

An Assessment Review of Inflation Impact on Supply Chain Management in Construction.

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Abstract. Supply chain management (SCM) refers to the centralized control and coordination of the movement of goods and services to and from an organization. It encompasses all the activities and procedures involved in converting raw materials and components into finished products. The SCM is highly affected due the rapid inflation in the construction industry leading the investors to explore strategies to effectively manage projects during periods of inflation. The theses study the previous outcomes of the previous studies in the field from 2020 to 2024, and compares the parameters and outcomes of each study. The parameters and outcomes from a paper are compared to the parameters and outcomes from other thesis as a method of analytical verification. The verified results are the indicators that will be used in the future study and verified using a case study of two recent projects.

Key Words: Supply Chain, Supply chain management, Supply Chain Quality Management, Inflation, Project Management

1. Introduction:

In the recent 13 years from 2011 to 2024, The local and global market has undergone significant changes, becoming dynamic and highly competitive. The adaptability and flexibility of the supply chain play a crucial role in responding to this dynamic environment. Many business owners have turned their attention to supply chain applications to improve flow control. However, rapid inflation in recent years has posed challenges for projects, requiring investors to find solutions. To be able to understand supply chain and how to manage the supply chain there are some terms that needs to be defined as following:

- **Supply Chain Management (SCM):** is a scientific discipline that focuses on optimizing costs and delivering maximum value to customers through the coordination and management of material and information flows within a network of organizations (Boateng, 2019; Jaklic et al., 2006). It involves the coordination of various business functions, such as procurement, purchasing, conversion, and logistics (Chakraborty and Gonzalez, 2018).
- **Supply Chain Quality Management (SCQM):** aims to enhance customer satisfaction by coordinating network companies, information systems, and high-performance processes to deliver high-quality products and services (Marcineková and Sujová, 2015; Zhou, 2016). It encompasses areas such as purchasing, finance, and others (Crumbly, 2015). To effectively respond to market changes, SCM requires reliable analysis tools that can adapt to supply chain variables (Salah et al., 2011).
- **Lean implementation:** is a strategy for waste reduction in the supply chain, maximizing production efficiency, reducing costs, improving flexibility, and enhancing competitiveness (Nimeh et al., 2018; Arif-Uz-Zaman and Ahsan, 2014). The application of lean principles in supply chain distribution optimizes system performance, meets customer demand, and minimizes waste (Arif-Uz-Zaman and Ahsan, 2014).
- **Sustainable Supply Chain Management (SSCM):** is a framework for improving a company's environmental and social performance, thereby creating added value. SSCM encompasses

environmental, social, economic, governance, and performance aspects (Panigrahi et al., 2019). figure 01 shows the cycle of SSCM.

2. Objective and scope

The objective of this paper is to develop a systematic mechanism to help decision-makers address the challenges posed by price changes and inflation in engineering projects, particularly in short-term projects. The study involves an analysis of 17 theses, comparing and synthesizing them to identify the best mechanisms for managing projects during periods of inflation.

3. Methodology:

The methodology of this paper involves data collection from previous research, the data collected from the thesis are methodology and results. The data collected are filtered through comparisons to get the matches and differences between thesis. The matched results are the parameters to be verified later in the future studies. Figure 01 illustrates the flow of the methodology

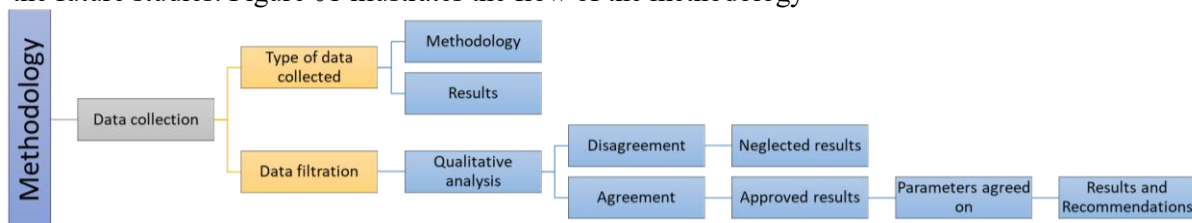


Figure 1. Methodology chart.

3.1. Data Collection:

The paper collects data from different 17 theses in the same field. The data collected are methodology, results. The following are summaries of the theses:

3.1.1. "Three-Echelon Supply Chain Management with Deteriorated Products Under the Effect of Inflation." [1]

This thesis examines the impact of inflation on global supply chain profitability and addresses the issue of product deterioration during storage or transportation. A three-echelon supply chain model is developed, considering one producer and multiple buyers, with inflationary fluctuations incorporated into the model.

- The study demonstrates that decreasing inflation rates lead to increased total profit, while increasing inflation rates result in decreased total profit.

