelligence management reporting firm (Negash & Gray, 2008) achieve the responsiveness of the competitive market, an APS (agent-based procurement system) business intelligence system has

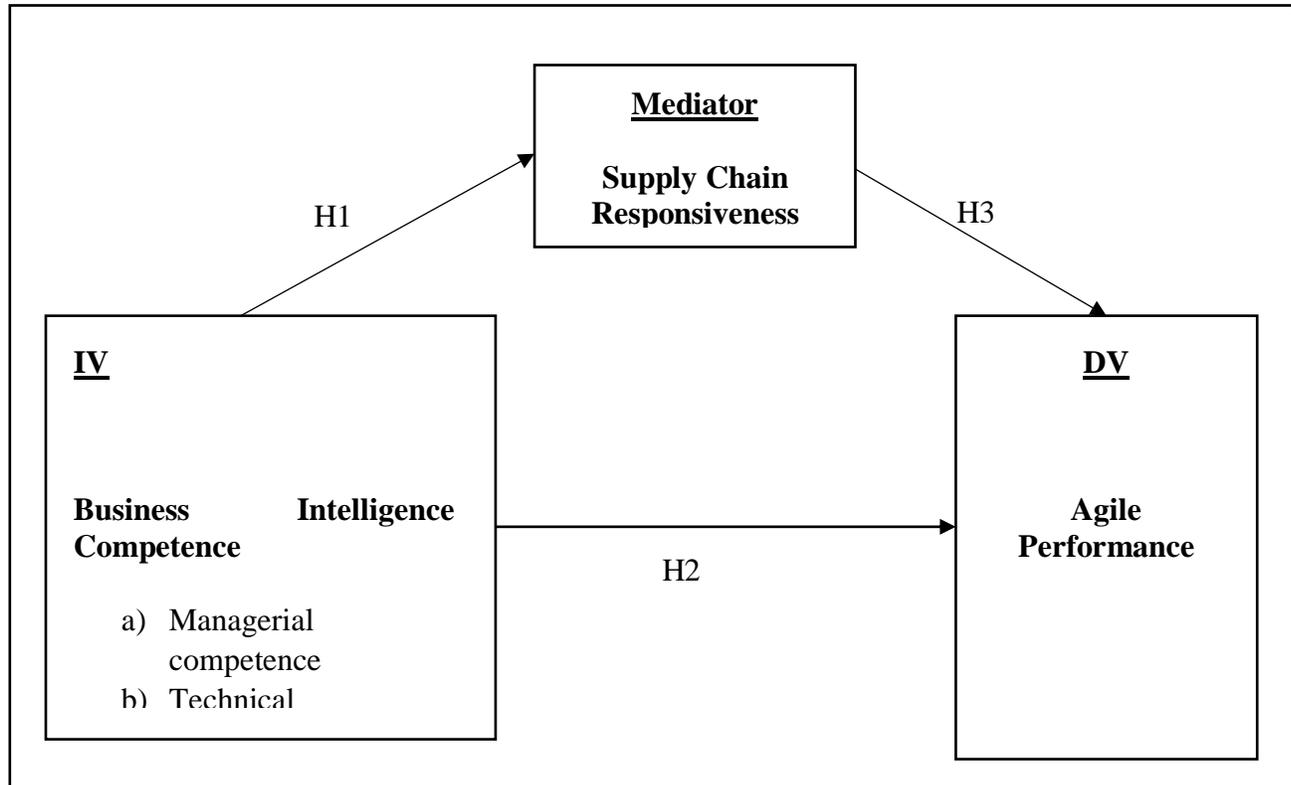
been developed. The three key components of this framework are the business intelligence module, the data repository and the procurement module (Lee, Lau, Ho, & Ho, 2009). Online analytical processing (OLAP) is enabled by the business intelligence module, which enables a company to make an appropriate decision by analyzing data. It uses the features of time series analysis to identify market patterns that enable the organization to respond effectively to the market (Seufert & Schiefer, 2005). The data repository requires a query response, a database server or a framework to handle structured information and accept queries. This makes it possible for the organisation to operate on data search and provide the system with real-time information. This effectively decreased the customer's response time (J. Li, Krohn, Mazières, & Shasha, 2004). From the logistics perspective, business intelligence tools allow the logistics company to exchange expertise and information with customers and provides assistance to the company in numerous ways, such as enhancing facilities, delivering IT-based services and improving organizational support functions (Sahay & Ranjan, 2008). Business intelligence tools can assist with the effectiveness of logistics services in terms of service enhancement through in-depth research and reports on various functions (Richards, Yeoh, Chong, (2019). In addition, by offering an integrated view of the functions and decision making, business intelligence can strengthen organizational support functions such as financial management and human resources (Stefanovic & Stefanovic, 2009). The relationship between competence in business intelligence and agile capability is strong, according to Razmi (2015) also highlighted that various features such as process automation and business awareness can categorize the agile supply chain. Information and knowledge management skills are therefore essential for agile development and developing response capacities and all definitions, business intelligence has played an important role.

