GRADUATE PROGRAMS INSTITUTE
DEPARTMENT OF BUSINESS ADMINISTRATION

LEAN PROJECT MANAGEMENT IN SMEs

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PREFACE

Small and medium-sized enterprises, or SMEs for short, have always been the targets of business cutthroats, and occasionally, they are left with no choice but to look for strategies to survive in this ever-changing business environment. As they navigate various marketplaces, they must consequently understand the need to practice project management terms. While this research provides an outline of the function of project management in SMEs and their development, it also discusses the benefits of embracing this field.

SMEs tend to focus more on the lean project management practices as a way to gradually translate concepts into reality. It involves adopting lean concepts, which originated in production but eventually spread to other industries, rather than just experimenting with various methods. Although the issue has been analyzed there is a lack of an empirically grounded approach to applying project management among SMEs which has rarely been considered, as it is the case with current literature. There is a considerable gap in understanding sustainable lean project management between SMEs and its complexities. Filling this hole is the aim of this study it will look into the implementation of sustainable lean project management in SMEs. On our way it is important to admit their contribution and teamwork between project management professionals, practicing dominating industry, and those scholars. This supervisory team's combined power has improved our comprehension of how principles function and their impact in many contexts.

This study aims to add value to the current state of ongoing discourse of project management in SMEs by building on the identified areas of strength. This will cause SMEs to go through a stir of changes by implementing a culture of staff potential unleashing through the modification of project management practices. We do believe the material of our provided guides will encourage more exploration, discussion, and lean project management methods practice, and eventually can help SMEs succeed in the world where the business environment is under constant changes.

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ABSTRACT

LEAN PROJECT MANAGEMENT IN SMEs

The objective of this study is to explore the significance and results of the use of lean project management schemes across small and medium-sized enterprises. The research utilized the qualitative method to analyze the ideas and experiences held by managers and stakeholders with respect to lean project management. This methodology provided a detailed understanding of the application of lean principles to project management practices, facilitating a thorough examination of specific case studies that employed these principles during project implementation. The data collection was conducted through semi-structured interviews with 11 professionals in different industries. The data was managed and analyzed using the MAXQDA 2020 package. It helped organize the interviews in a way that made thematic analysis possible, allowing to outline patterns in the ways that lean project management was used during the project's execution as well as often encountered issues. The study revealed several key findings, revealing significant benefits such as cost savings, improved team morale, and enhanced operational efficiency. Key findings also include the critical role of effective communication, strategic alignment, and adaptability in overcoming challenges and ensuring sustainable growth. Also, resistance to change and the need for cultural adaptation came up as barriers to effective lean project management adoption. The research highlights the potential of lean principles to drive innovation, streamline processes, and foster a culture of continuous improvement in SMEs. From a managerial standpoint, the study offers top-level managers and project managers useful information on how to use and maintain lean project management practices to optimize results and resource utilization. The paper discusses the potential of lean project management to revolutionize project management and offers guidance on avoiding common mistakes made by practitioners of lean approaches in their pursuit of project productivity gains.

Keywords: Lean management, Lean project management, SMEs, Productivity, Efficiency, Cost saving, Resource allocation,

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ABBREVIATIONS

SMEs: Small and Medium Enterprises

JIT: Just-In-Time

LPS: Last Planner System

KPIs: Key Performance Indicators

VSM: Value Stream Mapping

PMI: Project Management Institute

TPS: Toyota Production System

LCI: Lean Construction Institute

VSM: Value Added Management

RCA: Root Cause Analysis

LPM: Lean Project Management

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INTRODUCTION

In today's highly competitive business world, lean project management has gained value as a critical strategy for increasing efficiency and ensuring that operational operations are in accordance with an organization's strategic goals. Since the quick change and dynamics that call for responsive management methods, this strategy has proven to be essential in a number of industries. Adaptation of project management strategies to a firm's specific needs is mandatory in order that they can use them.

Lean, which has its roots in the Japanese idea of "Kaizen," encourages a mindset of incremental, tiny changes (Hosono, 2020). Lean project management is recognized for its efficiency, adaptability, and commitment to continuous improvement within the dynamic realm of project management methodologies (Ekström, 2024). Although lean principles were initially used in the manufacturing sector, they have subsequently expanded outside of it to impact several other industries and organizational environments. Lean project management concepts emerge as a potent solution for businesses struggling to boost productivity, save expenses, and respond swiftly to shifting market conditions (Humble et al., 2020). Lean project management is essentially a paradigm shift from traditional project management methods (Ansah, 2016). While traditional project management systems emphasize rigorous documentation, meticulous planning, and a sequential flow of work, lean project management adopts a more flexible and responsive approach (Hindarto, 2023). Lean project management is an appealing choice for various projects due to its inherent adaptability (DeCarlo, 2010). It is suitable for different sectors like software development, manufacturing, service-oriented organizations, and construction. Toyota Production System achieved success by continuously pursuing reduction, waste, efficiency, and value creation (Sezen & Erdogan, 2009). At its core, lean focuses on cutting waste and increasing value for the final user (Douglas et al., 2015). This value-centric approach also manifests itself in other ways, such as in terms of labor, finances, and time. Value delivery and customer satisfaction are consistently prioritized throughout the whole project lifetime, as lean project management advocates for a complete strategy (Kerzner & Saladis, 2011). Because it emphasizes continuous improvement so much, lean project management is distinct. Lean project management, for instance, may be extremely helpful in optimizing

operations and raising customer satisfaction in the fields of engineering and hotel management. In contrast, lean ideas facilitate rapid project turnaround times and foster an environment that continuously stimulates innovation in the fast-paced realm of digital media.

Furthermore, the business industry today is fast-paced and competitive, with small and medium-sized firms (SMEs) being vital in stimulating innovation and fostering economic progression. SMEs today need to manage projects well for success and sustainability (Strucker, 2018). Effective project management is vital for SMEs that intend to differentiate themselves from the competition (Lima et al., 2023). Companies benefit from problem-solving strategies that make their advancement possible over a period of time. Run by project management approaches, SMEs can reduce operational costs while at the same time increasing productivity, thus providing benefits to shareholders, according to Vrečko et al. (2023). The reason project management has never become obsolete among small enterprises is because of the dynamic evolution of technology, global linkages or networks, and the ever-changing expectations of their customers; hence, in the growth of such organizations, efficient planning, implementation, and evaluation methods have to be put in place (Vargo & Seville, 2011). Organizations benefit a lot from project management and generally need different kinds of project management techniques for development and growth (Parasuraman, 2020). For success, one ought to understand well the project management methodologies that have been specifically developed for the impediments and potentialities faced by SMEs.

Taking into account SMEs importance and the assumption on lean techniques to add further value to their success in today's competitive environment, this study tackles on the core concepts of project management, evaluates its effectiveness on SMEs, and bring to the fore strategies that can assist these smaller enterprises surmount their peculiar barriers. The research provides a detailed examination of project management approaches within the SMEs and identifies the main determinants of project's outcomes. The study has been enhanced by the perspectives of seasoned professionals from several fields, including hairdressing, digital media, hotel management, travel and tourism, and event organizing. All domains provide different obstacles and opportunities for implementing lean concepts, rendering them ideal environments for examining the efficacy of these strategies.

It is important to understand that implementing lean project management is not a universal approach. Each organization, regardless of its size or sector, needs to tailor lean principles to suit its individual needs. The primary objective of this research is to equip project managers, business leaders, and enthusiasts with the necessary knowledge and abilities to effectively leverage lean's innovative capabilities in the ever-evolving realm of project management. This

research will concentrate on clarifying the specifics of lean project management for SMEs, to assist them in appreciating the fundamental principles. The following important questions are the focus of this research to address the difficulties above and gaps in project management in SMEs:

(1) What advantages does lean project management offer SMEs, specifically in terms of cost reduction, increased productivity, and overall project success? (2) How does the integration of lean project management impact the long-term viability and expansion of SMEs, and how does it align with their overall business strategy? (3) In what ways can SMEs leverage lean project management for their benefit, and what future trends and advancements are anticipated in this sector? (4) Which tools, approaches, and strategies are most effective for SMEs in implementing lean project management, and how can these be tailored to meet their specific needs? (5) How can SMEs successfully integrate and apply the fundamental principles of lean project management for optimal results?