3.1.2. "Leadership in Project Management" [2]

This thesis emphasizes the significance of leadership qualities for managers and specialists in project management. It explores effective approaches for organizing project teams and successfully executing complex and responsible work.

- The study highlights the importance of time-bound implementation, adherence to budgets, and quality indicators, and emphasizes the role of leadership qualities in ensuring project success.

3.1.3. "Global Supply Chain Pressures, International Trade, and Inflation" [3]

This thesis investigates the impact of the COVID-19 pandemic on global supply chains and its relationship with inflation. It explores how disruptions in international trade can lead to inflationary pressures and analyses the effects of inflation on different sectors of the economy.

- The amplification of compositional effects, specifically the shift from services to goods consumption, has implications for both trade and inflation on a global scale due to interconnected

input-output relationships.

- Unlike the 2008-09 crisis, changes in GDP did not elicit as strong of a response in international trade, despite the robust demand for goods. This reduced trade elasticity can be attributed, in part, to bottlenecks within the global supply chain.
- The occurrence of sector-specific labor shortages can result in elevated inflation compared to a scenario without such supply shocks.
- Over the period of 2020-21, foreign shocks and bottlenecks in the global supply chain played a significant role in explaining inflation within the Euro Area, surpassing the influence of domestic aggregate demand shocks.

3.1.4. "Managing Construction Projects in Inflationary Environments" [4]

This thesis focuses on the challenges faced by the construction industry during periods of inflation. It examines strategies for managing construction projects effectively to mitigate the negative impacts of inflation on costs, schedules, and productivity. The study proposes methods such as inflation indexation, risk management, and cost control measures to address these challenges. The research strategy involved a two-stage mixed methods approach, (1) case vignettes, for which an on-line semi-structured questionnaire containing both open-ended and closed questions, was used and (2) a group discussion concerning propositions derived from the case studies extended to include issues that the discussants felt were missed out in the case studies. The research concluded the following results:

- Successful projects exhibit characteristics associated with resilience: environmental orientation, sensitivity, mindfulness, acceptance of diversity and equality, and multilateral information relationships.
- Resilient organizations prioritize individual and team resilience of project managers.
- Successful organizations balance formalization with flexibility in decision-making.
- Resilience is defined as the ability of a system to sustain and thrive in the face of variations.
- Successful project-oriented organizations intelligently and flexibly utilize their attributed characteristics throughout the project timeline.
- Preparation, awareness, and analysis are crucial for successful project management.
- Smart organizations exhibit slow reactions, calmness, reflection, and team involvement during confrontation and analysis.
- Once decisions are made, successful organizations swiftly implement coordinated and cautious actions for recovery.
- Complex projects tend to have better-prepared project managers who are more adaptable to unexpected events.
- In simpler contexts, project managers may rely on established routines for too long, leading to potential failure.

3.1.5. "Supply Chain Risk Management in the Era of Inflation"[5]

This thesis explores the concept of supply chain risk management and its relevance in the context of inflation. It discusses different types of supply chain risks that can arise during inflationary periods and presents strategies for identifying, assessing, and mitigating these risks. The study emphasizes the importance of proactive risk management practices to maintain supply chain resilience in the face of inflationary pressures. The study involved administering an online survey to IS project managers. The collected data was analyzed using quantitative statistical analysis, namely descriptive and inferential analysis. results show that

- IS projects are currently achieving high levels of success.

- The success of a project is determined by 38 out of 47 ISO 21500/PMBOK processes. However, when we specifically look at success in terms of meeting project scope, time, and cost without any deviations, there are 21 processes that make a significant difference. Among these processes, quality management and risk management stand out as particularly important.

3.1.6. Improving the Supply Chain Management. [6]

To evaluate the status of supply chain management, a phased approach using online survey methods was implemented. The survey consisted of closed-ended single-choice questions employing a 5-point Likert scale, mean score ranking, and ABC analysis based on the Pareto principle. The study findings indicated the following:

- Irrespective of the surveyed country, a significant number of businesses adopt a reactive supply chain design. However, this reactive approach hampers the development of a resilient supply chain. To address this issue, recommended practices were formulated during the pilot phase.
- These practices primarily concentrate on enhancing supply chain management and gradually transitioning from a reactive design to a collaborative management model. The objective is to promote the development of a resilient supply chain capable of withstanding uncertainties.

3.1.7. Impact of Human Resource Management in Project Management [7]

This article investigates the influence of Human Resource Management (HRM) on project management and employs regression analysis in Excel to examine this relationship quantitatively. The study adopts a quantitative approach to assess the impact of HRM on project success. Primary data is collected through a survey, while secondary data from journals, textbooks, and other publications are also utilized. The statistical analysis is conducted using Excel due to its comprehensive data analysis capabilities. Regression and correlation analyses are employed to test the research hypotheses (Mir & Pinnington, 2014; Müller, Pemsel, & Shao, 2014).

