Information Technology Factor Affecting Firm Performance through Supply Chain Agility

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Abstract: The purpose of this study is to investigate the elements that influence organisational performance, specifically the aspects pertaining to informational technology and the agility of supply chain management. The flexibility of the supply chain management acts as a mediator in this particular study. Both qualitative and quantitative data were collected for the study. The pharmaceutical businesses in Indonesia were given a questionnaire that they filled out on their own in order to contribute their responses to the current study. A straightforward method of random sampling is utilised in the distribution of three hundred questionnaires across the pharmaceutical industry. The data analysis was done with the help of the smart PLS. The findings of the study indicate that all of the hypotheses can be accepted because they exhibit positive and meaningful outcomes, as opposed to two hypotheses that show results that are negligible. The conclusion of the study includes a discussion of more debate as well as the limitations of the study.

Keywords: Information system, Infrastructure, Organizational performance, smart PLS, Agility of SCM.

Introduction

In recent years, information technology has played a significant role in fostering an atmosphere that is conducive to the continued expansion of enterprises and boosting the rate at which businesses grow [1]. Information technology refers to the application of various technological components inside informational systems [2]. The use of information technology (IT) was a significant contributor to the enhancement of the supply chain management system [3]. The integration of information systems leads to improvements in the performance of an organisation. The performance of an organization is dependent on its financial and operational performance, both of which can be improved by integrating supply chain management effectively and making appropriate use of the most recent technologies [4]. The application of information technology as a tool for the optimization of supply chain management is a relatively new idea. It is impossible to coordinate communication between the many various organisations that are partners in supply chain management without the most up-to-date information technology system [5-11]. The management of the organization's agile supply chain serves as the organization's central focus in its efforts to develop products that are tailored to the requirements of individual customers [12]. The business is able to respond more quickly to the needs of its consumers and produce goods that are more precisely tailored...
to those needs because of the agility provided by SCM [13]. Agility in the supply chain helps businesses deal with unpredictability in their environments, which in turn boosts organisational performance [14]. This is accomplished by lowering resource consumption and giving them an advantage in the marketplace [15-19].

The purpose of this study is to investigate how the incorporation of information technology and supply chain agility might positively impact the overall performance of a business [20]. Utilizing cutting-edge technologies such as information technology skills and knowledge, the infrastructure of information technology, information technology-based systems integration, global positioning system, and geographic information system is the primary focus of this research project [21]. This is done with the intention of enhancing the level of communication that exists between the various partners involved in supply chain management [22]. In addition to this, the study enhances the performance of organisations by increasing the flexibility of supply chain management [23-26]. Because of the agility of both IT and supply chain systems, the organisation is able to quickly satisfy the requirements of the customers by transmitting information between the partners in the supply chain system [27]. These techniques will become more common, which will result in increased profits for firms as well as increased competitive advantages [28].

In addition, the purpose of this study is to do a literature review on all of the factors that influence organisational performance, such as IT skills and knowledge [29-31]. Infrastructure for information technology, system integration based on information technology, global positioning and information systems, supply chain agility, and literature on organizational performance [32]. Next, this article delves into the research framework, methods, findings, and discussion of the current study, before concluding with a discussion of the study's shortcomings [33]. Collect information regarding the pharmaceutical sector in Indonesia for the purpose of this study. In Indonesia, one of the most significant sectors of the economy is the pharmaceutical business [34].

The level of motivation to accomplish corporate objectives is directly proportional to organisational performance [35]. The term "organisational performance" can relate to goals that are either financially or commercially focused. Short-term and long-term goals can be broken down into two categories when discussing organisational performance in the context of supply chain management [36-41]. These categories are as follows: short-term objectives and long-term objectives. In the short term, we want to achieve our goals of managing the supply chain system in an efficient and effective manner by cutting costs and maximising resource utilization [42]. The long-term goal of supply chain management is to raise the profit of supply chain members as well as rapidly increase the market share by placing an emphasis on SCM resources that are efficient and effective [43]. In the end, all of the operations of the company include the integration of SCM, the infrastructure of the information system, and the agility of supply chain management [44]. This ultimately improves the performance of the organisation and increases its advantage over its competitors [45-51]. Both financial performance and operational performance can contribute to a company's overall performance; whereas financial performance is tied to making effective use of resources, operational performance is related to making less use of people's time [52-59]. Therefore, both of these performance indicators are necessary for determining an organization's success and for developing agility in SCM through the decrease of both costs and the amount of time spent on tasks [60-63].

