

THE IMPACT OF KNOWLEDGE MANAGEMENT ON THE QUALITY OF LOGISTICS OPERATIONS IN PANAMA

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ABSTRACT

This research analyzes the quality of logistics operations in terms of the impact exerted by knowledge management variables; explicitly, knowledge generation, knowledge dissemination, knowledge interpretation and knowledge responsiveness. Our research hypotheses are that the quality of logistics operations depends directly on knowledge responsiveness, and that knowledge generation influences knowledge dissemination, which influences interpretation of knowledge. This last variable impacts knowledge responsiveness. A questionnaire survey is designed to collect data among companies conducting logistics operations in Panama, Central America. In order to test the hypotheses, we first validate the measurement instruments through content analysis, reliability and validity tests. The statistical data analysis includes t-test of the means, factor analysis, and regression. The results should provide useful information regarding the quality of logistics operations and its dependence on knowledge management. This is important for academia as well as industry; on one side the research hopes to offer a contribution to the existing logistics operations literature regarding the relationship between the variables under study, and on the other side companies will have useful information for decision making.

Keywords: logistics operations, knowledge management, quality

INTRODUCTION

Analyzing knowledge management within the operational logistics context is interesting due to the special kind of information flows necessary among the different players that include customers, suppliers, and logistics providers. Being able to measure the interrelationships between knowledge management variables and their impact on the quality of logistics operations is important because it allows the assessment of the successful application of created knowledge. Fugate et al. (2009) state that knowledge management is composed of knowledge generation, knowledge dissemination, knowledge shared interpretation, and knowledge responsiveness; each one of them is equally important when the objective is to obtain the most out of the knowledge management process.

In logistics operations, being able to achieve a shared interpretation of knowledge among key players is a characteristic that companies can use to advance decision making processes and create customer value (Fugate et al., 2009). The successful transformation of information into useful knowledge is especially important in activities where inbound and outbound flows of information, materials and products are a main component of everyday activities. Furthermore, *the knowledge-based view of the firm holds that a firm's abilities to create and apply knowledge are key to creating and sustaining competitive advantage* (Barney, 1991). This implies that the source of strategies is knowledge, meaning that from knowledge it is

possible to develop strategies. Thus, the study of relationships among knowledge creation, application, and performance should take into account the influence of environmental context or structure (Droge et al., 2003).

The literature review revealed that research in logistics operations and knowledge management includes the study of knowledge interpretation processes (De Treville et al., 2004), logistics operations integration (Chen and Paulraj, 2004), and effective communication for successful process integration (Nonaka and Takeuchi, 1995). The use of effective communication in process management has been analyzed by authors in different disciplines, specifically organizational behavior and strategic management (Slater and Narver, 1995; Hult et al., 2005). Our research hopes to add to the body of existing logistics operations literature by analyzing the impact that the knowledge management associated variables have on the quality of the logistics operations. Based on our study of the literature, this relationship has not been empirically analyzed so far. We propose to study these relationships and test the research model through statistical analysis of the sample data collected from companies operating in the area of logistics in the Republic of Panama. Panama is a small country in the Central American region, with a population of 3.6 million people, where service is the second main industry. Thus, logistics operations are an important element of the national economy.

This paper presents the theoretical framework and development of the research model. It explains the methodology used and the proposed validity and refinement of the measurement model. The conclusions are presented in terms of the proposed research model. The main contribution of the paper is the development and refinement of the model that explains the relationship between knowledge generation, knowledge dissemination, knowledge interpretation and knowledge responsiveness as well as the impact of these variables on the quality of logistics operations.

THEORETICAL FRAMEWORK AND RESEARCH MODEL

Being able to measure the interrelationships within knowledge management variables is interesting due to the importance of each one of them for successfully applying created knowledge. Reaching high levels of quality in logistics operations (LO) is only possible when the generated knowledge is applied successfully. Additionally, *a response to knowledge of the business environment cannot be unified if the parties involved do not have a shared understanding of the knowledge* (Fugate et al., 2009).

The model proposed is presented in Figure 1. It is partially based on the model proposed by Fugate et al. (2009). As shown, logistics operations knowledge (LOK) generation determines LOK dissemination levels, which impact LOK interpretation; the interpretation of knowledge defines LOK responsiveness (Fugate et al., 2009). Additionally, our model proposes that the quality of logistics operations depends directly on LOK responsiveness.