- The analysis result indicates that human resources and practicing of its key elements have a significant impact on the success of the project.

3.1.8. Impact of Inflation Rate on Construction Projects Budget [8]

This research paper focuses on investigating the relationship between inflation and its effects on both the overall economy and the construction industry. Additionally, it presents a framework that emphasizes the strong connection between the inflation rate and the construction sector. The framework aims to mitigate the issue of project cost overruns caused by inflation by improving budget estimation models. Inflation has a significant impact on economies worldwide and affects various industries. It is important to recognize that not only does the inflation rate impact industries, but industrial factors can also exert a substantial influence on a country's inflation rate. Among industries, the construction sector is particularly vulnerable to the consequences of inflation, as previous studies consistently emphasize the role of inflation in project cost overruns. Fluctuations in prices of construction materials, labor wages, and machinery rental rates, attributed to inflation, result in deviations between the initial and final budgets of construction projects.

- In order to tackle the issue of cost overruns, it is crucial to devise a method that incorporates the inflation factor into the budget formulation process at the beginning of the project, prior to finalizing the budget estimation.

3.1.9. The Impact of Blockchain on Project Management [9]

The objective of this study is to examine the contribution of blockchain technology in enhancing

project management (PM). By analyzing six case studies centered around blockchain in e-services, the research investigates the connection between PM and blockchain. Through thorough analysis, the study aims to gain insights into the influence of blockchain technology on PM practices and project success. The research findings indicate that:

- Blockchain and project management can collaborate to enhance project efficiency.
- Blockchain enables secure, auditable, and transparent data recording and transfer.
- Smart contracts empower project managers and optimize manual processes.
- Blockchain improves communication with stakeholders and provides transparent project records.
- The high level of security in blockchain ensures data integrity through consensus agreement.
- Many organizations are adopting blockchain technology for daily operations due to its benefits.

3.1.10. Blockchain in Supply Chain Management [10]

This article explores the effects of integrating blockchain technology into the supply chain. To investigate this topic, the research paper utilized a literature review methodology. The review examined various scholarly papers that focused on the technical aspects of blockchain in relation to the supply chain. The findings of the research strongly suggest that companies should consider investing in blockchain technology in order to improve the transparency, flexibility, and security of their supply chains. Additionally, blockchain technology plays a vital role in building trust among stakeholders involved in the supply chain. Furthermore, the article discusses the positive impacts and possibilities of blockchain in promoting collaboration and integration within the supply chain.

3.1.11. Analysis of Supply Chain and Supply Chain Management Studies [11]

This research investigates the supply chain and supply chain management studies conducted in Turkey from 2012 to 2021, utilizing the Scopus/Sci-Val database. A comprehensive analysis identified a total of 1,412 scholarly publications focused on supply chain and supply chain management during this timeframe. These publications collectively garnered 23,759 citations, resulting in a field-weighted citation impact of 1.62. On average, each publication received 16.8 citations, and the total number of views per publication amounted to 67.4. Among the surveyed universities, Istanbul Technical University stood out with the highest number of publications, totalling 113 scholarly outputs. For a visual representation of the connections between sustainability, project management, and urban projects, Figure.02 shows Links between sustainability, project management, and urban projects



Figure 2. Links between sustainability, project management, and urban projects.

3.1.12. Points of Intersection Between Sustainability and Project Management [12]

This research aims to explore the intersection of sustainability and project management, leveraging the strengths of both fields. By combining project management expertise and sustainability tools, the efficiency of implementing sustainability in projects can be improved.

- The findings highlight the importance of considering environmental, social, and economic aspects in project decision-making and execution. The research emphasizes the need for collaboration between project managers, sustainability experts, and stakeholders to achieve sustainable project outcomes.

3.1.13. Agile Project Management in Software Development [13]

This research explores the application of agile project management methodologies, such as Scrum and Kanban, in software development projects. It examines the benefits and challenges of implementing agile practices and provides recommendations for successful adoption.

- The findings highlight improved customer satisfaction, faster delivery cycles, and increased team collaboration as key advantages of agile project management in software development. The research also addresses common challenges, such as managing scope creep and ensuring effective communication within agile teams.

3.1.14. Risk Management in Construction Projects [14]

This research investigates the identification, assessment, and mitigation of risks in construction projects. It explores various risk management techniques and frameworks, including risk registers, risk matrices, and Monte Carlo simulation.

- The findings emphasize the importance of proactive risk management in minimizing project delays, cost overruns, and quality issues.
- The research also highlights the need for a collaborative approach to risk management, involving all project stakeholders from the planning stage to project completion.