By examining how project management may be used to help SMEs achieve and improve their goals for business performance, the study seeks to emphasize the significance of project management in SMEs. The aim is to determine how innovation and improvement may be achieved by examining the unique project management challenges faced by these SMEs. This includes looking at the effects of stakeholder actions, company culture, and resource limitations. There will be a thorough examination of the project management techniques being used by SMEs. The assessment is going to take into account the implementation of methods, tools, and the assimilation of project management concepts into the entire organizational structure. This thesis will also build on the findings by suggesting strategic frameworks and recommendations suited to SMEs' requirements. The objectives of these frameworks are to maximize project results, improve productivity, and encourage long-term development. The main method of data collection was conducting in-depth qualitative interviews with professionals from different industries (Managers of hotels, travel and tourism, digital media, engineering, hotel management, event planning, etc.). These in-depth interviews were designed to elicit specific details of each participant's initial encounters with lean approaches, providing insights into the difficulties and achievements faced.

The methodology of research that was used is qualitative. It aims at going deep and exploring the intricacies of Lean Project Management within SMEs. This combines to give a comprehensive view regarding its adoption as well as outcomes amidst other contextual factors within the SME setup. Across a wide range of industries, lean project management has proven to be essential in boosting operational effectiveness and encouraging strategic growth. This

investigation has demonstrated that lean approaches may be efficiently tailored to fulfill a variety of business demands, irrespective of the industry—whether it be manufacturing, services, or technology. The broad applicability and success of lean concepts demonstrate how well they can handle the complex issues that modern businesses encounter, improving an organization's efficiency as well as its agility and resilience. Results from a range of industries show that lean project management not only makes processes more efficient, but also makes sure that business activities are in accordance with strategic goals. This means that all of an organization's efforts are directed toward achieving its long-term objectives. In today's dynamic business world, when businesses must be both nimble and consistent in their processes to flourish, this strategic alignment is essential. Furthermore, it has been demonstrated that applying lean principles increases innovation and sustainability, assisting businesses in overcoming the difficulties posed by competitiveness and market volatility.

The study has four main sections. The first section is a comprehensive literature review, which is also divided into two parts. The first part of the literature review discusses the brief history of lean management, its application, various tools and techniques, and lean manufacturing. The second part of the literature review is on SMEs, their definition, and their significance. The second main section of the study is the methodology, including information about the semi-structured interview form, data collection, working group, and analysis. The third section deals with findings and discussion. Even though most studies tend to separate discussions from the findings part, in this study, the results of each analysis were given in the findings section and matched with the previous studies right after. The last section is the conclusion, including managerial implications, future directions, and limitations.

1. LITERATURE REVIEW

1.1. Lean Management

1.1.1. Historical Development of Lean Approach

Lean thinking has developed historically through several stages that have shaped its applications and guiding principles. The development of agile project techniques over time has aided in drawing more attention to lean methodologies, especially in improving project leanness and agility. The inception of lean thinking may be attributed to Japan following World War II, where Toyota had financial difficulties and looked for creative ways to improve production efficiency. Lean thinking originated from the Toyota Production System, which was created in the 1950s and 60s by Taiichi Ohno and Shigeo Shingo (Ohno, 1982). The main objectives were to maximize production efficiency, reduce waste, and enhance flow. Lean thinking became popular in non-manufacturing sectors like healthcare, construction, and services in the 1980s. Academics and professionals started modifying lean concepts to fit these industries' particular difficulties. Lean Healthcare approaches, for example, were developed as a result of applying lean thinking to the healthcare industry with the goals of decreasing waiting times, enhancing patient care, and minimizing errors (Radnor & Boaden, 2008; Toussaint et al., 2010). Moreover, incorporating cloud manufacturing ideas has brought about an alternative viewpoint for applying lean manufacturing concepts in many contexts, showing the ongoing evolution and modification of lean thinking (Yuqiuge & Petri, 2017). Lean initiatives are also experimental, frequently depending on creative worker tactics to propel advancement and change (Gerardo, 2004). Global market globalization in the late 20th century forced businesses all over the world to accept lean thinking to remain competitive. With a focus on effectiveness, quality, and customer happiness, lean concepts have become essential to supply chain management (Dennis et al., 2018). The introduction of lean methods into international corporate operations has shown how adaptable and useful they are across cultural and geographic divides. Lean thinking has been extremely effective, but it is not without its detractors and difficulties. Lean methodologies, according to their detractors, could cause an excessive focus on cutting costs at

the price of innovation and employee well-being. Additionally, corporate culture and context must be carefully taken into account when applying lean principles to a variety of industries. Lean thinking innovates and adapts as sectors change further. A new frontier is the integration of data analytics, artificial intelligence, and digital technology with lean approaches (Mary & Tom, 2003). The dynamic evolution of lean thinking from post-war Japanese manufacturing floors to a worldwide management philosophy is reflected in its historical development. The concepts of effectiveness, minimization of waste, and ongoing enhancement have demonstrated their durability in a variety of sectors. Lean thinking is still a significant force influencing how businesses approach quality, productivity, and customer satisfaction in a world that is always changing. This is because it is still evolving.

1.1.2. Application of Lean Principles in Project Management

Value Stream Mapping is one of the core lean concepts used in project management. Project teams can decrease lead times and increase efficiency by getting rid of waste and concentrating on actions that provide value. Pull planning is a method used in lean project management where work is scheduled based on actual project needs instead of estimated deadlines. This approach, inspired by just-in-time (JIT) manufacturing, helps to minimize delays and optimize resources by ensuring that each task is started only after the previous one is finished (Ballard, 2000). In the construction industry, Kanban is a popular visual management tool utilized by project managers to oversee work processes efficiently. By displaying work stages on a Kanban board, teams can streamline workflows, minimize work-in-progress, and enhance project visibility (Joseph, 2019). The construction sector has embraced Lean concepts to enhance project delivery. Lean construction focuses on continuous improvement, collaborative planning, and waste minimization (Koskela, 2008). The Last Planner System (LPS), a technique within lean construction, aims to improve coordination and communication by involving all project stakeholders in the planning process (Ballard & Howell, 1998). In project management, agile methods and lean concepts are frequently integrated. Agile frameworks like Scrum and Kanban incorporate lean principles to improve adaptability, customer collaboration, and continuous improvement (Mike, 2006). This method, which effectively provides value in dynamic project settings by combining lean and agile techniques, is known as lean-agile. It's crucial to determine how well lean adoption in project management is going. Lead time, cycle time, and customer satisfaction metrics are examples of key performance indicators (KPIs) that are frequently used to evaluate how lean concepts affect