2.3.3 Cultural Competence

Cultural competence indicating the culture of developing BI across the organization include Intra and inter-organizational culture. By using BI culture to create, share and utilize to build a more healthy and intelligence culture in the organization (Machuca & Costa, 2012). Based on Shehzad and Khan (2013) analysis results, business intelligence able to help organizations on creating a clear business vision. Those solid business cases derived from the analysis of business could help to measure whether the current knowledge is being used effectively (G. Robinson & Dechant, 1997). When a clear business vision and knowledge measures are implemented efficiently, this could results in a strong organizational vision, efficient business outcome and quality products. Besides that, with business intelligence, the project can keep on improving even though the project is in better scoped and planned. Business intelligence helps leaders to measure and determine the scope of the projects meanwhile project management team in an organization could fulfil the requirements and attaining the organizational goals (Shehzad & Khan, 2013).

2.3.4 Supply Chain Responsiveness

The supply chain consists of a complex system with a large amount of data and information that is difficult to integrate and analyze. Business intelligence is one of the great ways to analyze these data effectively. The business intelligence method has the capability to process and suggest the right decision at the right time in teamwork with the right partners (Stefanovic & Stefanovic, 2009). Gindy, Saad, and Yue (2015) explained responsiveness is the ability to make a purposeful quick adjustment to the significant events, opportunities or threats to obtain a competitive advantage. By all means, the organization has the capabilities to react toward the new changes or enable them to predict events in order to control, respond and profit from it. From the view of the logistics industry, business intelligence able to help in three ways which are service improvement, provide technology-based services and improve organizational support functions. Typically, these are important for the logistics industry which able to provide unprecedented customer responsiveness, decrease cycle time and, and optimize the supply chain (Lin, 2007). There are more logistics company embraced the business intelligence system to enhance the coordination of activities on the tracking facility to its customers to ensure continuous competitive advantage. Moreover, with the help of business intelligence, logistics company able to provide their customer with an analyzed report on their supply chain (Britta & Larson, 2001). With these services, the company could improve its response time to market. In-depth, business intelligence tools are able to obtain more insight on the complicated process of transportation management such as cycle time analysis, supplier compliance analysis, carrier performance evaluation, capacity planning, and mode-cost analysis (Nwaubani, 2011). The analysis result on the carrier performance evaluation can reduce the time of management decision on choosing the most suitable carriers for future projects. The mode-cost analysis provides the analysis of the different modes of transport and the vehicles employed. This assists the management in deciding the most cost-effective third-party carrier companies for future projects. Furthermore, with the analysis results on the available capacity, the logistics company able to plan effectively by reducing the loss of revenue due to shortfall in capacity and future capacity increments (Banister, 2016). Lastly, the supplier compliance analysis by business intelligence allows the logistics company to predict different loading points based on the trends on historical data which allow the company to reduce the unpredictable delays of suppliers (Canelas, Martin, & Rodriguez, 2013). Financial management is one of the important parts of the organization (Osadchy & Akhmetshin, 2015). Business intelligence consists of budgetary analysis and fixed asset return analysis as compared with existing financial tools that provide financial reporting only. The budgetary analysis provides detail information about cost analysis such as cost overruns and budget versus actual expenditure analysis (Olexová, 2014). These analyses able to help management to allocate the budgets more effectively for the future financial period which allows the organization to respond to the dramatic market changes more effectively.



H1: Business intelligence competence has a positive significant impact on supply chain responsiveness.

H2: Business intelligence competence has a positive significant impact on the agile performance of the supply chain.

H3: Supply chain responsiveness has a positive significant impact on the agile performance of the supply chain.

