

The influence of environmental uncertainty, organizational structure and distribution network competence on the quality of supply chain management information systems

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ABSTRACT

This study aims to find empirical evidence regarding the factors that affect the quality of information systems and the quality of supply chain management as seen from the environmental uncertainty of the organizational structure and the distribution network competence in manufacturing companies in Medan, Indonesia. The research method used is quantitative and verification that aims to determine the relationship between variables through a hypothesis testing. The data used are primary data using a questionnaire aimed at functional managers of marketing managers and production managers with a Likert scale. The study uses a sampling technique through a census of the entire population as a unit of analysis as many as 206 managers spread across 103 manufacturing companies in the city of Medan. Data analysis was performed through multiple linear regression analysis. The results showed that environmental uncertainty, organizational structure, and distribution network competence partially and simultaneously affected the quality of supply chain management information systems in manufacturing companies.

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1. Introduction

Information system in supply chain management is part of an information system that measures, processes, and reports management information that is useful in making decisions to smooth the qualified supply chain. Supply chain management information systems are intended for company distribution network in supply chain decision making. Quality supply chain information is information that is in accordance with the required specifications compared to the specifications produced (Azhar, 2008; Richardson et al., 2014; Baltzan et al., 2008; Bocij et al., 2008; Romney & Steinbart, 2015; Laudon & Laudon, 2017). The quality of information produced in an organization affects every decision made by managers and by organizational actors. Quality information can be used by managers to analyze corporate strategy development in processing the workflow of supply chain management. The quality of the resulting information is influenced by the quality of the supply chain management information systems (Lupasc et al., 2009; Azhar, 2013; Woodall et al., 2012; Laudon & Laudon, 2017). To improve the performance by utilizing the role of supply chain management, an organization influences each other and is interconnected between supply chain management information systems which are very complex and affect many factors such as organizational structure, expertise, politics, organizational culture, environment and management policies. Supply chain management information systems that are not qualified related to flexibility are not able to adapt to changes in environmental conditions so that they can cause overall losses for organizational performance (Belkaoui, 2002; Woodall et al., 2012; Mughal, 2019). Qualified information and supply chain management information systems have a vital and strategic role for the manufacturing company. However, in reality, there are still many companies in Indonesia in various business sectors experiencing problems with supply chain management information systems, as suggested by Karlis (2011)

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that the supply chain management information systems are not yet integrated, so more time is required for data processing and supply chain decision making. Likewise, in the Vivere Group, companies engaged in the furniture & fixture industry have problems with supply chain management information systems because the systems between company divisions are not yet fully integrated so that they affect the effectiveness of work between divisions (Rochimat, 2012). However, some studies confirmed that many companies in Indonesia do not yet have an integrated supply chain management information system so that their operations are inefficient and require large costs (Wiyati et al., 2019; Rao & Holt, 2005; Napitupulu, 2015; Ariyanti, 2018; Naway & Rahmat, 2019). North Sumatra is one of the largest provinces in Indonesia having two industrial estates occupied by state owned companies, national private companies and foreign companies. From this condition, it can be seen that the market is no longer only entered by domestic competitors, but has also been visited by foreign competitors. Therefore, a quality information system is needed by companies in making decisions in order to stay ahead of the competition. Hence, this study aims to find empirical evidence regarding the factors that affect the quality of information systems and the quality of supply chain management as seen from the environmental uncertainty of the organizational structure and the distribution network competence in manufacturing companies in Medan, Indonesia.