project outcomes (Mohammad, 2018). Regular evaluation of these variables of performance and process adjustment enables continuous improvement. Although lean concepts provide many advantages for project management, there are drawbacks and objections. Critics contend that cultural resistance to change might prevent the successful implementation of lean and that a one-size-fits-all approach may not be appropriate for every project (Koskela & Howell, 2002). Overcoming these obstacles requires a thorough understanding of the situation and the ability to adapt lean principles to the unique needs of the project. Any activity that, from the customer's point of view, does not add value to the project or product is considered waste, or Muda in Japanese. Waste, as seen through a lean lens, is an example of losses that can transpire within a program or project on several levels (Ohno, 1988). To be eliminated, waste needs to be identified and measured. There are seven distinct kinds of Muda: Overproduction, the act of producing more before it is required; flaws, fixes, or new work; motion, any motion that is wasted because there isn't direct access to information, people, equipment, or systems; Inventory is a waste of precious resources since it fixes capital rather than adding value; over-processing, waste resulting from a process that is not efficient and contains tasks or functions that do not provide value; transportation, unnecessary labor spent while transporting components, materials, or completed goods as a result of process installation limitations; additionally Waiting for supplies, components, approval, or any other non-work related activity (Hines & Taylor, 2000; Ohno, 1988). Researchers have been interested in VSM in the past few years. To improve the production process by identifying waste and its resources, Rother and Shook (1999) proposed VSM, which is defined as an enterprise improvement technique to visualize an entire production process, representing information and material flow. Finding the product families and choosing one to improve upon is the first step in the VSM process. A map of the current state is created using the data. The third step is to map the future state. Finally, a plan for future applications is developed for implementation. The pull system primarily describes the information flow from a downstream supply chain agent to an upstream agent, asking for the required demand about material flow. Adopting this strategy at every stage of the supply chain is essential to helping with inventory control, lowering overproduction, and, as a result, waste-related expenses (Ilias, 2015; Vikram et al., 2015). When a task in any field, industry, or activity requires a high level of complexity, teamwork is thought to be one of the most useful instruments for achieving goals. Teamwork is crucial to the continuous and uninterrupted elimination of activities that do not add value to the service or product, which is

how a lean system accomplishes more with fewer resources (Shah & Ward, 2007). Although it has never been empirically validated, lean is a practical approach to process improvement that identifies and eliminates non-value-adding activities from a customer perspective (Schonberger, 2007). This leads to higher customer-focused performance, such as quick customer inquiries, speedy complaint handling, and customer satisfaction through improving business processes (Jasti & Kodali, 2015). Lean employs methods of value stream analysis, improvement, and control to guarantee that services and products are produced and delivered according to customer needs (the "voice of the customer"). This results in the delivery of the appropriate good or service at the appropriate time and location (Laureani & Antony, 2019). The foundation of Lean is the development of close relationships between suppliers and customers, wherein the latter are heavily involved in the former's product development and process improvement (Lander & Liker, 2007). As a result, there is a direct correlation between Lean and customer-focused performance, including delivery dependability, prompt customer service, and customer satisfaction (Fullerton & McWatters, 2001). As part of its Toyota Production System, Toyota Motor Corporation of Japan initially published the JIT technique (Sugimori et al., 1977). JIT is a system that aims to eliminate wasteful practices to provide the right item in the right quantity at the right place at the right time (Ohno, 1988). JIT purchasing is a necessary prerequisite for implementing JIT production, and it is an extension of the internal JIT system. As part of a lean philosophy, JIT delivery minimizes waste and inventory by providing goods or services as soon as customers need them. The application of JIT principles in project management involves making sure that tasks are finished promptly to meet project deadlines and preventing needless delays. Lean project management in the future will require utilizing technology and data analytics. Lean concepts can be integrated with artificial intelligence, machine learning, and project management software to improve decision-making, allocate resources optimally, and boost overall project performance (Rene, 2022).

1.1.3. Studies on Lean Project Management Success and Challenges

An organization's goals and strategy must often be aligned for lean project management to be successful (Zoe et al., 2016). Also, for a project to be successful, academics stress that there must be a clear link between its goals and the larger organizational goals (Jeffrey & James, 2011). With an emphasis on developing a culture that encourages continuous improvement, leadership is essential to the success of lean initiatives (Koskela & Howell, 2002). Project performance is largely dependent on a collaborative culture and a leadership team that adheres

to lean principles (Quan et al., 2018). A project's success depends on its ability to involve stakeholders at every stage of its lifetime (Saja et al., 2017). Effective lean project outcomes are influenced by having open lines of communication and including important stakeholders in the decision-making process (Mossman et al., 2013). Two important success aspects that are mentioned are giving project teams enough training and empowerment (Reijers & Mansar, 2005). Lean project success requires investing in staff skill development and maintaining a learning culture (Baines et al., 2014). One major obstacle to applying lean concepts is cultural resistance (Cameron, 2009). Research has indicated that in order for firms to overcome cultural obstacles, they must put into practice efficient change management techniques (Reijers & Mansar, 2005). Misunderstanding lean concepts might cause difficulties when implementing them (Pedro & Jeffrey, 2015). To avoid misunderstandings and inappropriate applications, it is crucial to completely comprehend lean ideas and obtain the necessary training (Poppendieck & Poppendieck, 2003). Senior management's lack of support is one barrier to efficient lean project management (Elonen & Artto, 2003). In order to get beyond this obstacle, leadership must show commitment and involvement. (Al-Sinan & Bubshait, 2022). Numerous studies have shown the difficulties in measuring the effectiveness of lean programs (Al-Sinan & Bubshait, 2022). To assess the benefits of lean project management, it is essential to develop pertinent Key Performance Indicators (KPIs) and assessment criteria (Hasanain et al., 2023). The literature discusses the integration of lean concepts with well-known project success frameworks, such as the PMI model (Zwikael & Globerson, 2006). Many experts stress the need to adjust conventional measures of project success to match lean project management strategies (Belout & Gauvreau, 2004). The healthcare industry has successfully implemented lean project management principles, resulting in better patient outcomes and lower costs (Radnor et al., 2015). Case studies show how lean thinking increases the effectiveness of healthcare delivery (Mazzocato et al., 2010). Lean construction projects have reduced waste, improved teamwork, and shortened lead times (Koskela, 2000). Case studies demonstrate how lean construction techniques can be successfully used (Ballard & Howell, 1998). Information Technology (IT) projects have effectively used lean concepts to improve project delivery (Shah & Ward, 2007). Maintaining lean implementation is the most typical challenge. The lean symbol is the primary viewpoint from which challenges are formulated (Wilson, 2010). Lean operations may not be appropriate for certain industries due to factors such as the type of product, production circumstances, supply, or demand (Eroglu & Hofer, 2011). Companies are

not ready to dedicate the time and resources necessary to maintain lean. It is a difficult task. “The journey to learn is not for the timid, and there are no stopping places along the way… Making the transition is highly challenging, and many falls by the wayside” (Drew et al., 2016). Thinking that lean can only be applied in the manufacturing sector presents another frequent implementation challenge. The lean enterprise idea, first presented by Womack and Jones, calls for applying lean management practices to every function inside a business. Implementing lean in a single department may have favorable benefits at first, but with time, when the department impacts other departments, the effects will probably start to fade (Bicheno & Holweg, 2008). The fact that "lean systems are inherently knowledge-intensive" presents yet another difficulty for businesses looking to apply lean (Drew et al., 2016). Toyota has benefited from years of studying and expanding its understanding of lean concepts and principles. Not only are systems and processes capturing the knowledge of lean, but workers are also thinking in terms of lean. Senior management may be against such a significant shift in operations, as lean adoption changes how things are done (Drew et al., 2016). (e.g., by doing away with the traditional method of building inventory). Using lean to reduce labor and inventory (which ultimately lowers costs) is one of the two most prevalent mistakes made by businesses using the methodology. A company's inventory is typically kept on hand for good reason—it may serve as a safeguard against imbalances in the business or against external and internal uncertainty.