Theory of Technology Acceptance Model

The Technology Adoption Model (TAM) refers to the effect of a person's decision to use new technology (Charness & Boot, 2016). As suggested, there are three considerations: perceived ease of use (PEU), perceived utility (PU) and attention to use. With TAM, this analysis will concentrate on the study of the behavioral purpose and viewpoint of top management of business intelligence systems, as well as understanding the degree of corporate acceptance towards the implementation of business intelligence systems (Bach, Čeljo, & Zoroja, 2016). King and He (2006) noted that the technology acceptance model (TAM) is a model that has been widely researched and applied with

a broad sample size and is widely used in the academic field. King and He concluded that the perceived utility and behavioral purpose are strongly associated with each other and it can be further clarified as there is more effect on perceived ease of use when the impact of perceived usefulness on actions is deep. One example of this is Internet applications. The customer intends to use a device with critically advantageous features (Davis, 2014). PEOU (Perceived Ease of Use) is one of the important factors in evaluating behavioral intent in the technology acceptance model, according to the Lee, Kozar, and Larsen (2003) report. In embracing the use of technology, the company will feel rather difficult and they will rather go for less effective technology but simple to use. The adoption of business intelligence applications usually depends on four factors: technology, individual differences, social effect and situational constraints based on the TAM model (Yoon, Ghosh, & Jeong, 2014).

In terms of technology, innovation characteristics such as complexity and compatibility are of interest to the company. Complexity can have a significant adverse effect on the purpose of implementing a business intelligence application (Skyrius et al., 2016). Similarly, the incompatibility of business intelligence with current job practices limits the organization's probability of implementing it due to the incompatibility of the technologies available that would entail a substantial shift in existing work practices that require a lengthy learning period (Marjanovic, 2007). Individual differences such as gender, education, and motivation will also influence technology's individual acceptance, as the latest technology aims to offer users values such as enhancing job efficiency, Wakefield and Whitten (2006) therefore conclude that extrinsic motivation would have a positive impact on the purpose of implementing organizational business intelligence applications. There has been widespread awareness of social impact on business intelligence, whereby when some see this new technology as useful tools and others see this technology as a valuable commodity for the company, people or organizations prefer to embrace this new technology (Schilling & Hill, 1998). Situational constraints such as finances, the environment of organizational learning and the skills needed will have a major positive effect on the intention of the person to implement business intelligence applications. If the employer is unable to provide an employee with adequate opportunities to try new technology, the employee is less likely to implement new technology (Davis, 2014).

3. METHODOLOGY

3.1 Population and Sampling

In general, the population for study is a collection of individuals or objects that fulfill the researcher's formulated assumptions. There are several procedures to determine the required sample size for the analysis, according to Burns and Burns (2008). Knowledge from the selected population may allow the researcher to generalize results that match the objectives of the study.

The research population of this study was aimed at 3PL Logistics Company, which introduced in its business activity a business intelligence framework. The targeted population for this study focused on the top management of 3PL Logistics companies based in Klang Valley to reflect the maturity and condition of the implementation of business intelligence in Malaysia.

3.2 Sample Size

A sample design is known as a mathematical function that assists in the choice of source sampling. Sampling size is part of the sample design that specifies the number of subjects in a sample that are considered. Inadequate sampling size may lead to results that are unreliable or less reliable. The reliability and precision of the outcomes could be improved by greater sample size, but it could be more time and costly. For the determination of the sample, four variables are taken into account, such as (1) the appropriate sampling error range; (2) the size of the population; (3) the varied interest characteristics of the population; and (4) the smallest subgroup of the sample (Salant, Dillman, & Don, 1994). In deciding the sampling size of this research with a sample size between 30-500 respondents, the Roscoe (1975) approach was implemented based on the above guideline. Therefore, approximately 50 questionnaires will be distributed to Klang Valley business intelligence firms. This is due to the high status of people in the business as the target population. The respondents responded to a total of 50 or 100 percent questionnaires and all data was used in data analysis. Usually, with a standard deviation of 20.4, the average response rate for a survey is 52.7% (Baruch & Holtom, 2008). A high response rate (100 percent) from respondents who are in higher positions in their industry is assumed to be attributed to their greater personal credibility and transparency. Besides, it is relatively easier to follow up and control the response rate from a small sample. The respondent's profile is presented as table below.