Existing literature states that information needs to be obtained, analyzed and evaluated to determine its relevance (Kohli and Jaworski, 1990; Droge et al., 2003). More specifically, this process involves summarizing, prioritizing, modifying and possibly delaying information so that the transformation results in relevant and valuable knowledge. Thus, we define LOK generation as obtaining and analyzing information that can be transformed into knowledge useful for the company.

The second variable in the model, LOK dissemination, refers to selectively distributing knowledge to the right people in the company (Daft and Huber, 1987), within this context, how fast knowledge is transferred among individuals is an essential component because of the actual business environment characterized by rapid changes and quick flow of information. This condition may cause knowledge to quickly become obsolete and irrelevant (Garvin, 1993). Our research model defines LOK dissemination as the capability of the company to share knowledge in a timely manner.

Achieving unified understanding of knowledge among key LO personnel is essential if knowledge is to be effectively applied to raise the quality of LO and to increase value for the customer. As Huber (1991) points out, it *involves the development of diverse interpretations that foster learning through a repertoire of potential responses facilitated by a breadth of opinion*. Timing is also important when reaching consensus since the quicker consensus on knowledge happens, the sooner it can be acted upon. This process of achieving a common understanding requires that individuals question each other, discuss different opinions and accept the best course of action (Gioia and Thomas, 1996). Fugate et al. (2009) define LOK interpretation as reaching a cohesive understanding of knowledge in a timely manner. This research proposes that the manner in which LOK is disseminated determines the level of LOK interpretation.

Knowledge responsiveness is described as planning and implementing based on acquired knowledge (Nonaka and Takeuchi, 1995). It refers to how knowledge changes actions and influences the decision making process of the firm. The LOK interpretation variable has a strong influence on LOK responsiveness, this is because reaching a consensus on knowledge interpretation is essential to respond or act upon that knowledge. A unified response among LO personnel ensures that the decision making process is implemented having the support of those individuals involved.

Based on previous research, we propose that the quality of LO strongly depends on LOK, specifically LOK responsiveness. In general, company's performance depends to a great

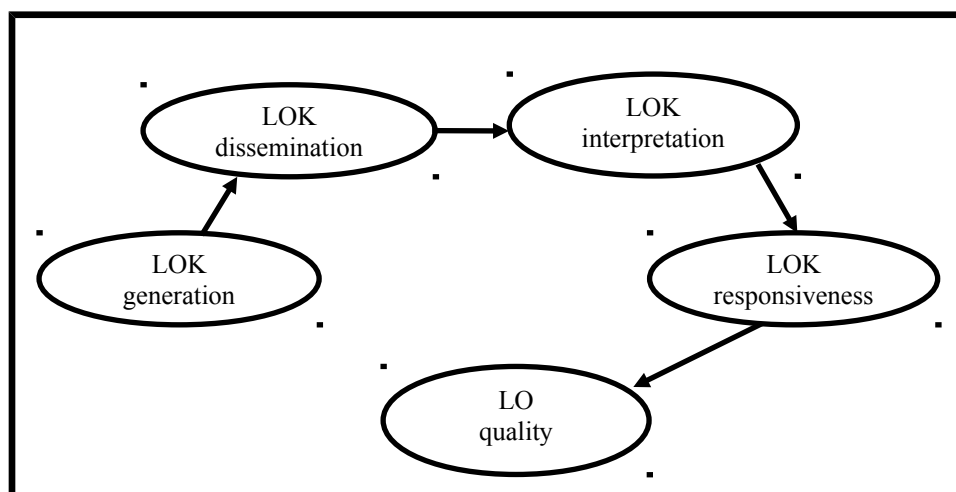


Figure 1 – Research Model of the Impact of Knowledge Management on the Quality of Logistics Operations

extent on how knowledge can contribute to its development (Nonaka, 1994). LO quality is measured by how fast the company answers the customer, the cost of the service offered and profit margins (Droge et al., 2003). Bobbit (2004) states that the quality of LO is defined by damage-free deliveries, forecasting accuracy, time on backorder, and total inventory turns.