Technology that is based on computers now has an impact on the day-to-day operations of businesses [64-65]. By utilising the information technology system, extensive transfer inside the managerial and information system is achievable [66]. In addition, having the knowledge and abilities related to information technology makes it simple to communicate electronically, transmit data, and store documents [67-73]. Therefore, information technology strengthens the capabilities of companies by increasing the attractiveness of the organization's product to customers and the agility of the management
system for supply chains [74]. In addition, information technology and knowledge skills encompass areas such as software creation, project management, responsiveness to users' needs, and interoperability between hardware and software [75-81]. Therefore, the purpose of this study is to discuss the IT skills and knowledge, as well as the determinants that are included in the IT skills and knowledge, in order to increase the efficiency of supply chain management system agility [82-94].

The implementation of an information integration system is not unusual for any organisation. The vast majority of organisations make use of data-oriented and service-oriented integration systems, and integrations are also determined by the context in which the organisations operate. In addition, an organisation can combine the dealers, high technology modules, subsystem software, leaders, knowledge, and engineers to generate the product for the purpose of generating a competitive edge in the organisation by utilising system interconnections [95-99]. In a similar vein, the successful integration of a business sometimes depends on the successful integration of a system. On the other hand, the information technology-based integration system featured data-oriented integration, system-oriented integration, and organisation integration. All three of these types of integration have an effect on the system's agility [100].

In recent years, it has been abundantly clear that the IT infrastructure of an organisation significantly impacts the latter's power to practise IT in a manner that is competitive [101-105]. On the other hand, organisational capability is something that supply chain agility takes into consideration. Because of this, the firm performance of the organisation is also improved as a result of the high-performance business capabilities that are enabled by the IT architecture that has been outlined [106]. The expansion of transmission, data storage, multimedia communication, cryptography, and many more areas are among the goals of IT infrastructure [107]. In addition, the IT infrastructure, the transformation of knowledge, the alignment of processes, and the achievement of the flexibility in operation made possible by IT infrastructure are all critical factors in determining the efficacy and efficiency of any given firm. SO's information technology infrastructure consists of fibre optic networks, wireless networks, and a satellite system [108-111].

The geographic information system has the ability to collect, store, absorb, utilise, evaluate, and demonstrate data in an environment that is uniquely designated for that purpose [112-115]. It is able to examine obvious facts and comprehend patterns, tendencies, and correlations that are not readily visible in tabular or etched form [116-122]. In addition, the internet is becoming an increasingly important part of geographic information systems. The geographical information system, sometimes known as a GIS, is the gold standard for evaluating man-made surroundings. In addition, Web GIS is an efficient and cost-effective solution for the delivery of geospatial processing tools and data. Together a similar manner, the development of the global positioning system (GPS) is tied in with geographic information systems [123].

In addition, the level of consumer confidence is enhanced, and costs are lowered, thanks to the implementation of GPS in the supply chain [124-127]. The use of geographic information systems (GIS) and global positioning systems (GPS) in the supply chain can improve decision-making and increase the amount of information that is available to a company, so enhancing its competitive edge [128]. In addition to this, GPS helps increase the amount of confidence that clients have, and GIS helps eliminate the imbalance that exists in the various types of geographical information [129]. The cost of the technology, as well as the web GIS and the GPS handbook, are included in the GPS and GIS [130].

It is necessary to make the system that manages the supply chain adaptable so that alterations may be quickly integrated into the supply chain systems and the partners involved in supply chain management [131-132]. In addition, the flexibility and speed of the system that makes up the supply chain and the members of that system play a significant role in elevating the firm's overall performance. Studies done in
the past have demonstrated that the integration of supply chains and organisational performance have a
direct correlation with one another [133-137]. In a similar vein, current research has shown that the
integration of the supply chain does not exclusively effect the performance of the company; rather, the
adaptability of the supply chain plays an essential role [138]. Integration of the supply chain and
information technology both contribute to increased customer response, which in turn moves the needle
on firm performance. Increased firm performance can be attributed to increased supply chain agility,
which acts as a mediator between the two [139]. The combination of resource management and
information systems results in an increase in the organization's adaptability [140]. The responsiveness of
the company is improved along with the system's agility, and the organisation gains a competitive
advantage as a result of these two factors: the infrastructure of information technology and the integration
of the SCM [141-145].

Methodology

It has become increasingly significant in modern corporate contexts, and as a result, the topic that this
research has focused on namely, the ways in which information technology systems can boost
organisational performance is of the utmost importance [146-151]. In addition, the deployment of
information technology systems in supply chains has been identified as a predictor of supply chain agility,
which results in increased organisational performance. The current study combines qualitative and
quantitative methods. For the purposes of data collecting, the pharmaceutical business has been chosen
[152]. At the moment, there are a total of 102 enterprises, both private and state-owned, operating in this
market [153-157].