1.1.4. Lean Manufacturing in Project Management

The lean concept of manufacturing was introduced through the Toyota production system and since then it became one of the subjects of research in project management to maximize the potential. Main factors including favorable principles - waste reduction, value stream mapping, JIT production, and continuous improvement fall at the heart of lean manufacturing. Academicians have certainly carried out a good job of examining the application of the above principles in manufacturing (Lander & Liker, 2007; Womack et al., 2007). Such exercises help in eliminating non-value-adding activities thereby enhancing operations. Accumulated project management researchers believe that lean principles represent a reliable work model (Ballard, 2000; Koskela, 1992). Project managers are steadily implementing lean approaches as well as waste reduction, encouraging interpersonal skills, and improving communication during projects. Individual JIT methodologies were introduced, for example, volume stream map, flow Kanban, and 5S, to limit the process time and boost the project's effectiveness (Abdelkader et al., 2015; Koskela & Howell, 2002). Studies trying to point out the salient features of lean and

agile strategies suggest to choose the lean principles based on the volatile nature project condition. The purpose of planning those lean and agile strategies is to finish projects creatively, dynamically, and with customer satisfaction (Cao & Connolly, 2008). During the process of learning how lean manufacturing is implemented in project management, one obtains a practical understanding that one can extend to their work. Examining successful cases, like those in software development (Reifer, 2011) or construction (Ballard, 2000), can help us understand how lean principles can be adjusted to suit specific project scenarios. "While there are definitely benefits to using lean manufacturing principles in project management, researchers have also identified challenges and limitations. The successful application of these principles could be hindered by issues such as cultural differences, resistance to change, and the need for extensive training (Fawcett et al., 2008).

1.1.5. Historical Development of Lean Manufacturing in Project Management

Lean manufacturing originated from the Toyota Production System (TPS) developed by Taiichi Ohno in the 1950s. The fundamental principles of lean thinking in manufacturing include minimizing waste, constantly improving processes, and mapping out value streams. These concepts were documented in academic works by Womack et al. (2007) and Shingo (2019). Lean concepts started to find their way into project management in the late 20th century, especially in the construction sector. Ballard presented the Last Planner System, which prioritizes cooperative scheduling, waste reduction, and ongoing enhancement in building projects (Ballard, 2000). The 21st century saw the software development industry implement lean concepts. Reifer (2011) talked about applying lean thinking to software project management to control uncertainty and boost productivity. This was a major change in the way lean concepts were applied to knowledge work and project situations outside of traditional manufacturing. Koskela made a significant contribution to the fusion of project management techniques and lean principles (Koskela,1992). "Lean project management" is a newly developed concept that emphasizes streamlining processes, improving communication, and adding value to projects. The goal of this integration was to offer a more comprehensive method of project management that prioritized effectiveness and value to the customer. Standardization efforts are a result of the widespread recognition that lean manufacturing techniques in project management have enjoyed throughout history. Organizations such as the Project Management Institute (PMI) and the Lean Construction Institute (LCI) have included lean concepts in their project management frameworks, indicating the widespread acceptance and application of lean

thinking in several industries. Lean manufacturing in project management has developed historically, starting with its manufacturing foundations and spreading to a wide range of project scenarios. The historical trend points to a gradual transition toward project delivery that is more efficient, collaborative, and customer-focused, even while lean concepts continue to have an impact on project management techniques.

1.1.6. Lean Tools and Techniques in Project Management

Lean methods and technologies, which originated in the manufacturing sector, are now frequently applied in project management to increase output, reduce waste, and simplify processes. Value stream mapping is a crucial lean tool that helps with the visualization and analysis of a project's whole process flow. Value-added management (VSM) has been emphasized as being important for identifying and eliminating non-value-adding operations (Rother & Shook, 1999). This procedure improves overall productivity by streamlining project procedures. The Kanban system, which has its roots in Toyota's production system, is a popular tool in project management that helps with workflow management and job visualization. Lander and Liker (2007), and Anderson (2010) mention how the Kanban approach can assist project teams to be more responsive overall, control work-in-progress, and cut lead times. Pull planning and collaborative scheduling approaches are used in lean project scheduling. The Last Planner System was first presented by Ballard and Howell (1998), who emphasized cooperative planning and ongoing schedule improvement. The goal of this lean methodology is to improve team member cooperation and communication. To find and fix the root causes of issues in project processes, Root Cause Analysis, or RCA, is used. Ishikawa talk about how RCA may be included in lean project management to help find and fix problems' core causes in a methodical way, which would help improve processes over the long run (Ishikawa, 1976). Kaizen is a Japanese word for continuous improvement is another vital element of lean philosophy. Through Kaizen incorporation in project management, a suitable environment for continual development is fostered which in turn is aimed at inspiring teams to regularly look at and boost their processes. There is also attention to these issues in studies (Shingo, 2019; Womack & Jones, 1997). At first, the Andon system was made and then it was adapted for project management, and it is used to determine the incidents of delay and progress of the project. Also, humanizes that the Andon system basically plays the role of signaling problems, pressed to be resolved, and avoids project issues from escalating. The introduction of inventions

capable to cut down waste and increase efficiency by using lean project management premise is leading business evolution in this field (Klefsjö, 2011; Sobek, & Smalley, 2008).

1.1.7. Integration of Lean Manufacturing Principles and Project Management

Combining lean manufacturing concepts with project management techniques has become a popular and effective way to increase productivity, cut down on waste, and improve project results. Lean thinking has well-documented roots that come from the Toyota Production System (TPS) (Womack et al., 1990; Shingo, 1989). The emergence of lean manufacturing principles was greatly aided by early ideas like waste reduction, continuous improvement, and value stream mapping. As more scholars realized that lean thinking could be applied to areas other than manufacturing, the application of lean ideas to project management gained traction. The foundation for integrating lean concepts into project management was established by Koskela (1992) and Ballard (2000), who highlighted waste reduction, enhanced cooperation, and communication. To increase productivity, several lean tools have been included in project management techniques. Applications of value stream mapping (Koskela and Howell, 2002), kanban (Liker, 2004), and 5S methodology (Abdelkader et al., 2015) have been made to improve lead times, optimize project workflows, and enhance project delivery as a whole. Pull scheduling and collaborative planning are the main focuses of lean project scheduling methodologies, such as the Last Planner System (Ballard &Howell, 1998). By encouraging cooperation and communication among project stakeholders, these approaches provide a more responsive and adaptable project environment. Case studies provide insightful information about effective implementations of lean manufacturing concepts in project management. Lean integration improves project efficiency and results; examples from software development (Reifer, 2002), construction (Ballard, 2000), and other industries attest to this. Although there are clear advantages to combining lean concepts with project management, there are also drawbacks. Implementation success may be hampered by cultural hurdles, resistance to change, and the requirement for intensive training (Koskela, 2008). Lean thinking combined with project management is a powerful strategy for accomplishing organizations' goals of process optimization, waste reduction, and improved project outcomes.

1.1.8. Convergence of Lean Manufacturing and Project Management

Lean manufacturing concepts and project management techniques are integrated to create a dynamic synergy that maximizes project outcomes, reduces waste, and improves operational

efficiency. At the end of the twentieth century, a merge of the project management and lean manufacturing began its history. Scholars began to recognize the benefits of integrating lean principles—which originate in manufacturing—into project management practices. The early integration projects laid the groundwork for a more comprehensive approach to project delivery (Ballard, 2000; Koskela, 1992). Lean manufacturing principles are the core of the integration strategy. As mentioned earlier, reducing waste, mapping value streams, and striving for continuous improvements are the important elements of this strategy (Koskela and Howell, 2002). Underlined the concepts related to project management that enhance efficiency, the reduction of not value-adding tasks, and the improvement of the working environment in terms of the cooperation and communication. Some lean techniques and technologies have been incorporated into project management methodologies to boost productivity. Value stream mapping, Kanban lean, and 5S practices that are vision-related, lead time reducing, and desk organizing techniques have been applied (Abdelkader et al., 2015; Lander & Liker, 2007). This mixture has resulted to the creation of planned system for the production Last Planner System (Ballard & Howell, 1998). The primary aim of these techniques is partner teamwork, communication, and prompt project response which is achieved by giving priority to pull scheduling and integrated planning. Bringing project management convergence and lean manufacturing in sync with the agile is the art. To be able to deal with vague characters of modern projects, Poppendieck and Poppendieck (2003) implemented lean formal frameworks into agile-flexible organization. Some examples of these operations have portrayed how a project management can be very aligned with lean production, especially in these industries. Results are evident in factory projects and software development (Reifer, 2011) as well as construction and building processes (Ballard, 2000). Such a demonstration makes evident how the project kickoff benefits the output quality and effectiveness. Through the balance of pros and cons of lean manufacturing project management, there is much to consider before initiating the process. Cultural resistance can slow down efficient implementation processes and require intensive training of personnel. Assimilation of lean techniques into different project situations is also a challenge which needs to be dealt with (Koskela, 2008). The synergy of project management and lean manufacturing has acquired the current progressed technique for controlling project performs. With lean concepts in projects, companies have a comprehensive framework to enhance the delivery process and cut costs as efficiency improvement is the key result of the present day.