Table 1: Respondents' Profile

Characteristics	No. of Respondents	Percentage (%)
Gender		
Male	32	64%
Female	18	36%
Age		
21-30	32	64%
31-40	10	20%
41-50	8	16%
Level of Education		
Primary School	2	4%
Secondary School	6	12%
Diploma	20	40%
Degree	20	40%
Master	2	4%
Position Level		
Founder / Business Owner	8	16%
C-Level	10	20%
Manager	32	64%
Years of Industry Experience		
1-3	20	40%
4-5	10	20%
Above 5	20	40%
Familiarity with Business Intelligence		
Beginner	38	76%
Intermediate	12	24%
Information System Use		
SAP	4	8%
Oracle	2	4%
Microsoft	42	84%
Rank Alpha	2	4%

3.3 Questionnaire Design

In this study, the questionnaire was generated to obtain data from the respondents. As an inadequate questionnaire may confuse the study, sufficient and relevant questions in the questionnaire are essential (Acharya, 2010). The design of the questionnaire is to design suitable questions for the participants to answer relevant to the selected variables for the study. The questionnaire in this study consisted of 39 questions. Section A covers demographic information; Section B covers business intelligence competence; Section C covers supply chain responsiveness, and Section D covers the agile efficiency of the organization of the participants. The questions were divided into 4 parts. Each of the parts consisted of 7, 20, 5 and 7 questions. Nominal and ordinal measuring scales were adopted in this review. The nominal scale is generally used to measure variables without any quantity value, while the ordinal scale is typically used to measure the order of a variable in each group (Sekaran & Bougie, 2016). Section A is also calculated using a nominal scale, whereas the Likert scale was used in Sections B, C and D as an ordinal scale for queries. The expected time for the respondent to complete the survey is planned between 15 minutes and 20 minutes.

3.4 Measurement of Reliability and Validity

According to Sekaran and Bougie (2016), the pilot study can be defined as a small scale study that serves the same purpose and objectives of the research in order to have better preparation for the final study. It usually conducted an investigation on a small scale population with a reasonable number of respondents (Lanphear, 2001). By conducting the pilot study, it enables the researcher to identify inadequacies and correct the shortfalls of the instrument before conducting data collection (Hassan, Schattner, & Mazza, 2006). A pilot study was conducted in this study. Among the Federation of Malaysian Freight Forwarders (FMFF) members, 5 members were selected for the pilot study and questionnaires were distributed. From the pilot test, feedback was collected from the participants to ensure all respondents understand the questions in the questionnaire. Before applying to the real study, the correction was made to improve the effectiveness of the questionnaire to achieve the research objectives.

Table 2 Cronbach's Alpha for Each Variable

Variables	Cronbach's Alpha
Managerial Competence	0.962
Technical Competence	0.988
Cultural Competence	0.989
Supply Chain Responsiveness	0.978
Agile Performance	0.946

3.5 Pearson Correlation

According to Koo and Li (2015), Pearson correlation methods will show the result in between -1 and $+1$ to indicate the relation of two variables. Typically, a correlation of ± 0.5 implies a significant relationship. Based on table 3 below, there is a significant positive relationship between business intelligence competencies and supply chain responsiveness with the correlation value of 0.505. Supply chain responsiveness increases in business intelligence competencies. According to Moniruzzaman, Kurnia, Parkes and Maynard (2015), well-defined procedures and methods to integrate, analyze, and organize supply chain information and knowledge which provided by business intelligence can help supply chain company to improve their responsiveness. These analysis results comply with the first hypothesis as well. Also, complete the first objective were main to identify the relationship between business intelligence competence and supply chain responsiveness. In addition, there is a significant positive relationship between business intelligence competencies and agile performance with a correlation value of 0.644. The better the business intelligence competencies, the better the agile performance. One of the main keys for supply chain agile performance is managerial and technical which achievable by business intelligence competence (Sangari & Razmi, 2015). This result completed the second hypothesis and second objective that main to identify the relationship between business intelligence competencies and agile performance. Lastly, the correlation value of agile performance and supply chain responsiveness is 0.861 which indicate a high relationship between these two variables. The better the agile performance in supply chain company, the better the responsiveness. Applying the proper agile strategy allows the company to implement a proper supply chain practices to execute and support supply chain activities which directly improve the supply chain responsiveness (Qrunfleh & Tarafdar, 2013). This complies with the research where agile performance is highly dependent on each other. This has achieved the second objective that main to identify the relationship between supply chain responsiveness and agile performance of the supply chain. In conclusion, there is a positive correlation between business intelligence competence, supply chain responsiveness, and agile performance.

