Information Technology in Supply Chain Management. Case Study

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Abstract. Information technology advancements have made communicating information easier for supply chain participants. The performance of the supply chain may be improved by raising the quality of the information. This article aimed to identify information technology tools/instruments companies can use to manage effective supply chains. The data collected for this article was obtained from 100 companies located in Tiranë and Durrës, in Albania, during the mid-year of 2022. The relationship between CEOs/managers, information sharing, information quality, and information technology tools/instruments was examined in this article. The results showed that information technology tools/instruments significantly affect information quality and information sharing for managing the internal work of companies. The results gained from this article benefit managers, information technology specialists, and CEOs of companies. Relationships between supply chain partners and companies with the help of information technology in information sharing can help companies operate better and gain a competitive edge.

Keywords: Information technology · Supply chain management · Survey · Case study · Data collection

1 Introduction

Nowadays, companies participate in supply chain management competitions instead of individual market management competitions. The last decades have been a period of rapid changes for organizations, especially for businesses, forcing them to be much more innovative, flexible, responsive, and focus on the actual demands and needs of consumers to survive and compete in the intensely competitive global environment [1]. Supply chain management is a science that discusses suppliers and customers from upstream to downstream to achieve lower costs and superior customer value [2]. Supply chain management is an essential company process planned through systemic coordination, such as procurement, purchasing, conversion, and logistics [3].

Coordination between all participants in supply chain management depends primarily on information sharing. The basis of integration in the supply chain is information sharing; therefore, decisions about what information to share and how to share it are directly related to conclusions concerning the level of integration.

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Knowledge transfer in supply chain management has significantly transformed in recent years. Companies now know how crucial it is for their supply chain partners to use information technology [4]. Sharing information with all supply chain members can increase efficiency, effectiveness, and ability to respond more rapidly to shifting client demands [5].

As a result of globalization, companies are now starting to change their supply chain relationships, including the ways of communication, the use of technology, the increase of the diversity of business operations, and process optimization.

A company's supply chain management must be responsive to respond as rapidly as possible to different customer demands and short product life cycles. Supply chain management has evolved and been more widely used across companies, attributable to the constant development and application of information technology. The supply chain now mainly consists of intelligence, networking, and digitization.

De Barros [6] emphasized the benefits generated by companies for using information technology tools/instruments, such as cost reduction, time of delays reduction, inventory control, quality and efficiency improvement, innovation and distinction of product, reliability, and accuracy of the information, etc. Suppliers, manufacturers, distributors, retailers, and customers can reduce delays, documentation, and other unnecessary processes using information technology tools/instruments.

The article aims to identify information technology tools/instruments companies can use to manage their supply chain more effectively. This article has the following structure. The second section demonstrates a brief review of the literature. The third section presents the methodology used in this article. The fourth section provides the results of the research in this article. The fifth and final section concludes with the conclusions.

2 Literature Review

With the advancement of both hardware and software in the 1980s, companies started utilizing computer applications in their support functions.

The conventional approaches to managing the supply chain have significantly modified during the past few decades.

Li [7] classifies the information chain systems into decision-making systems, executive information systems, information management systems, communication systems, and transaction processing systems.

Carr and Kaynak [8] evaluated the ways of communication buyers use to interact with their suppliers and divided them into conventional and cutting-edge techniques. Conventional techniques include the use of telephone, e-mail, and face-to-face communication, while cutting-edge techniques include the use of Electronic Data Interchange (EDI), Computer-to-computer links, and Enterprise Resource Planning (ERP).

The most recent technologies utilized in logistics and supply chain management have been divided into three categories [9]: Automatic Identification Technology, Communication Technology, and Information Technology.

2.1 Supply Chain Management with Simple Information Technology

Electronic Data Interchange, EDI—permits data transfer between computers owned by different companies in a uniform electronic format, such as invoices and purchase orders.

Electronic Funds Transfer, EFT—refers to the automatic transmission of invoice messages and payments via electronic technologies.

Enterprise Resource Planning, ERP—combines every aspect of company operation, such as marketing, production, sale, finance, accounting, distribution, warehousing, planning, etc.

Scanner—is used to identify and monitor commodities at every procedure stage.

Barcode—is how a number/code is presented so the computer can read it.

Inventory Management Systems, IMS—determines what inventory levels should be maintained, when they should be placed, and how big orders should be based on the rules and procedures that monitor inventory levels.

Warehouse Management Systems, WMS—includes receiving products, allocating storage locations, filling empty spaces, producing lists, order taking, and order picking.