1.2. Small and Medium-Sized Enterprises

1.2.1. Small and Medium-sized Enterprises

SMEs are an integral part of economies globally. They are very instrumental in economic growth through creating jobs, reducing poverty levels, and boosting entrepreneurship levels (Sitharam & Hoque, 2016). SMEs are, however, distinguished by their smaller scale in working capital, assets, and skilled workforce, which may affect its operation, especially when trading off goods and services (Khan & Khalique, 2014). SMEs, despite being small, are important for reducing income disparity and promoting proper economic growth (Ghofirin & Wahyuningtyas, 2021).

There is confusion in defining SMEs since all varies across regions. According to definitions given by the European Commission, SMEs were classified in terms of the number of employees: small enterprises include less than 50 employees, and medium-sized ones will have less than 250 employees (Zaied & Mohmed, 2020). SMEs are diverse; they operate in all kinds of sectors and differed under economic and social conditions (Padachi & Bhiwajee, 2016). This diversity underlines the need to understand the strategic behavior of SMEs towards environmental impact, intellectual capital, sustainability, innovation, and corporate social responsibility (Aragón-Correa et al., 2008; Guijarro et al., 2009; Khalique et al., 2018; Kot, 2018; Perrini, 2006).

Research shows that they include barriers to innovation, limited access to training, financial constraints, and inadequate management skills (Demirkan et al., 2021; Ufua et al., 2020; Widayati et al., 2023). The performance of SMEs, particularly in dynamic and complex business environments, might be enhanced by effective resource and knowledge management, entrepreneurial competencies, and finally, government support from the public policy agenda (Lanz et al., 2018; Pulka et al., 2021). Moreover, technologies can be adopted, which enables the adoption of Enterprise Resource Planning, e-commerce, and other technologies to help SMEs take part in global value chains more easily and become more competitive in markets (Calof, 2020).

1.2.2. Lean Implementation in SMEs

The implementation of lean management practices obviously brings numerous benefits to SMEs, and research has proved quite a number of reasons for this. It is for this reason that a lean management approach, which dwells much on efficiency, waste reduction, and continuous

improvement, makes it very popular as a strategy by SMEs seeking sustainable business practices (Caldera et al., 2019). Examples are demonstrated in which the implementation of lean initiatives of SMEs is shown to be thriving where innovation, adaptability, and inclusion culture was present (Le, 2023). SMEs can enhance their performance in sustainability through lean and sustainability-oriented innovation through waste reduction, quality promotion, decrease of costs, and increasing flexibility up and down the supply chain (De et al., 2020). Implementation of lean practices has been shown to reduce accidents, machine breakdowns, and inventory levels, associated with better operational performance for SMEs (Ali et al., 2020).

Lean management is, therefore, perceived as an effective practice in any SME looking to maintain a globally competitive edge in the 21st century, emphasizing the need for SMEs to implement the lean philosophy with the sole purpose of enhancing their all-round performance (Al-Baldawi, 2024). Studies have shown that the adoption of lean practices has affected operational performance of SMEs favorably (Sahoo & Yadav, 2018; Yadav et al., 2019). The strengths and weaknesses regarding the adoption of lean practices by SMEs have to be evaluated so that proper managerial initiatives for the full adoption of lean principles can be taken up and the associated benefits can be obtained (Psomas et al., 2018).

Studies have been targeted on the importance of lean practices in different industries, including food enterprises, where research in how SMEs in those specific sectors implement lean practices (Dora et al., 2013). Researchers also focus on the potential benefits of lean practices which can be context and environmentally adapted and are suitable for startups and micro enterprises with limited resources - energy efficiency technologies (Shah & Ward, 2003). The shortage of the experience of the SMEs in carrying out these practices is another major difficulty they face. Conversely, SMEs can be engaged by introducing educational programs for embedded consultants, or combined with local trade networks, can fill the knowledge-gap and perform implementation of lean practices (Zangiacomi et al., 2020). SMEs run with strong organizational cultures tended to resist changing their status-quo practices while they hesitated about the implementation of new practices (Beckmann et al., 2023). Proper communication, the utilization of good change management strategies, and strong leadership are important in the barrierless transition of change processes (Maletič et al., 2014).

Research has also demonstrated frequently that SMEs are victims of considerable barriers to implement in their lean strategies. The digital technology is to aid SMEs in their decision-making process and increase efficiency. Meanwhile, this will also be useful to large

corporations (Linderman et al., 2006). Amongst the challenges is acquiring and retaining competent lean managers to lead and guide the implementation of its principles, especially in SMEs (Knapić et al., 2022). Although deployment in SMEs is accompanied by challenges, it is essential for the elimination of wastes, enhancing quality, and cost-cutting activities to improve business performance (Wushishi, 2024). In addition, researches have documented lean implementation in large-scale industries, trying to optimize their supply chains as well as to enhance customers' happiness, as suggests (Sohal & Egglestone, 1994). However, entrusting to individuals and businesses, there are more differences than the similarities in the way of accomplishment of this goal and the attainable results. The research conducted by Shah and Ward (2007) points out that SMEs are noticed to have faster and more substantial improvement because they quickly adopt and implement new changes. SMEs might be advantaged from slack and freely networked structures designed for the adoption of alterations while in the large corporations, it could be complex with highly linked systems and patterns (Womack & Jones, 1997).

In summary, SMEs are very important drivers of economic growth and development, and it is important to be aware of the specifics that characterize them, challenge them, and present opportunities for their growth and sustainability. Moreover, lean management is what SMEs require to improve the performance of their operations, quality, cost, and competitiveness. The result will be that SMEs will be able to practice business in a sustainable way, become efficient in operations, and achieve complete business success.

2. METHODOLOGY

2.1. Research Objective

Given the importance of SMEs (Ghofirin & Wahyuningtyas, 2021; Sitharam & Hoque, 2016) and the evidence supporting lean management's ability to further enhance their success, efficiency, and productivity (Ali et al., 2020; Caldera et al., 2019; De et al., 2020) in today's competitive environment, this study aims to investigate the core concepts of lean project management, evaluate its effectiveness on SMEs and bring to the fore strategies that can assist these smaller enterprises. The research provides a detailed examination of project management approaches within the SMEs and identifies the main determinants of project's outcomes. The following important questions are the focus of this research to address the benefits, difficulties, and gaps in project management in SMEs:

(1) What advantages does lean project management offer SMEs, specifically in terms of cost reduction, increased productivity, and overall project success? (2) How does the integration of lean project management impact the long-term viability and expansion of SMEs, and how does it align with their overall business strategy? (3) In what ways can SMEs leverage lean project management for their benefit, and what future trends and advancements are anticipated in this sector? (4) Which tools, approaches, and strategies are most effective for SMEs in implementing lean project management, and how can these be tailored to meet their specific needs? (5) How can SMEs successfully integrate and apply the fundamental principles of lean project management for optimal results?