2. Literature Review and Hypothesis Development

2.1. *Quality of supply chain management information systems*

The supply chain information systems are collections of data and processing procedures that produce the information required by its supply chain users. Supply chain management information systems accumulate, classify and summarize, and report information that will help employees in an organization in supply chain decision-making, planning, controlling and performance measurement activities (Drury, 2012). The supply chain management information systems are sub-system of the information systems in addition to the accounting and financial information sub-system (McLaren et al., 2004; Williamson et al., 2004; Bayraktar et al., 2009; Azhar, 2013). Information generated by supply chain management information systems is used by managers to develop, communicate and implement strategies, in addition to coordinating decisions about product design, production and marketing processes and performance appraisals (Horngren et al., 2015; Gunasekaran & Ngai, 2004). Hilton and Platt (2005), Edwards et al. (2001) and Shah et al. (2002) further argue that supply chain management information systems provide all types of information to management to support management's role in directing organizational activities. Quality is the ability of a product or service that is reflected in the various features or attributes or characteristics it has to meet the needs or desires of distribution network (Reynolds & Stair, 2010; Horngren et al., 2015). Stair and Reynolds (2012) argue that the quality of information is directly related to how this information helps supply chain decision making to achieve organizational goals. The quality of information refers to the level of usefulness of the information (Woodall et al., 2012). Meanwhile, Atrill and McLaney (2009) stated that the quality of information is determined by how far the information is able to meet the needs of managers (users). Quality information has several characteristics or dimensions. Marakas and O'Brien (2013) stated that there are 15 quality information attributes, namely: timeline, currency, frequency, time period, accuracy, relevance, completeness, consistency, scope, performance, clarity, detail, order, presentation and media which are grouped into 3 (three) dimensions: time, content, form. Meanwhile, Stair and Reynolds (2012) stated that there are 11 (eleven) characteristics of quality information, namely: accessible, accurate, complete, economical, flexible, relevant, reliable, secure, simple, timely, and verifiable. Furthermore, Laudon and Laudon (2017) stated that there are 7 dimensions of information quality, namely: accuracy, integrity, consistency, completeness, validity, timeliness, accessibility. Wiengarten et al. (2010) mentions quality management information in terms of relevant information which is determined by characteristics of accurate, timely, consistent, and flexible.

2.2. *Environmental Uncertainty and the Quality of Supply Chain Management Information Systems*

The company environment includes all elements that exist outside the company that have the potential to influence the company (Daft, 2010; Wagner & Hollenbeck, 2014). Furthermore, Robbins and Judge (2013) states that the company environment includes institutions and forces outside the company that can affect company performance, such as: suppliers, customers, competitors, government agencies, and pressure groups in society (pressure groups). Environmental uncertainty can occur when managers have minimal information about events in the environment against the company. Environmental uncertainty refers to the level of environmental change and the level of environmental complexity (Mufti et al., 2019; Robbins & Coulter, 2012; Wheelen et al., 2017; Hatch & Cunliffe, 2013; Moorhead & Griffin, 2008). Understanding and responding to the environment effectively is essential for manager to improve its supply chain advantage. If managers do not understand the environment, their ability to make decisions and execute plans will be very limited (Bateman & Snell, 2013). Managers at all levels use information about the environment to facilitate supply chain decision making, but unfortunately, information about the environment is not always available, and managers often operate in conditions of uncertainty (Bateman & Snell, 2013). Therefore, the environment in which the company operates must be considered when planning supply chain management information systems that can be adapted to changing environmental conditions to be a key supply chain competitive advantage (Laudon & Laudon, 2017). The environment is one of the factors that affect supply chain management information systems (Weetman, 2010). Dramatic changes in the business environment significantly affect the supply chain management information systems (Drury, 2012). Furthermore, based on the research results of Mohamad et al. (2015) found that the quality of supply chain management information systems changes dynamically according to changes in the environment in 120 companies listed on the Tehran Stock Exchange in Iran. Based on the descriptions that have been stated, it can be showed that environmental uncertainty significantly affects the quality of supply chain management information systems.

2.3. *Organizational Structure and Supply Chain Management Information Systems*

Organizational structure is a formal system that regulates how work, authority and responsibility are divided, grouped and coordinated within the organization so as to enable the achievement of organizational goals. The organizational structure must fulfill 2 (two) things, namely: First, the organizational structure must provide a framework regarding responsibilities, reporting relationships, and grouping tasks and dividing the workforce according to the tasks carried out. Second, the organizational structure must provide a mechanism to link and coordinate organizational elements into something coherent by combining and coordinating the division of tasks to ensure that tasks are carried out (Daft, 2010; Moorhead & Griffin, 2008). Therefore, it can be said that the organizational structure provides guidelines regarding the relationship between reporting, control, authority and decision-making within the organization. In linking organizational elements into something coherent, the use of an information system is required (Daft, 2010). Kendall and Kendall (2011) state that one of the factors considered when analyzing and designing a supply chain management information system is the organizational structure at various levels of management (Laudon & Laudon, 2017). Furthermore, Weetman (2010) states that the management information reporting framework must be integrated with the organizational structure so that responsibilities can be identified appropriately. The results of research conducted by Strumickas and Valanciene (2010) state that the quality of supply chain management information systems in 7 companies in Lithuania is strongly influenced by the organizational structure. Likewise, Hammad et al. (2013) state that organizational structure is an essential factor for the quality of supply chain management information systems in 50 hospitals in Iran. Based on the descriptions that have been stated, it can be concluded that the organizational structure significantly affects the quality of the supply chain management information systems.