Table 3: Result of Pearson's Correlation Analysis

Correlations			
	Business Intelligence Competence	Supply Chain Responsiveness	Agile Performance
Business Intelligence Competence	1	0.505**	0.644**
Supply Chain Responsiveness	0.505**	1	0.861**
Agile Performance	0.644**	0.861**	1

** . Correlation is significant at the 0.01 level (2-tailed)

3.6 Simple Linear Regression

Generally, the value (R^2) can be defined as an index that measures the relations between variables. It explained the changes in the independent variable which are business intelligence competencies and supply chain responsiveness. This value represents the percentage of influence by the independent variable to the dependent variable. Table 4 demonstrates the model summary of a simple regression test in this study.

Table 4 : Results of Simple Linear Regression Analysis

No	Hypothesis	P-value	R Square Value	F Value	Hypothesis Results
1	H1 Business intelligence competence has a positive significant impact on supply chain responsiveness.	.000	.255	16.469	Accepted
2	H2 Business intelligence competence has a positive significant impact on agile performance of the supply chain.	.000	.742	138.177	Accepted
3	H3 Supply chain responsiveness has a positive significant impact on agile performance of the supply chain	.000	.415	33.993	Accepted

4. DISCUSSION, CONCLUSIONS, RECOMMENDATION

4.1 Business Intelligence Competence has a positive impact on Supply Chain Responsiveness

As described in table 4.4, the regression results revealed the R square value of 0.255. This indicates that 25.5% variance that explained the business intelligence competence was accounted for by the supply chain responsiveness. Thus, the F value of 16.469 with significant value of less than 0.001, business intelligence competence has a positive impact on supply chain responsiveness.

4.2 Supply Chain Responsiveness has a positive impact on Agile Performance

As described in table 4.4, the regression results revealed the R square value of 0.415. This indicates that 41.5% variance that explained agile performance was accounted for by the supply chain responsiveness. Thus, the F value 33.993 with significant value of 0.001, business intelligence competence has a positive impact on agile performance.

4.3 Business Intelligence Competence has a positive impact on Agile Performance

As described in table 4.4, the regression results revealed the R square value of 0.742. This indicates that 74.2% variance that explained the business intelligence competence was accounted for the agile performance. Thus, the F value 138.177 with significant value of less than 0.001, supply chain responsiveness has a positive impact on agile performance.

There are three hypotheses to be identified in this research to investigate the relationship and impact between business intelligence competence, supply chain responsiveness and agile performance. Business intelligence competence is the independent variable while agile performance is the dependent variable, thus, supply chain responsiveness act as the mediator. The first and second research objectives are (1) to identify the relationship and impact between business intelligence competence and supply chain responsiveness; (2) to identify the relationship and impact between business intelligence competence and agile performance. The first hypothesis (H1) is business intelligence competence has a positive significant impact on supply chain responsiveness, thus, the second hypothesis is business intelligence competence has a positive significant impact on agile performance of the supply chain. Business intelligence competence is the capabilities of the company to produce and to make business decisions with more effective and efficient. Business intelligence competence is formed in three dimensions which are managerial competence, technical competence and cultural competence. Managerial competence is the ability to search and create the information and data which is needed and relevant for the management team to make a more accurate decision (Petrini & Pozzebon, 2009). Technical competence is the ability to gather data and generate a report in a short period with a different type of analytical and reporting tools (Herschel & Jones, 2005). Cultural competence is the ability to adapt the BI system across every entity of the organization to create a synchronize and healthy organization culture (Machuca & Costa, 2012). Accordingly, the first hypothesis (H1) and second hypothesis (H2) is