Transport Management Systems, TMS—increases the order and delivery visibility.

2.2 Supply Chain Management with advanced Information Technology

Radio Frequency Identification, RFID—is a technology used in supply chain management to identify products uniquely, communicate intelligently, and share real-time information.

Decision Making Systems, DMS—is a computer program or knowledge-based system that facilitates automated, manual, or combined decision-making at a company's managerial, planning, and operational levels.

Electronic Supply Chains, ESC—refers to the supply chain between companies maintained electronically based on EDI or the Internet.

Customer Relationship Management Systems, CRM—refers to companies' procedures, plans, and tools to control, analyze, and manage customer interactions and lifecycle data to enhance customer relationships, maintain clients, and increase revenue.

Advanced Planning and Scheduling, APS—is a group of programs used to control the three parts of the supply chain: planning, scheduling, and execution.

Technology and Web Services—allows companies to work with partners for lower costs and more customer satisfaction.

Human Resources Management System, HRMS—helps with payroll management, performance evaluation, benefits administration, employee schedules, recruiting, collecting, storing, and accessing employee information, etc.

Distribution Requirement Planning, DRP—connects warehouse operations and transportation needs.

Computerized Maintenance Management System, CMMS—analyzes maintenance and information about equipment to optimize management and support for strategic, tactical, and operational decisions.

E-commerce—describes a company's capacity to purchase and resell products online.

E-business—defines a collection of company's practices enabled by Internet technologies focused on networking consumers, suppliers, and manufacturers to improve supply chain performance continuously.

3 Methodology

The article was created using data analysis collected through a survey given to companies operating in Albania (respectively in Tiranë and Durrës) that are crucial links in supply chain management. A concrete overview of the present condition of supply chain management in Albania is revealed by the questionnaire given to the CEO and managers (in two ways: electronically through email and face-to-face meetings) of a sample size of 100 companies that operate in a variety of sectors, including agriculture, construction, industry, trade, transport/warehousing, accommodation/food service, information/communication, etc. The sample size is a critical factor that can affect research results. A large sample size brings more confidence in the generalizability of statistics [10].

3.1 Establishment of the Survey

The survey given to companies includes 20 questions in total. The questions throughout the survey are formulated in a clear, concise, and understandable way for all company managers/CEO so that the result obtained from it is reliable.

In the first part, the survey contains questions about the profile of the company:

- company name,
- location,
- website/e-mail,
- the position of the respondent,
- type of sector,
- number of employees,
- position of the company in the supply chain.

In the second part, the survey contains questions about the employers:

- in managing the internal company work,
- in sharing information with supply chain partners (the level of information sharing and the level of information quality),
- in creating relations with supply chain partners (trust, commitment, and vision),
- in showing the benefits/barriers of supply chain management from information technology.

Indicators obtained from the survey are measured on a 5-Level Likert scale, which means:

1—not at all, 2—a little, 3—enough, 4—a lot, and 5—completely.

3.2 Methodology Framework

More details on the methodological steps in this article are presented in Fig. 1.

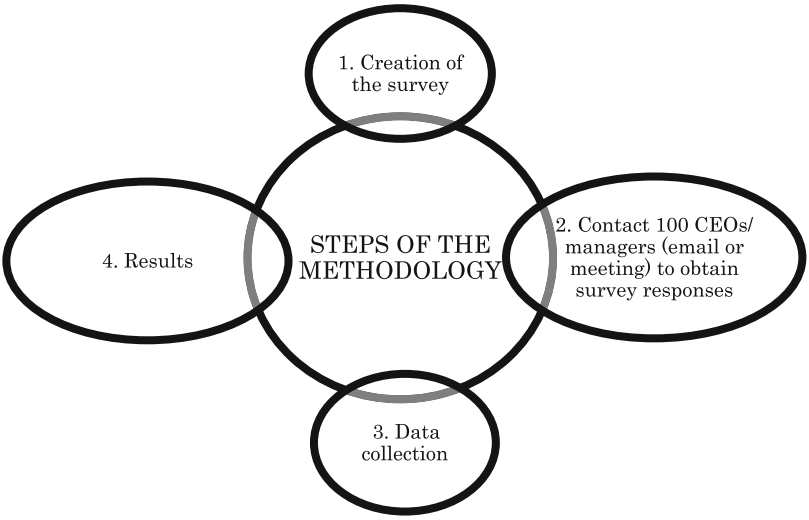

Fig. 1. Methodology framework.

Table 1. Distribution of companies by city.