2.2. Semi-Structured Interview Form

The development of the semi-structured interview questions comprised some very important steps to ensure clarity, relevance, and effectiveness. First of all, at the stage of defining the problems, thorough identification of objectives of the research was made, followed by the development of keywords in order to have a good literature review (Karasar, 2007). At question writing and draft form creation stage, the questions were written based on the research

questions, making sure that those questions directed to the participants will yield fruitful results. The theoretical framework related to the subject is fully mastered and the questions writing process is completed (Büyüköztürk et al., 2016). In the third stage, expert opinions were utilized in the formation of a pre-application form so that accurate data could be captured through the questions. Through feedback from experts, the semi-structured form came under review and refinement. The last task involved conducting the pre-application analyses and then finalizing the interview questions in the light of those and the expert feedback (Büyüköztürk et al., 2016). These stages collectively ensured the construction of well-framed semi-structured interview questions, which would elicit the required data for the research. The interview questions are presented in Table 1.

Table 1. Semi-Structured Interview Form

Q1	Can you share a specific example of how lean project management contributed to cost reduction or increased productivity in a project you managed?
Q2	In your experience, how do you integrate cost considerations into your project planning and execution?
Q3	Describe a situation where you faced unexpected challenges during a project. How did lean principles guide your approach to overcome these challenges?
Q4	When developing project plans and schedules, how do you ensure alignment with the long-term goals and strategic vision of the company?
Q5	In your experience, how has effective communication and relationship building played a role in establishing trust and credibility with team members, stakeholders, and customers? Can you share a specific example?
Q6	Looking ahead, how do you foresee the integration of lean principles contributing to the future viability and expansion of SMEs?
Q7	Can you describe a situation where effective risk management, guided by lean principles, played a significant role in the success of a project you managed?
Q8	Identifying key challenges in your industry today, how do you see lean project management addressing or mitigating these challenges?
Q9	Considering future trends, how do you envision the evolution of lean project management practices in the SME sector?
Q10	Tell us about how you ensure that lean principles are integrated into your project governance structures effectively?
Q11	Can you provide an example of successfully navigating and resolving conflicts within a project team, while aligning with lean principles?
Q12	In your view, how can SMEs customize and tailor lean project management strategies to address their specific needs and challenges?
Q13	Elaborate on the differences between risk and issues in project management. How do lean principles guide your approach to managing these aspects in a project?
Q14	Considering lean principles, what major types of risks do you anticipate in project management, and how do you proactively address them for optimal results?

2.3. Population and Sample

Qualitative research techniques, such as semi-structured interviews, offer different perspectives compared to quantitative research methods. In studies using qualitative methods, a small sample size, sometimes even just one person, is usually used. As a result, the focus is on an in-depth understanding of the individual rather than achieving statistical representation (Patton, 1990). This approach aims to examine the sample holistically and in the context of the study, rather than trying to generalize the results to the entire population. According to Lincoln and Guba (1985), when conducting qualitative research, the focus is on selecting individuals who can provide a significant amount of information, rather than on the size of the sample. The selection of the sample is based on research purposes rather than representative power. Rubin and Rubin (1995) suggest that the semi-structured interview technique can be used to determine when the sample size is sufficient because interviews can be stopped when the desired amount of information is obtained. Another way to describe this scenario is that the sample size is considered complete when the information collected reaches a point of saturation or sufficiency. Patton (1990) supports this idea by stating that the main objective is to select individuals who can provide valuable insights into the subject being studied. It also emphasizes the importance of flexibility in the selection of purposefully selected samples.

The primary goal of studies using the interview technique is not to make sweeping generalizations about the entire population for which data were collected, but to draw conclusions about individuals who share similar characteristics or characteristics (Schofield, 1990). In addition, in-depth studies involving a small group of individuals can be used to gain insight into the behaviors and attitudes of people with similar qualities. According to Patton (1990), there is no fixed guideline for selecting sample size in qualitative research, especially in interviews. The sample size is determined by various factors such as the purpose of the study, available sources, time, reliability, and the usefulness of the collected data (Türnüklü, 2000).

Kuzel (1992) emphasized that sample selection criteria should be carefully evaluated when using qualitative research techniques such as interviews. First, the sample selection process is highly adaptive and may change in parallel with the progress of the study. Secondly, the selection of sample units is a gradual process influenced by the individuals involved in the study. Third, the sample is constantly updated to reflect changes in the topic or theory being investigated. Finally, the selection process also includes negative people and situations that may reinforce or support the topic or theory under study.

In accordance with the standards mentioned above, sample selection is carried out with some flexibility, but there are several techniques for sample selection in the literature. In qualitative research, various sample selection techniques are used such as extreme or contradictory sampling, maximum diversity sampling, affinity sampling, typical case sampling, critical case sampling, snowball or chain sampling, criterion sampling, confirmatory or falsifier sampling, and easily accessible case sampling (Yıldırım and Şimşek, 1999).

In this study, snowball sampling method was used for the selection of participants. This technique is applied in cases where complete knowledge about the universe is limited and therefore it is difficult to reach individuals who are part of the universe. In such cases, the researcher interviews several people who meet the sampling criteria, and they provide information about other individuals who meet the same criteria. This process is repeated until a sufficient number of participants are included in the study. Snowball sampling is useful in situations where participant selection is difficult and assistance is required from existing participants to identify suitable candidates to be included in the sampling (Earl, 2004). Within the scope of this study, snowball sampling was preferred since it was difficult to find individuals applying lean project management in SMEs. At first, participant number 1 was contacted by whom additional participants were contacted.

2.4. Data Collection

At this stage, interviews were conducted with 11 people. Before the interview, general information was given about the structure, purpose and content of the interview questions. Beforehand, an appointment was made with phone calls with the participants and then online interviews were made. The interviews were conducted online. The interviews with the participants lasted an average of one hour. The interviews were recorded with a video recorder and then the recordings were decoded and transmitted to a computer. The interview questions were submitted to the Beykoz University Scientific Research and Publication Ethics Board, on May 8, 2024, to ensure compliance with scientific research and publication ethics. The Board issued a positive opinion, resulting in decision number 6 during its meeting on June 6, 2024.

In the qualitative aspect of the study, data generation was conducted until saturation was achieved. In total, eleven participants were interviewed. Table 2 presents the sociodemographic profile of participants.

Table 2. Interview Participant Information

Participants	Gender	Industries
Participant 1	Female	Hairdresser Chain
Participant 2	Male	Hospitality
Participant 3	Female	Digital & Media
Participant 4	Female	Event Planning
Participant 5	Male	Engineering
Participant 6	Female	Fashion & Apparel Store
Participant 7	Male	Software Development
Participant 8	Male	Agriculture & Food
Participant 9	Female	School
Participant 10	Female	Travel & Tourism
Participant 11	Female	Management Consulting

2.5. Analysis and Interpretation of Data

The answers given by the participants were examined using the content analysis method which involves analyzing texts to make reliable and precise inferences. Its main purpose is to reveal the underlying meanings of written, auditory, visual, or other content that conveys symbolic and meaningful information. Content analysis is a method that enables the identification of words, symbols, meanings, themes, thoughts, messages, and categories (Krippendorff, 2004). The ultimate goal of this approach is to depict the data and reveal the hidden truths within it. Moreover, content analysis tries to produce a meaningful output that addresses research questions by coding data according to specific themes and concepts (Yıldırım and Şimşek, 2016). An approach based on inductive data moves from the specific to the general so that certain patterns are observed and then combined into a larger whole or general expression (Chinn and Kramer 1999). The main feature of all content analysis is the classification of many words of the text into much smaller content categories (Weber 1990; Burnard 1996). In the inductive content analysis approach, topics and categories derive their source from data sets (Zhang and Wildemuth, 2009). That is, the codes arise from the words of the participants and can form semantic sentences. This analysis process includes explicit coding, creating categories from codes, and summarizing themes. Within the scope of the research, the following analysis process was applied.