2.4. Distribution Network Competence on supply chain management information systems

Competence is a characteristic that a person has in an appropriate and consistent way to achieve the expected performance. Stewart and Brown (2019) stated that competence is the knowledge, skills and abilities needed to carry out an activity. Meanwhile, Mondy & Martocchio (2016) states that what is meant by competence is a person's ability to orchestrate and apply a combination of knowledge, skills and abilities consistently to carry out work successfully in a required work situation. Supply chain competence is a function that integrates and coordinates with the abilities possessed by individuals involving in supply chain management (Wheelen et al., 2017). Furthermore, distribution network competence is a unique/special characteristic inherent in an individual resulting from knowledge, expertise, skills and motivation which is a reflection of the way of thinking and behaving in an individual which describes the success of that individual's supply performance (Mejia et al., 2005; Yukl, 2013; Stewart & Brown, 2019; Wheelen et al., 2017). Competence is often used to describe the qualities considered for managers in organizations and in certain and specific professions. Information system distribution network with their competencies are an important component of a supply chain management information systems (Hall, 2011; Romney & Steinbart, 2015). A supply chain management information system cannot provide benefits to the organization if its distribution network fails to contribute their competence in implementing a supply chain management information system (O'Brien & Marakas, 2010). Madapusi and Ortiz (2019) stated that the quality of supply chain management information systems is influenced by the competence of information system distribution network in companies that use ERP Systems in India. Furthermore, Hertati and Zarkasyi (2015) show that the competence of information system distribution network is an important factor affecting the quality of information systems in State-Owned Enterprises in South Sumatra. Hence, it can be showed that distribution network competence significantly affects the quality of supply chain management information systems.

3. Research Methods

3.1. Research Approach

This study aims to obtain a description of the factors that affect the quality of supply chain management information systems in terms of environmental uncertainty, organizational structure and distribution network competence. In accordance with the objectives to be achieved, two types of research are used, namely descriptive and verification research. Descriptive research aims to obtain a description of the characteristics of the variables. Meanwhile, verification research is a type of research that aims to determine the relationship between variables through a hypothesis testing. In connection with this type of research, the research method used is a survey method.

3.2. Operationalization of Variables

This study uses three independent variables, consisting of environmental uncertainty (X_1), organizational structure (X_2), and distribution network competence (X_3) and one dependent variable, namely the quality of the supply chain management information systems (Y). Environmental uncertainty (X_1) is defined as the inability of managers to properly understand and predict the effects of environmental change and complexity caused by the unavailability of adequate information about the business environment (Daft, 2010; Wagner & Hollenbeck, 2014; Robbins & Coulter, 2012; Hatch & Cunclife, 2013; Moorhead & Griffin, 2008). The dimensions of the environmental uncertainty variable are (1) environmental complexity with indicators of complexity of customers, suppliers and government; and (2) environmental change, with indicators of economic changes and technological changes. Organizational structure (X_2), is defined as a formal system that regulates how work, authority and responsibility are divided, grouped and coordinated within the organization to enable the achievement of organizational goals (Colquitt et al., 2011; Robbins & Judge, 2013; Moorhead & Griffin, 2008; Jones & George, 2016). The dimensions of the organizational structure variable are (1) departmentalization, with indicators of

grouping tasks and coordination between sections; (2) span of Control with indicators of supervision from superiors to subordinates and reporting from subordinates to superiors; and (3) formalization with indicators of formal procedures and formal regulations.