City	Frequency	%
Tiranë	72	72
Durrës	28	28
Total	*100*	*100*

4 Results

The distribution of the companies taken into consideration in this article can be seen from the collection and evaluation of data from the survey reflected in Table 1.

Tirana has the most significant number of companies, with 72 companies or 72% of the total number of companies, followed by Durrës with 28 companies or 28% of the total number of companies.

The operation sector of the companies taken into consideration in this article can be seen from the collection and evaluation of data from the survey reflected in Table 2.

52% of companies operate in the service sector, 26% in the trade sector, 14% in the production sector, and only 8% in the service & production sector.

The technologies used by companies taken into consideration in this article for sharing information with supply chain partners can be seen from the collection and evaluation of data from the survey reflected in Fig. 2.

93% of respondents use information technology to share information with supply chain partners. The results show that most employers for sharing information with supply chain partners use internet services such as e-mails (46%), social networks (42%), and

Table 2. Distribution of companies by sector.

Sector	Frequency	%
Service	52	52
Production	14	14
Trade	26	26
Service and production	8	8
Total	*100*	*100*

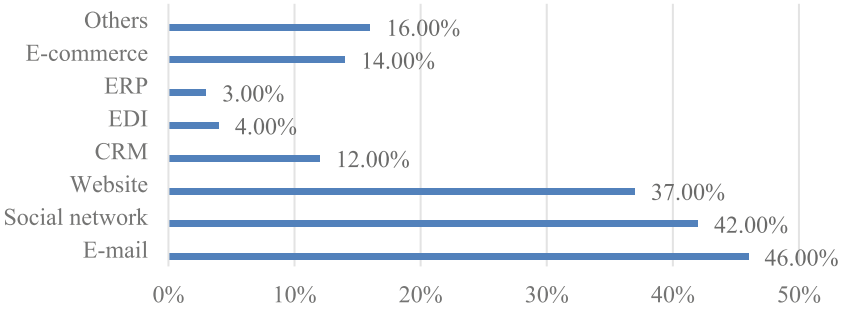

Fig. 2. Distribution of technologies for sharing information with supply chain partners.

websites (37%). (14%) make purchases online, (12%) use CRM, (4%) use EDI, (3%) use ERP, and (16%) use other information technology tools/instruments.

The technologies used by companies taken into consideration in this article for managing the internal work of companies can be seen from the collection and evaluation of data from the survey reflected in Fig. 3.

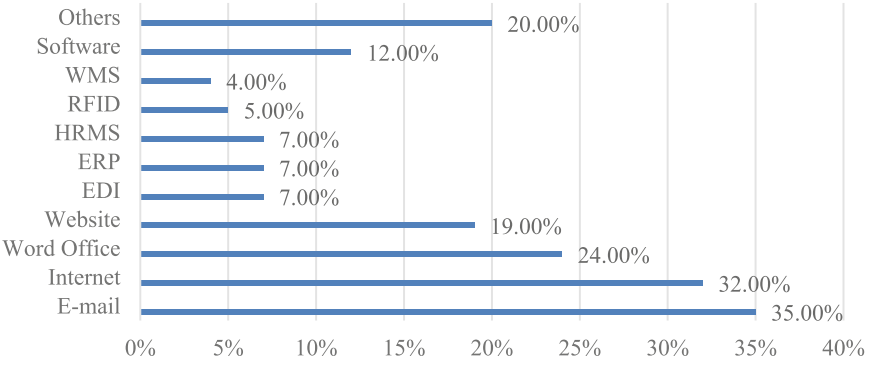

Fig. 3. Distribution of technologies for managing the internal work of companies.

The most used technologies for managing internal work for companies are e-mail (35%), internet (32%), word office (24%), other information technology tools/instruments (20%), website (19%), and software (12%). The least used technologies for managing internal work for companies are ERP (7%), EDI (7%), HRMS (7%), RFID (5%), and WMS (4%).

Table 3 shows the benefits of the companies taken into consideration using information technology.

Table 3. Benefits of indicators using information technology for companies.