to identify the relationship and impact between business intelligence competence, supply chain responsiveness and agile performance. With the analysis result of H1 has 0.505 in Pearson correlation and H2 there were 0.644 correlations between business intelligence competence and agile performance. This indicates business intelligence competence has a strong and positive correlation relationship toward supply chain responsiveness and agile performance. Correspondingly, H1 has 0.000 p-values and 0.255 R square value in simple linear regression analysis while H2 has 0.000 p-values with 0.742 R square value. This show business intelligence competence has a significant influence on supply chain responsiveness and agile performance. In short, these findings of this study presented business intelligence are strongly affecting the responsiveness of the supply chain and the agile performance in the logistics industry. Therefore, increasing business intelligence competence of the company will enhance the performance of the company response speed and agile performance. The findings of Gu (2014); Holweg (2005); Moniruzzaman, Kurnia, Parkes and Maynard (2015); Nasab, Ziaei and Alifiah (2015) are consistent with our study that business intelligence competence has a positive significant impact on supply chain responsiveness meanwhile the findings of agile performance. The third research objectives are to identify the relationship and impact between supply chain responsiveness and agile performance. The third hypothesis (H3) is supply chain responsiveness has a positive significant impact on agile performance. Responsiveness referring to the ability of quick react and adjustment according to the need of the situations. Therefore, the organization enable to obtain the opportunities to improve their business performance or avoid the threats will cause further damage to the organization (Gindy, Saad, & Yue, 2015). This is to say, supply chain responsiveness is how fast the organization enable to respond to the ad hoc events, task or customer requirements to sustain their business position and competitive advantage. Notably, the third hypothesis (H3) is to identify the relationship and impact between supply chain responsiveness and agile performance. With the analysis result of H3 has 0.861 in Pearson correlation between supply chain responsiveness and agile performance. This indicates supply chain responsiveness has a very strong and positive correlation relationship with agile performance. Not to mention, H3 has 0.000 p-values and 0.415 R square value in simple linear regression analysis. This indicates supply chain responsiveness has a significant impact on agile performance. To sum up, this findings of this study presented supply chain responsiveness are strongly affecting the agile performance in the logistics industry. Therefore, enhancing supply chain responsiveness will improve the company's agile performance. The finding of Barhmi (2019); Hoek, Harrison and Christopher (2001); Qrunfleh and Tarafdar (2013); Tarafdar and Qrunfleh (2017); Towill and McCullen (1999) are consistent with our study that supply chain responsiveness has a positive significant impact on agile performance.

Table 6: Summary of Hypothesis Testing Result

	Description of Hypothesis	Results
H1	Business intelligence competence (Managerial competence, Technical competence, Cultural competence) has a positive significant impact on supply chain responsiveness.	Accepted
H2	Business intelligence competence has a positive significant impact on agile performance of the supply chain.	Accepted
H3	Supply chain responsiveness has a positive significant impact on agile performance of the supply chain.	Accepted

Conclusion

In the final analysis, the factors that significantly impact the agile performance of 3PL logistics company in Klang Valley had been studied. Three hypotheses were formulated according to the past literature also a theoretical framework had been created to describe the relationships between the independent variable, mediator and dependent variable. As mentioned in the previous chapter, the target audience of this study is focused on 3PL logistics company whose hold a high position in the organization. For the reasons, they are the people who enable to look the organization as a whole with a bigger picture, therefore, their opinion and insight are more valid, reliable and subjective toward this research topic. Besides that, all three hypotheses were accepted with strong correlation value and significant (0.000). First of all, business intelligence competence has a positive significant impact on supply chain responsiveness and agile performance. Next, supply chain responsiveness has a very strong positive correlation and significant impact toward agile performance. In brief, the findings of this study align with past research. Hoping the findings and results of this research enable to provide some useful insight to future researchers and practitioner interested in business intelligence, supply chain responsiveness and agile performance in the logistics industry. There are some limitation is found in this study. The limitation of the research is due to the reason where researcher unable to control although the research provide and contribute insight for the study. First, the limitation of this study is the location of the research conducted. This study focuses on collecting data from the logistics company located at Klang Valley. Future research can include the logistics company in all the state of Malaysia or other countries. This is because different state or country may have different level agile performance and digital literacy as this study only represent the logistics company in Klang Valley. Moreover, the limitation of the research is where most of the findings identified that the respondents were from top management.

Generally, the data should have collected from a larger sample size which might including the employees that proficient in the business intelligence system. Therefore, future research can be conducted by involving the employees from the IT department or expert in business intelligence system to measure whether any difference in the result. Besides, this study is using a quantitative method such as a questionnaire for the survey. Future studies can be made in the qualitative method to have a better understanding of agile performance based on the depth of the interview with the respondent. Furthermore, there is a limitation according to the analytics tool used to analyze the data. In the current study, SPSS was used to get the findings. Future research might use PLS software as it considered better statistical approaches and advanced analytics tool. Lastly, future research can include or explore more variable which can contribute to the development of agile performance. It also can be adding moderator and mediator to furnish the research framework toward a better model.

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