3.1.15. Role and Importance of Packaging in Supply Chain Management [15]

Packaging plays a vital role in optimizing the efficiency and effectiveness of the entire supply chain. It enables easy access to products for customers and contributes to cost reduction, time savings, and decreased labor requirements within the supply chain. The concept of packaging logistics encompasses various strategies aimed at improvement. Packaging has a direct impact on the cost of logistical activities and significantly influences the productivity of logistical systems. The size and density of packages directly affect transportation and storage costs. Meanwhile, handling costs are contingent on unit loading techniques, and accurate identification systems are crucial for inventory control. Product protection and the costs associated with unpacking and disposing of packaging materials influence customer service. The decision to postpone or speculate on packaging has ramifications for the overall cost of the logistical system. Packaging requirements and costs are determined by the specific characteristics of the logistics system. An integrated approach to packaging within logistics can generate substantial value in this field. Please refer to Figure 04 for a visual representation of the key interactions of packaging within the supply chain.

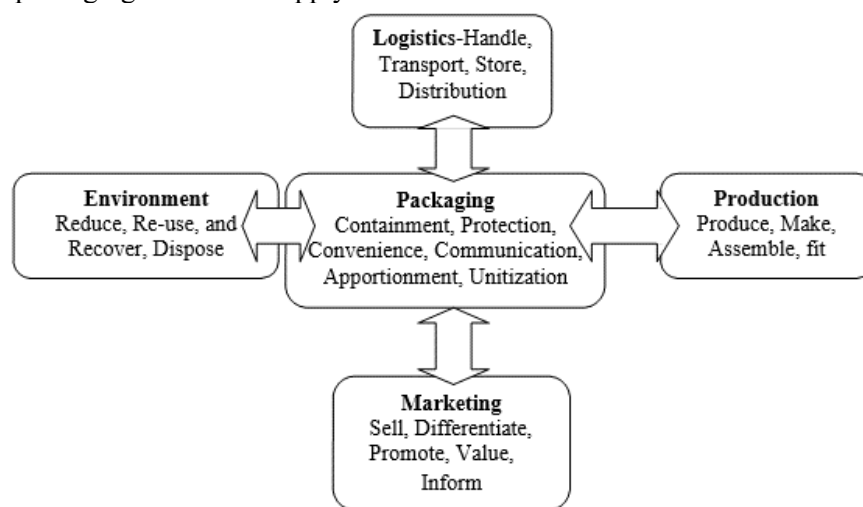


Figure 3. The main interactions of the packaging's

3.1.16. Inflation Expectations and The Supply Chain [16]

Firms employ price fluctuations within the supply chain as indicators for predicting overall inflation, even when these fluctuations are not directly linked to inflationary factors. Moreover, firms adjust their prices based on these anticipations. They pass on changes in inflation expectations, as measured by the Consumer Price Index (CPI), entirely to their sales prices. These findings provide support for Lucas' island model, where firms extrapolate aggregate inflation based on local signals obtained from the supply chain. Empirical evidence aligns with models that incorporate various types of information rigidities, such as significant disparities in inflation expectations and insufficient attention to macroeconomic developments. Utilizing input price inflation to forecast CPI inflation can result in divergent expectations due to varying conditions within supply chains. Given the volatility of supply chain inflation, firms tend to concentrate on analyzing shocks that directly impact their own businesses. Consequently, this study emphasizes that the utilization of input price inflation in CPI inflation forecasting can lead to disparate expectations, potentially resulting in price dispersion that incurs welfare costs. To alleviate the adverse effects of information frictions and ensure effective policy transmission through the expectation channel, it is essential to enhance central bank communication and address firms' inattentiveness. The research was conducted by Elias Albagli, Francesco Grigoli, and Emiliano Luttini.

4. Analysis and Decisions:

From the previous studies, the researches shows that the supply chain plays a vital role in the cycle of

all projects, it affects the projects in different ways which is obvious in the different methodologies. 16 researches were chosen to represent the last 20 years, The researches have a range from 4- 2020 to 12/2022, 11 research out of the 16 used are in 2022. The results of each paper were studied to review the updated achievement of each paper, also the methodologies were compared to each other and to the paper mythology to be able to verify the method adopted by the paper. The paper “Blockchain in Supply Chain Management” got a methodology similar to the research, the paper discusses the previous studies to answer questions about the blockchain effect and then apply the study on 6 study cases.

5. Conclusions and Recommendations:

This study investigates the impact of the supply chain on project management. To address the research questions and verify the methodology adopted by the research, a literature review methodology was employed. The findings of this research underscore the extensive coverage of the supply chain's influence on various projects in existing review papers. Furthermore, the study suggests that organizations should consider investing in supply chain management technology to optimize project flow, particularly during periods of inflation, thus enabling investors to navigate these challenges successfully.

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