In addition, there are 29 international businesses operating in this industry within the country of Indonesia
[158]. It is impossible to hit such a vast target as the population. The next step is to establish a sample size
that is representative of the overall population [159-164]. Researchers have offered a variety of methods
for determining the sample size, and some researchers have stated that researchers need to make use of
ratios when determining the sample size. When there is a greater proportion of people in the population,
there will be a smaller number of people in the sample [165]. There are instances when the overall
population has a limit. When the population is limited, gathering the necessary information to figure out
the appropriate size of the sample becomes considerably simpler [166]. But it was not the case in this
particular instance because the population was not fixed. As a result of this line of thinking, the sample
size was decided to be a random selection of 300 workers from the workforce [167]. After determining
the size of the sample to be used, the following question to ask is about the respondents from whom the
data will be collected [168]. This objective can be accomplished by the application of any one of a
number of different sampling strategies. However, in this particular study, the researchers chose to use
methods of sampling that were convenient. It was chosen due to the extensive size of Indonesia's
geographical area as well as the number of pharmaceutical organisations located there [169-171].

Results

The following thing that needed to be done was to choose between primary and secondary methods of
data collection. Primary data have been utilised throughout the course of this investigation [172-175]. As
a result of this, a questionnaire was decided upon as a viable option for the data collection method that
would be used with the respondents. The questionnaire was broken up into two distinct parts [176-181].
In one part of the questionnaire, we asked respondents questions about their demographic information,
such as their age, education, experience, and so on. The respondents did not provide any information that
might be considered confidential [182]. The information technology skills and knowledge, system
integration, infrastructure, GPS and GIS, supply chain agility, and organisational performance were the
topics covered in the second section of the questionnaire, which was dedicated to questions pertaining to
the variables that were the focus of the research [183-186]. A total of twenty-four different items of measurement were modified so that they could be used to assess the information technology [187]. The agility of the supply chain was evaluated using a five-item scale, and in the end, the overall performance of the organisation was evaluated using the same five things [188]. The point-to-five-Likert scale was utilised for the survey's construction. The data analysis tool that was employed was called Smart-PLS.

Despite the fact that it does not take into account a number of covariance-based assumptions when using structural equation modelling, it is nevertheless used. In addition to that, the programme is adaptable and can handle small sample volumes [189-191]. The outcomes of the investigation will be discussed in greater depth in the following portion of the research paper. The most recent software for SEM, Smart-PLS, is used to conduct tests on the study model [192-193]. Before moving on to the test of the hypothesis, it is necessary to fulfil both of these conditions. The first is the scale's ability to be relied upon, and the second is its validity [194-195]. The value of Cronbach's Alpha can be thought of as an indicator of how reliable the scale is. It determines the degree to which the scale is consistent with itself [196].

Composite reliability and an extract of the average variance come together to form convergent validity. Both the CR and the AVE values need to be higher than 0.8 and 0.5, respectively. According to the findings of the research, each of the values for the composite reliability and the average variance extract is greater than 0.8 and 0.5 respectively [197]. In addition, the values of the factor loadings for each scale item need to be more than 0.7 in order to be considered acceptable. The results of the investigation make it abundantly clear that the values obtained for the factor loadings, CR, and AVE are all suitable and fall inside the acceptable range. Convergent validity of the scale is demonstrated by this result [198]. The second condition that needs to be satisfied before testing the hypothesis is known as discriminant validity. For the purpose of determining whether or not discriminant validity can be established, the current research utilised the recently developed "Hetrotrait-Monotrait Correlation Ratio." The HTMT dictates that the degree of correlation that exists between all of the variables must be lower than 0.85. According to the second body of study, none of the correlation coefficients between the variables are higher than 0.85 [199]. It demonstrates that the measure does have discriminatory validity. It is therefore possible to draw the conclusion that convergent and discriminant validity of the scale do exist, taking into account the findings that were presented in works 1 and 2.