Constructs of the research model

In order to measure the relationships between the variables and their influence on quality of logistics operations, we developed a set of question items for each construct, based on a comprehensive review of the literature and our knowledge and experience in the quality management field.

LOK generation

- Being involved in helping to resolve customer problems (Fugate et al., 2009)
- Surveying customers to find out actual and future needs (Kohli and Jaworski, 1993)
- Visiting customers' sites to enhance and build relationships (Kohli and Jaworski, 1993)
- Participating in events that impulse innovation such as research conferences, fairs, forums, etc. (March, 1991)
- Interacting with the R&D department and providing valuable information for R&D activities (Hitt et al., 2000)
- Accompanying our employees who deliver logistics service to observe how things work (Fugate et al., 2009)
- Visiting suppliers to learn more about logistics operations related activities (Matsuno et al., 2000)
- Reading reports from the government and regulatory bodies dealing with logistics related information (Matsuno et al., 2000)

LOK dissemination

- Sharing relevant information with logistics operations personnel in a timely manner (Matsuno et al., 2000)
- Sharing relevant information with management in a timely manner (Matsuno et al., 2000)
- Sharing information through informal means (Baker and Sinkula, 1999 and Fugate et al., 2009)
- Sharing information through formal means (Baker and Sinkula, 1999 and Fugate et al., 2009)

LOK interpretation

- Discussing different opinions and reaching a consensus (Fugate et al., 2009)
- Stating different points of view regarding the meaning of information (Fugate et al., 2009)
- Sharing similar understanding of the meaning of the information within the logistics operations context (Brockman and Morgan, 2003)
- Agreeing on how the information should be used (Brockman and Morgan, 2003)
- Being able to listen and understand other's opinions (Spender 1996)

LOK responsiveness

- Integrating acquired knowledge into new products, processes or services (Droge et al., 2003)
- Understanding how our responses to changes in the business environment impact logistics (Fugate et al., 2009)
- Understanding how our responses to changes in the business environment impact other operations (Fugate et al., 2009)

- Understanding how our responses to changes in the business environment impact the company (Fugate et al., 2009)
- Being able to respond quickly when our customers are unhappy with our logistics services (Kohli and Jaworski, 1993)
- Being able to respond quickly when our competitors start a new service offerings (Kohli and Jaworski, 1993)

LO quality

In general, it refers to the degree to which knowledge can contribute to a firm's development (Nonaka, 1994), specifically our model defines it in terms of speed, lower costs and higher profit margins.

METHODOLOGY

A questionnaire is designed to gather data from companies conducting logistics operations in the Republic of Panama. According to the Georgia Tech Logistics Innovation & Research Center based in Panama City, there are approximately 484 companies nationwide involved in logistics activities.

The questionnaire is composed of a total of 27 question items. The Likert scale is used to evaluate the question statements, assigning values from 1 to 7. The initial questionnaire was tested by managers and employees from three different companies, allowing us to review the originally proposed instrument and refine it to enhance the applicability, readability and comprehensiveness of the question items.

The research is actually in the data collection stage. The following step is testing the model to validate the proposed hypotheses.

VALIDITY AND REFINEMENT OF THE MEASUREMENT MODEL

In this research, the literature review provides content validity. In addition, the managers and employees that answered the trial questionnaire during the testing phase were asked to propose any question items deemed necessary to complete the construct. They also provided information regarding lack of clarity or misleading questions. We revised the questionnaire items and incorporated their suggestions and information accordingly. Therefore, literature review and suggestions from managers and employees provide content validity to the measurement model.

CONCLUSION

Our research model is designed to evaluate the influence of knowledge management variables on the quality of logistics operations. We define logistics operations quality in terms of speed, lowering costs, and increasing profit margins. The survey questions emphasize the importance of knowledge generation and define it in terms obtaining and analyzing information that can be transformed into knowledge useful for the company. LOK dissemination refers to selectively distributing knowledge to the right people in the company while LOK interpretation is defined as reaching a cohesive understanding of knowledge in a timely manner. The last knowledge management variable is knowledge responsiveness which is described as planning and implementing based on acquired knowledge. This variable has a direct influence on the quality of logistics operations. The total set of 27 questions allows us to evaluate not only the impact of knowledge management on quality of LO but also the interaction between the variables associated to the different stages of the knowledge management process.

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