Distribution network competence (X_3) is defined as the ability of a person to use a supply chain management information systems so that the objectives of a supply chain management information systems can be achieved (Heidmann, 2008; Rowley & Jackson, 2011; Stewart & Brown, 2019; Mejia et al., 2005; Dessler, 2013; Astuty, 2015; Mondy & Martocchio, 2016). The dimensions of the distribution network competence variable are (1) knowledge with indicators of education and experience; and (2) skills with indicators of physical skills and analytical skills. Quality of supply chain management information systems (Y) is defined as the ability of a supply chain management information systems through its features to produce information needed by management to carry out its functions from planning to supply chain decision making (Heidmann, 2008; Reynolds & Stair, 2010; Drury, 2012; Azhar, 2013; Hilton & Platt, 2005; Horngren et al., 2015). The dimensions of the quality supply chain management information systems variable are (1) integration with indicators of integration between system components and integration between sub-systems; (2) flexibility with indicators of capable of adapting to user needs and capable of adapting to changing conditions; (3) accessibility dimension with indicators of capable of being accessed with easy efforts and capable of being accessed in various locations; and (4) media enrichment with indicators of using various alternative channels of communication and increasing interaction between personnel/departments.

3.3. Data Sources

This study uses data sourced from primary data through distributing questionnaires. A questionnaire is a set of questions/written statements formulated to record respondents' answers (Sekaran & Bougie, 2013). Respondents in this study were marketing and production managers in manufacturing companies in Medan Industrial Estate. These managers act as distribution network of the supply chain management information systems to make decisions and take actions in connection with the implementation of their duties/jobs.

3.4. Population and Sample

The populations in this study were functional managers consisting of marketing managers and production managers totaling 206 people spread across 103 manufacturing companies in Medan City. Furthermore, sampling in this study using saturated sampling/census, which is, using all members of the population as the research sample?

3.5. Instrument Testing

Collecting data in this study using a questionnaire, to obtain the accuracy of the research results, the research instrument was tested through validity and reliability tests. A construct has good validity if the Average Variance Extracted value is ≥ 0.50 while the construct has good reliability if the Construct Reliability value is ≥ 0.70 (Hair et al., 2016). Based on data processing using product moment correlation, the results of the research instrument validity test for environmental uncertainty variables (X_1), organizational structure (X_2), distribution network competence (X_3), and quality supply chain management information systems (Y) meet the requirements in testing validity with value the correlation coefficient ≥ 0.50 . Furthermore, based on the results of data processing using the alpha-cronbach method, the results of the research instrument reliability test for environmental uncertainty variables (X_1) have a reliability coefficient value of 0.899, organizational structure (X_2) has a reliability coefficient value of 0.864, distribution network competence (X_3) has a value The reliability coefficient is 0.876, and the Quality Supply chain management information systems (Y) has a reliability coefficient value of 0.869. The value of the reliability coefficient for the fourth questionnaire for the research variables was ≥ 0.70 , these results indicate that the questionnaire items on the four variables were reliable (reliable) to measure their respective variables.

3.6. Data Analysis Technique

The data analysis technique used in this study is multiple linear regressions, by including three independent variables consisting of environmental uncertainty (X_1), organizational structure (X_2), distribution network competence (X_3), and one dependent variable, namely and the Quality of Information systems Management (Y). Furthermore, as a prerequisite, the regression model should be tested using the classical assumption test through normality test, multicollinearity test, and heteroscedasticity test. Furthermore, to test the research hypothesis tested partially (t-test) and simultaneously (F-test) and the coefficient of determination (R^2 -test).

4. Result

Data collection was carried out through distributing questionnaires to functional managers of manufacturing companies in Medan, totaling 206 people spread across 103 companies. The questionnaire was distributed as many as 206 copies and back as many as 162 copies containing complete and continued in the analysis of research data. Furthermore, to analyze the factors that affect the quality of supply chain management information systems (Y) as seen from environmental uncertainty (X_1), organizational structure (X_2), distribution network competence (X_3), the data collected is then analyzed using multiple linear regression analysis. The results of data processing are presented in Table 1. Table 1 shows the constant coefficient of 7.826 with a positive direction indicates that if the environmental insecurity (X_1), organizational structure (X_2), and distribution network competence (X_3) are considered constant, the quality of the supply chain management information systems (Y) has been formed at 7.826. The regression coefficient for environmental uncertainty (X_1) on the quality variable of supply chain management information systems (Y) is 0.079. This shows that each increase in environmental insecurity (X_1) by one unit

causes the quality of the supply chain management information systems (Y) to increase by 7.9 percent or 0.079 units. Next, the regression coefficient of the organizational structure variable (X_2) on the quality variable of the supply chain management information systems (Y) is 0.134. This shows that every increase in the organizational structure (X_2) one unit causes the quality of supply chain management information systems (Y) to increase by 13.4 percent or 0.134 units. Furthermore, the regression coefficient of the user competency variable (X_3) on the quality variable of the supply chain management information systems (Y) is 0.414. This shows that if the user's competence is increased by one unit, it will improve the quality of the supply chain management information systems by 41.40 percent or 0.414. Furthermore, Table 1 empirically proves that environmental uncertainty (EU) has a significant effect on the quality of supply chain management information systems (QMIS) with a t-stat. of $2.378 > t_{table} 1,654$, or $0.019 < 0.05$.