- Data coding: These sections, which form a meaningful whole in themselves, were coded by the researcher.
- Determination of themes: Codes were aggregated and reviewed, matched with themes that can account for data at some general level and collect codes under certain categories of common aspects found under these themes.
- Organizing and defining data according to codes and themes: The researcher organized the data obtained at this stage. The data is described, explained, and presented in a language that the reader can understand.
- Interpretation of findings: This was the last stage, whereby the researcher explained the relationships between the findings in a bid to make sense of the data collected, the cause-effect relationships were established, some conclusions drawn from the findings were made and explanations made for the importance of the results obtained.

After the document analysis and the analysis of the interviews were completed, other findings related to the tables prepared based on the findings and results obtained from the interviews were interpreted by associating them.

MAXQDA 2020 package program was used for the content analysis. This program is well-known for its effectiveness in qualitative and mixed-methods analysis. MAXQDA software is suitable for various types of qualitative research, such as grounded theory, literature reviews, exploratory market research, qualitative text analysis, and mixed-methods approaches. This program provides the basis for testing and developing theories by enabling researchers to methodically analyze and understand qualitative data (Creswell and Miller, 2013).

- First, the data were analyzed using the frequency table, code sub-code sections model and code cloud.
- Then, qualitative analysis was performed using cross-tabulation, code matrix scanner and two case models of the codes.

3. FINDINGS AND DISCUSSION

3.1. Themes and Coding Analysis

1.1.1. Findings Regarding the Theme of Lean Project Management and Cost Productivity Increase

In the interview, the participants were asked to share a specific example of how lean project management contributed to cost reduction or increased productivity in a project they managed? Table 3 and Figure 1 contain the codes obtained within the scope of the research regarding the theme of lean project management and cost productivity increase.

Table 3. Codes for the Theme of Lean Project Management and Cost Productivity Increase

	N	%
Cost saving	11	26,83
Reduction in development time	8	19,51
Allocating more resources	7	17,07
Eliminating unnecessary features	6	14,63
Improved team morale	5	12,20
Value-adding activities	4	9,76
TOTAL	41	100,00

Codes related to the theme of lean project management and cost productivity increase are cost saving, reduction in development time, allocating more resources, eliminating unnecessary features, improved team morale, and value-adding activities. Table 3 presents how participants shared factors that resulted to improving management of projects.

The most commonly referred-to aspect is cost saving, which corresponds with 26.83% of all responses. Next, 8 participants mentioned that they need much less time for development processes which accounts for 19.51%. Allocated more money or got rid of some functions that were not needed anymore – all this according to answer of 7 and 6 participants and – 17.07% 14.63%. Boosted spirits, doing projects that generate value were among the least frequently mentioned, accounting for 5 participants (12.20%) and 4 participants (9.76%) respectively. Cost

saving is a top factor and most participants think about financial efficiency as very important. Therefore, project management practices may significantly change in the case of well-accepted initiatives aimed at cutting costs. The significance of reducing development time significantly underscores the need for efficiency in project timelines, time management strategies are critical for successful project outcomes. The importance of appropriate support and investment in project teams is one of the many reasons why committing more resources, human and material included is crucial. Featuring the removal of redundant components, it seems as if a lean style in managing projects is advocated for while still maintaining simplicity with respect to the core functions of the project. Though slightly less valued, improving the morale of a group is still significant. This point is a sign that there is an understanding among members of project teams about how to achieve successful outcomes by enhancing their welfare and motivation. The least cited among them is the fact that value-adding activities help in placing focus on activities that directly contribute to the goals and outcomes of a project.

These findings are consistent with Piotrowicz et al. (2021), who also found cost reduction and process improvements are key benefits of lean methodologies. However, the researchers place a higher emphasis on process and equipment efficiency, while this study highlights resource allocation and team morale as significant factors. The study discovered that the firms have to adhere to lean project management principles if they are to make substantial savings and improve efficiency. If an organization wants to trim operational time and do away with all unwanted features because this will make it easy for them which enables them create top notch finished goods more rapidly. Lean methodologies are not only beneficial for improving financial and operational metrics; they also help to cultivate an engaged and productive workforce as reflected in the emphasis being put on bettering team spirit and value addition activities. Investigating tomorrow will allow for the longer-term effects of lean project management on different performance indicators within an array of fields. To better understand how such advantages are implemented in organizations, the sample size should be increased using qualitative methods like interviews and case studies.

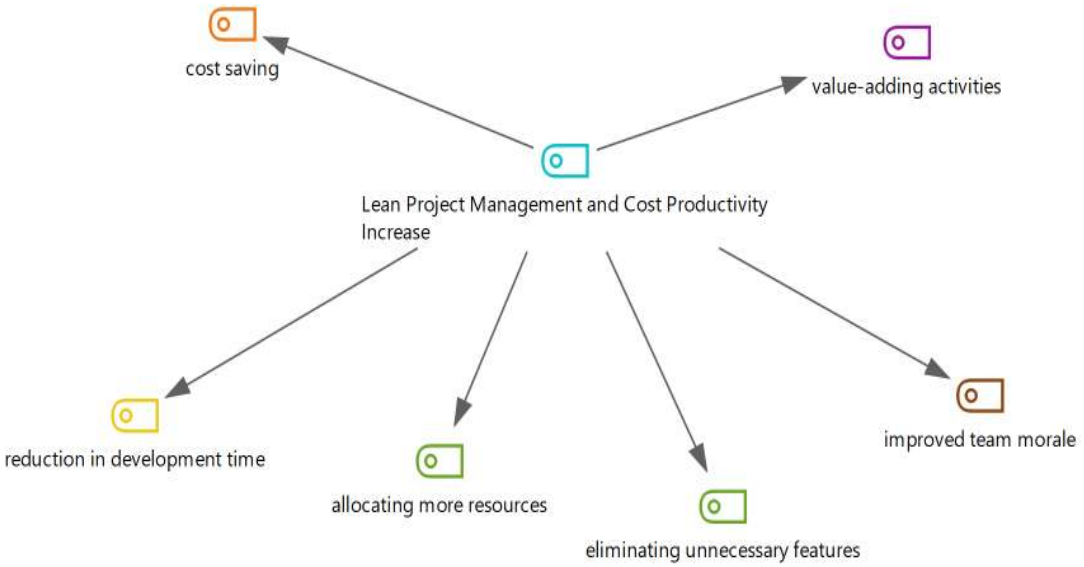

Figure 1. Hierarchical code-subcode model for regarding the theme of lean project management and cost productivity increase

Participant 3' answer is the best example in this regard as follows:

Participant 3: "In a digital media project aimed at enhancing our content delivery platform, we employed lean project management by streamlining our development process, eliminating unnecessary features that did not add value to the user experience. This focus on value-added features led to a reduction in development time by 20% and a cost saving of 15% without compromising the quality of the final product. This approach not only increased productivity but also significantly improved team morale as they could see the direct impact of their efforts on the project's success."

1.1.2. Findings Regarding the Theme of Integrating Cost Considerations into Project Plan, Execution

In the second question, the participants were asked to recall their experience on how they integrated cost considerations into their project planning and execution. Table 4 and Figure 2 contain the codes obtained within the scope of the research regarding the theme of integrating cost considerations into project plan, execution.

Table 4. Codes for the Theme of Integrating Cost Considerations into Project Plan, Execution

	N	%
Cost-benefit ratio	7	21,88

Adopting a value-driven approach	6	18,75
Upfront planning	6	18,75
Allocating resources efficiently	5	15,63
Informed decisions	5	15,63
Operational efficiency	3	9,38
TOTAL	32	100,00

Codes related to the theme of integrating cost considerations into project plan, execution are cost-benefit ratio, adopting a value-driven approach, upfront planning, allocating resources efficiently, informed decisions, and operational efficiency. Table 4 shows the distribution of factors that were considered important by the respondents as far as successful project management is concerned. The cost-benefit ratio is quoted by most people i.e., 7 respondents and this accounts for 21.88% of all other figures. This is then followed closely in second place with 6 citations each on taking value driven approach to managing projects and doing upfront planning among 6 respondents representing 18.75%. Each of the 5 respondents identified allocating resources efficiently and making informed decisions, composing 15.63% of the answers. Finally, 3 participants highlighted operational efficiency with 9.38% of the responses in total.