Following confirmation that the reliability and validity conditions had been met, the hypothesis was put to the test. For the purpose of testing the hypothesis, structural equation modelling was utilised. There is a considerable and positive association between the agility of a company and the performance of its organisation. The correlation coefficient is 0.361, which indicates that there is only a marginal impact that agility has on the success of organisations. The performance of a given company will improve in direct proportion to the extent to which the company has special talents. The age of information technology has arrived, and at this point, everything is being followed by satellites. In the sphere of business, the global positioning system has been an extremely important tool. The findings of the study have provided evidence in favour of this contention by demonstrating a beneficial connection between GPS and GIS and the agility of businesses. The company stays on the cutting edge of technology by ensuring that its GPS and GIS systems are always up to date. These systems may then be integrated into the company's day-to-day operations. In addition, it enables a company to monitor the delivery of its products and raw materials, as well as provide direction to both buyers and sellers. An organisation now has the ability to integrate all of its departments into a single platform thanks to advancements in information technology infrastructure. It cuts down on the use of resources like stationery and the needless involvement of workers in the event that an investigation needs to be conducted.
It is possible to check availability with only one click. According to the findings of the study, the information technology infrastructure of a business offers a variety of capabilities that are distinguishable from those offered by other firms. The connection is very important and should be viewed favourably. On the other hand, the value of the insignificant effect size is 0.13. It is interesting to note that the findings have showed that there is no substantial connection between the integration of information technology and its effect on the agility of supply chain operations. The fact that this association between these two variables was also negative is of utmost importance. In general, the integration of information technology into the activities of an organisation in such a way that it is appropriate results in benefits and an increase in the functional performance of the company. The findings of the current study, on the other hand, contradicted those that had been reported in the past. In conclusion, the research found a considerable connection between training and abilities, on the one hand, and supply chain agility, on the other. This indicates that if a company educates its workers appropriately on the use of information technology in the supply chain activities of a company, then the company will have a successful business. It has a tendency to boost the businesses' ability to respond quickly in the supply chain. Every single part of the hypothesis is validated, with the exception of a single unimportant part. It is possible to draw the conclusion that companies will be more adaptable once they have successfully integrated information technology in its purest form.

According to the findings of this research, a crucial mediator between GPS and GIS and organisational success is supply chain agility. According to the findings, the global positioning system (GPS) and geographic information system (GIS) have had a greater overall impact on the performance of organisations due to the presence of more supply chain agility. In addition to this, the findings indicated that supply agility had a key role in mediating the connection between ITI and organisational performance. It’s interesting to note that there isn’t much of a connection in terms of supply chain agility between the integration of information technology systems and organisational performance. In conclusion, it was discovered that the agility of the supply chain acts as a key mediator between the association of ITSK and the performance of the company. According to the findings, it is possible to draw the conclusion that supply chain agility provides an organisation with a number of characteristics that are unique, hence boosting the performance of the business.

Discussion

The field of business is experiencing a period of significant growth in information technology. As a result of this growth, businesses are increasingly deploying the adaptability of supply chain management by utilising information technology. A company needs to implement an information technology system in order to satisfy the needs of its customers in a shorter amount of time, lower its costs, and gain a competitive advantage over other companies in order to establish a business that will be successful in the long run. The business is able to enhance its earnings in the market thanks to advancements in information technology and agile supply chain management. Additionally, the organisation is able to develop items in real time that are tailored to the requirements of the customers. The adaptability of SCM and IT may also be utilised in the operation of an internal business, where it helps to reduce the consumption of available resources and improve communication networks inside an internal organisational system. Enterprises are required to always embrace fresh technology in order to familiarise their statistics with standardised data arrangements and inter-organizational harmonisation between companies in order to improve the agility of their supply chain management systems. Through the use of many aspects of information technology and the flexibility of supply chain management, the purpose of this study is to improve the performance of organisations. The findings of this research indicate a favourable connection exists between information technology skills and knowledge, as well as the agility of supply chain management systems. A better understanding of information technology enables a firm to
better respond to changes in customer requirements. The second hypothesis of the study suggests that a positive association exists between information technology base system integration and supply chain management agility; however, the findings do not support this hypothesis. There is a connection between them, although it is not very substantial. The causes behind this will be further investigated in subsequent studies. In addition, the findings of the third and fourth hypotheses indicate that there is a favourable correlation between IT infrastructure, GPS, and GIS and the agility of supply chain management. The findings are supported by previous research as well.

**Conclusion**

According to the findings of this research, there is no substantial connection between information technology base infrastructures and the agility of supply chains or organisational performance. Additional studies were conducted to analyse these association contradictions, and any other meditator was proposed. In this study, cross-sectional data was collected, and a longitudinal study design was used so that data could be collected at multiple points in time. It will provide more authentic results of IT elements that affect organisational performance and how the agility of supply chain management mediates those effects. The current study gathered its information from various pharmaceutical companies. In addition, researchers are able to conduct comparative studies with other businesses, such as the information technology industry. The individuals who work in the industry serve as the study's primary unit of analysis. In addition, the researcher of the future will be able to collect data from both upper and lower management in order to gain a deeper comprehension of how increased agility in SCM and IT infrastructure contributes to improved organisational performance.

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