Table 1
Hypothesis Testing

Hypothesis	B	Std. Error	Beta	t	Sig.
EU → QMIS	.079	.033	.128	2.378	.019
OS → QMIS	.134	.064	.147	2.102	.037
DC → QMIS	.414	.049	.618	8.410	.000

Unstandardized Coefficients (Constant): 7.826

EU= environmental uncertainty; OS= organizational structure; DC= distribution competence; QMIS= quality of management information system

The direction of environmental uncertainty has a positive effect on the quality of supply chain management information systems. Organizational structure (OS) has a significant effect on the quality of supply chain management information systems (QMIS) with a t-stat. of $2.102 > t_{table} 1.654$, or $0.037 < 0.05$. The direction of the organizational structure has a positive effect on the quality of supply chain management information systems. Meanwhile, distribution network competence (DC) has a significant effect on the quality of supply chain management information systems (QMIS) with t-stat. of $8,410 > t_{table}$ of 1.654, or $0.00 < 0.05$. The direction of distribution network competence has a positive effect on the quality of supply chain management information systems. Furthermore, to determine the effect of environmental uncertainty variables (X_1), organizational structure (X_2), distribution network competence (X_3) together on the quality of supply chain management information systems can be seen in Table 2.

Table 2
Analysis of Variance

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1470.885	3	490.295	78.369	.000
Residual	988.479	158	6.256		
Total	2459.364	161			

Predictors: (Constant), EU, OS, UC; Dependent Variable: QMIS

Table 2 presents that the environmental uncertainty (X_1), organizational structure (X_2), distribution network competence (X_3) together have an effect on the quality of supply chain management information systems (Y) with a F-stat. of $78.369 > F_{table}$ of 2,66 value and a significance value of $0.000 < 0.05$, so it can be argued that simultaneously the environmental uncertainty (X_1), organizational structure (X_2), distribution network competence (X_3) has a significant effect on the variable quality of supply chain management information systems (Y). Meanwhile, to find out how much influence the environmental uncertainty (X_1), organizational structure (X_2), distribution network competence (X_3) together on the quality variable supply chain management information systems (Y) can be seen in Table 3.

Table 3
Simultaneous effect of uncertainty, organizational structure and distribution network competence on quality of supply chain management information systems

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
EU, OS, UC → QMIS	.773 ^a	.598	.590	2.501

Table 3 shows that the quality of supply chain management information systems quality (QMIS) obtained a coefficient of determination (R^2) of 0.598 or 59.80 percent. This shows that 59.80 percent of supply chain management information systems quality variables can be explained by environmental uncertainty (X_1), organizational structure (X_2), distribution network competence (X_3) while the remaining 40.20 percent is influenced by other variables not examined in the study.

5. Discussion

In terms of the effect of environmental uncertainty on the quality of supply chain management information systems, the results of hypothesis testing in Table 1 concerning the effect of environmental uncertainty on the quality of supply chain management information systems indicate that the value of t-stat. of $2,378 > t_{table}$ of 1,654 or a value of $0.019 < 0.05$, with an error rate of 5 percent it was decided to the first hypothesis. Thus, it can be concluded that environmental uncertainty has a significant effect on the quality of supply chain management information systems. The results provide empirical evidence that the quality of supply chain management information systems can be improved if managers are able to better understand and predict the effects of the complexity and environmental changes they face. This is in line with the opinion of Atrill & McLaney (2009), Weetman (2010), Drury (2012), Azhar (2013) which states that the quality of supply chain management information systems is influenced by changes that occur in the environment and provides a strong and significant influence