Indicators	Not at all (%)	A little (%)	Enough (%)	A lot (%)	Completely (%)
Increase the sales	2	13	30	**35**	20
Increase coordination with customers	4	14	30	**33**	19
Increase coordination with suppliers	13	20	**36**	16	15
Increase coordination inside the company	**27**	20	22	15	16
Increase the quality of information	4	13	32	**37**	14
Increase the quantity of information	7	16	**32**	23	22
Increase the forecasts	14	28	**30**	16	12

The use of information technology has brought the following changes to the companies taken into consideration:

- 35% have benefited a lot in increasing their sales,
- 33% have benefited a lot in increasing the coordination with their customers,
- 36% have benefited enough in increasing the coordination with their suppliers,
- 27% have not benefited at all in increasing the coordination inside the company,
- 37% have benefited a lot in increasing the quality of information,
- 32% have benefited enough in increasing the quantity of information,
- 30% have benefited enough in increasing their forecasts.

Table 4 shows the relationship of companies taken into consideration with supply chain partners.

The use of information technology has brought the following changes to the relationship of supply chain partners with companies taken into consideration:

Table 4. Relationship of companies with supply chain partners using information technology.

Indicators	Not at all (%)	A little (%)	Enough (%)	A lot (%)	Completely (%)
Partners have shown in the past that companies can have faith	6	14	***52***	18	10
Partners have been honest in their dealing with companies	4	19	22	***28***	27
Partners respect the confidentially of the information they receive from companies	9	8	22	***49***	12
Partners respect the agreement very well	9	6	25	***42***	18
Companies and partners always try to keep each other's promises	5	10	19	***41***	25
Companies and partners have a similar understanding of supply chain vision and objectives	10	18	24	***30***	18
Companies and partners must review their relationship to improve it continuously	13	19	***29***	19	20

- 52% of supply chain partners have shown in the past that companies can have faith,
- 28% of supply chain partners have been honest in their dealing with companies,
- 49% of supply chain partners respect the confidentially of the information they receive from companies,
- 42% of supply chain partners respect the agreement very well,
- 41% of supply chain partners and companies always try to keep each other‘s promises,
- 30% of supply chain partners and companies have a similar understanding of supply chain vision and objectives,

- 29% of supply chain partners and companies must review their relationship to improve it continuously.

Most of the companies considered have understood the role of information technology in the success of their companies (68%). In the next 2–4 years, the companies intend to implement:

- Website (27%),
- Purchase system and online booking (8%),
- Customer management system (8%),
- Other technologies not on the survey list (mobile application, advanced computer networking technologies, etc.) (13%).

5 Conclusions

Companies nowadays modify their interactions due to globalization by utilizing information technology in supply chain management. Technology and information utilization are required to manage intricate supply chains efficiently. To improve product/service levels, decrease inventory levels, and reduce supply chain costs, information technologies can help in coordinating all supply chain processes. This article uses data collection analysis to determine which information technology companies use to manage their supply chains. The results of the data collection analysis revealed that email is the most popular information technology tool for managing tasks with partners in the supply chain and tasks within companies. The benefits of using information technology are significant. The participants benefited from better quality information, increased coordination with customers, and increased sales.

References

1. Coyle, J.J., Langley, C.J., Novack, R.A., Gibson, B.: Supply chain management: a logistics perspective. In: Nelson Education (2016)
2. Boateng, A.: Supply chain management and lean concept in construction: a case of Ghanaian building construction industry. Organ. Technol. Manag. Constr. **11**, 2034–2043 (2019)
3. Chakraborty, S., Gonzalez, J.: An integrated lean supply chain framework for US hospitals. Oper. Supply Chain Manag. Int. J. **11**, 98–109 (2018)
4. Santin, K., Sousa, L.S.G., Cardoso, B.M., Antoniolli, P.D., Argoud, A.R.T.T.: MRP implementation on supply management process: a Brazilian furniture industry case study. Euro. J. Bus. Soc. Sci. **4**, 58–173 (2015)
5. Li, S., Lin, B.: Accessing information sharing and information quality in supply chain management. Decis. Support Syst. **42**, 1641–1656 (2006)
6. De Barros, A.P., Ishikiriyama, C.S., Peres, R.C., Gomes, C.F.S.: Processes and benefits of the application of information technology in supply chain management: an analysis of the literature. Procedia Comput. Sci. **55**, 698–705 (2015)
7. Li, D.: e-supply chain management. WIT Trans. State Art Sci. Eng. **16** (2005)
8. Carr, A.S., Kaynak, H.: Communication methods, information sharing, supplier development and performance: an empirical study of their relationships. Int. J. Oper. Prod. Manag. **27**, 346–370 (2007)

9. Bhandari, R.: Impact of technology on logistics and supply chain management. IOSR J. Bus. Manag. **1**, 19–24 (2014)
10. Grinnell., Unrau, Y.A.: Social work research and evaluation: foundations of evidence-based practice. Oxford University Press (2010)