on the quality of supply chain management information systems. Likewise, Ajibolade et al. (2010) stated that environmental factors influence the application and design of Supply chain management information systems. Furthermore, in terms of effect of organizational structure on the quality of supply chain management information systems, the results of hypothesis testing in table 1 about the effect of organizational structure on the quality of supply chain management information systems show that the value of t-stat. of 2.102 > t-table of 1.654 or 0.037 < 0.05, with an error rate of 5 percent. Then, it was decided to accept the second hypothesis. Thus, it can be concluded that the organizational structure has a significant effect on the quality of the supply chain management information systems. Organizational structure is a major factor affecting the quality of supply chain management information systems and fundamental factors that must be considered in designing a supply chain management information system (Kendall & Kendal, 2011; Laudon & Laudon, 2017). The results of this study are in line with Indeje & Zheng (2010), Susanto (2017) which empirically proves that organizational structure has a positive effect on the effectiveness of supply chain management information systems. In the influence of distribution network competence on the quality of supply chain management information systems, the results of hypothesis testing in table 1 about the effect of distribution network competence on the quality of supply chain management information systems show that the value of t-stat. of 8,410 > t-table of 1,654 or a value of 0.000 < 0.05 with an error rate of 5 percent, it is decided to the third hypothesis. Thus, it can be concluded that the competence of information system distribution network has a significant effect on the quality of supply chain management information systems. Distribution network competence is an important element of the supply chain management information systems. A supply chain management information system cannot provide benefits to the organization if its distribution network fails to contribute their competence in implementing the supply chain management information systems (O'Brien & Marakas, 2010; Hall, 2011; Romney & Steinbart, 2015). The results of this study are in line with Deghanzade et al. (2011); Taber et al. (2014); Nurhayati & Mulyani (2015); Mulyani & Arum (2016) who state that distribution network competence affects the application of the information systems. Lastly, in the effect of environmental uncertainty, organizational structure, and distribution network competence together on the quality of supply chain management information systems, the results of hypothesis testing in Table 2 concerning the effect of environmental uncertainty, organizational structure, and distribution network competence together on the quality of supply chain management information systems indicate that the value of F-stat. of 78,369 > t-table of 1,654 or a value of 0.000 < 0.05, with an error rate of 5 percent it was decided to accept the hypothesis. Thus, it can be concluded that environmental uncertainty, organizational structure, and distribution network competence together have a significant effect on the quality of supply chain management information systems. The results of this study are in line with Atrill & McLaney (2009); Weetman (2010); Ajibolade et al. (2010); Drury (2012); Azhar (2008) state that environmental uncertainty affects the quality of supply chain management information systems, as well as organizational structure affects the quality of supply chain management information systems according to Indeje & Zheng (2010), and Susanto (2017). Further, Deghanzade, et al. (2011); Taber et al. (2014), Nurhayati & Mulyani (2015), Mulyani & Arum (2016), Ngai et al. (2008) state that distribution network competence affects the application of the information systems.

6. Conclusion

The results have shown that environmental uncertainty empirically affects the quality of supply chain management information systems. This provides empirical evidence that the better the ability of managers to understand and predict the effects of complexity and environmental changes faced will improve the quality of supply chain management information systems. Moreover, the organizational structure affects the quality of the supply chain management information systems. This provides empirical evidence that the better the company organizes its duties, responsibilities and authorities as well as supervision which is reflected through the organizational structure implemented, the better the supply chain management information systems quality. The competence of information system distribution network affects the quality of supply chain management information systems. The results of this study provide empirical evidence that the higher the distribution network competence will improve the quality of supply chain management information systems. Simultaneous effect analysis also showed that environmental uncertainty, organizational structure, and distribution network competence jointly affect the quality of supply chain management information systems. Theoretically, the findings provide empirical evidence that the better the ability of managers to understand and predict the effects of complexity and environmental changes faced will improve the quality of supply chain management information systems. It also provides empirical evidence that the better the company organizes its duties, responsibilities and authorities as well as supervision which is reflected through the organizational structure implemented, the better the supply chain management information systems quality. Practically, it can be suggested that the quality of supply chain management information systems can be improved if the company is able to better organize tasks, responsibilities and authorities as well as supervision. Managerially, the results provide managerial encouragement that the higher the distribution network competence will improve the quality of supply chain management information systems. In other words, it can be interpreted that the quality of supply chain management information systems can be improved if the competence of managers as distribution network of information systems can be improved both in terms of knowledge and skills. Moreover, in a practical term, the quality of supply chain management information systems can be improved if managers are able to deal with environmental uncertainty by understanding and predicting the effects of environmental complexity and changes by organizing tasks, responsibilities, authority and supervision and increasing knowledge and skills as distribution network of information systems management.

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