Effective project management requires understanding the significance of using the proportion of benefit compared to spending. In other words, participants tend to prefer strategic steps while planning a project since greater returns should be gained from the projects as opposed to total expenditure. It also shows the great significance of proper management of finances during plans and executions of these programs. The prominence of the cost-benefit ratio as the top factor indicates that financial analysis and balancing costs against benefits are viewed as critical for effective project management. This suggests that participants prioritize a strategic approach to ensure that the benefits of projects outweigh the costs, highlighting the importance of financial prudence in project planning and execution. The importance of foresight and ensuring project value delivery at each stage is highlighted by the same importance given to adopting value-driven approaches as well as strategic foresight. This means that every action undertaken on a given project should be those that contribute towards achieving its end objective but with no specifics given about their content until later stages. Another crucial aspect of good project management is the proper utilization of existing resources and well-informed, deliberate choices. If resources are allocated economically, it

keeps every corner of the project well maintained, thus enhancing cost-effectiveness. Conversely, rational decision-making entails the use of information and findings in decision making with regards to projects which increases chances for success. Although referred to less often operational efficiency remains an important factor, suggesting that participants may consider it as a consequence of other factors rather than a priority in itself despite the optimization of everyday operations being vital.

Fagarasan et al. (2023) also highlighted the importance of efficient resource allocation and informed decision-making in integrating cost considerations and sustainability metrics into project planning and execution. Also, the researcher emphasizes the need for upfront planning and a value-driven approach to achieve project success and sustainability goals. Subsequent investigations could look at how project outcomes are impacted by diverse cost management policies in dissimilar industry settings.

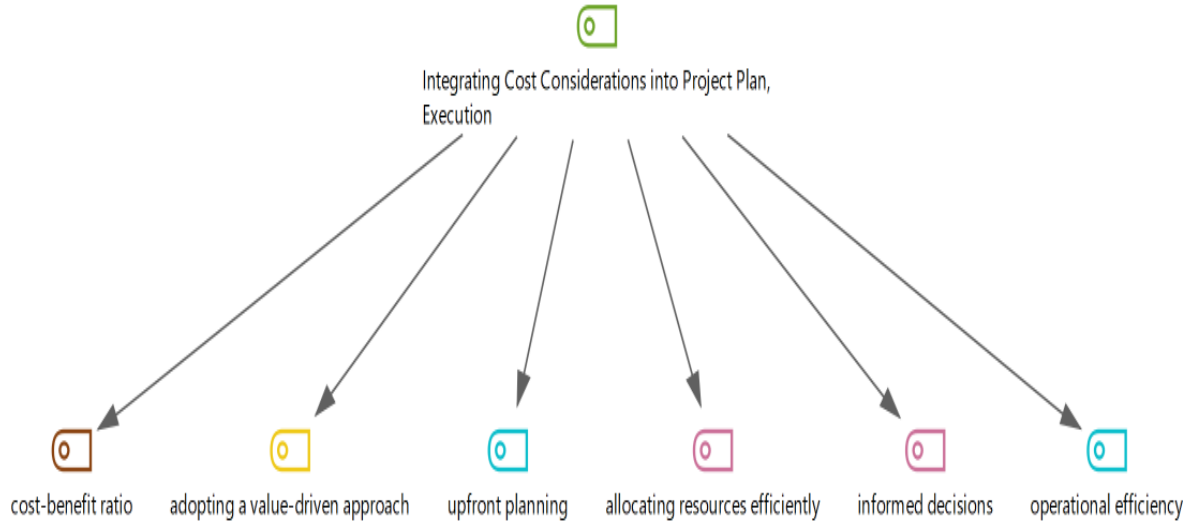

Figure 2. Hierarchical code-subcode model for the Theme of Integrating Cost Considerations into Project Plan, Execution

Participant 10 gave the best example answer in this regard and it is as follows.

Participant 10: "Cost considerations are integrated from the start through detailed budgeting, forecasting, and the application of lean principles to identify cost-saving opportunities without compromising the quality of our travel experiences. This includes negotiating with suppliers and optimizing internal processes."

1.1.3. Findings Regarding the Theme of Overcoming Unexpected Challenges with Lean Principles

In the third interview question, the participants were asked to describe a situation where they faced unexpected challenges during a project. If so, how did lean principles guide their approach to overcome these challenges? Table 5 and Figure 3 contain the codes obtained within the scope of the research regarding the theme of overcoming unexpected challenges with lean principles.

Table 5. Codes for the Theme of Overcoming Unexpected Challenges with Lean Principles

	N	%
More efficient process	8	22,22
Reducing time to market	7	19,44
Simplifying	6	16,67
Quickly reassess	5	13,89
Streamlining communication channels	4	11,11
Data integration	4	11,11
Minimizing disruptions	2	5,56
TOTAL	36	100,00

Codes related to the theme of overcoming unexpected challenges with lean principles are more efficient processes, reducing time to market, simplifying, quickly reassessing, streamlining communication channels, data integration, and minimizing disruptions. Table 5 displays how participants pinpointed various strategies they took as essential for increasing the productivity and effectiveness of a project. The most often mentioned strategy is deploying more efficient processes, which were indicated by eight participants making up 22.22% of responses. The following is that 20% of respondents emphasized the importance of reducing time-to-market, while process simplification was mentioned as a priority by 20% of them. Rapid process review and modification was identified as a primary area by some respondents (20%). Streamlining communication channels and integrating data were mentioned by 4 participants each, with each one of them constituting 11.11% of respondents. Lastly, minimizing disruptions was the least mentioned strategy with two people accounting for 5.56% of all responses.

What participants aim for is better project results gotten through making the internal processes superior in order to lower on wastage and have more work done in the most

productive way. The primary way of making the projects more efficient is by the first strategy of making processes work better or faster. The importance of fastness in project management and agility cannot be overemphasized as seen by the so much stress on reducing time to market in this project management strategy. Therefore, fast delivery appears to have been identified as one of the key enablers of success and this important emphasis is being given so much weight.

Simplifying processes is another important strategy, which is a suggestion that if we reduce complexity, it can lead us to have projects that are manageable and efficient. Inclusion works towards reducing errors as well as providing a clear picture for team members as they engage themselves into important activities. The need for adaptability and agility in project management is highlighted by the skill of quickly reevaluating our actions. This helps us move through periods of confusion and transition, and keep to our course with reference only when unexpected difficulties appear. Effective communication is not only prominent in the optimization of the communication portals but also in the fusion of data. When working efficiently, these means ensure every member of a team has enough information and enables collaboration of team members. Relevant information is kept in data integration that also helps in taking wise decisions. Minimization of interruptions, although mentioned more rarely, is nevertheless important. Here the project remains steady and stoppages hindering positive changes are minimized. Organizations must apply lean principles in function management to deal with and defeat unpredictable problems. To effectively address unanticipated barriers, it is highly instrumental for an organization's ability to respond to them to be broadened. For the sake of remaining flexible, and adaptable, this requires simplifying operational procedures and quickly reassessing situations when need be. An efficient information flow can be maintained by streamlining the communication channels and integrating data systems, which support informed-decision making. This also includes reducing interruptions within an organization even if it does not get as much weight as others when it comes to sustaining workflow uninterruptedness and productivity.

Our findings are consistent with Maware and Parsley (2022), who also highlight the critical role of improving process efficiency, management support, technical knowledge, and effective communication in overcoming challenges when implementing lean principles. However, our study emphasizes specific strategies such as reducing time to market and quickly reassessing plans, while their study focuses more on cultural change and overcoming resistance.

A different perspective could be that in the future, we need to research how lean principles might affect more than just acute but continuing adversity when met in different fields of work.

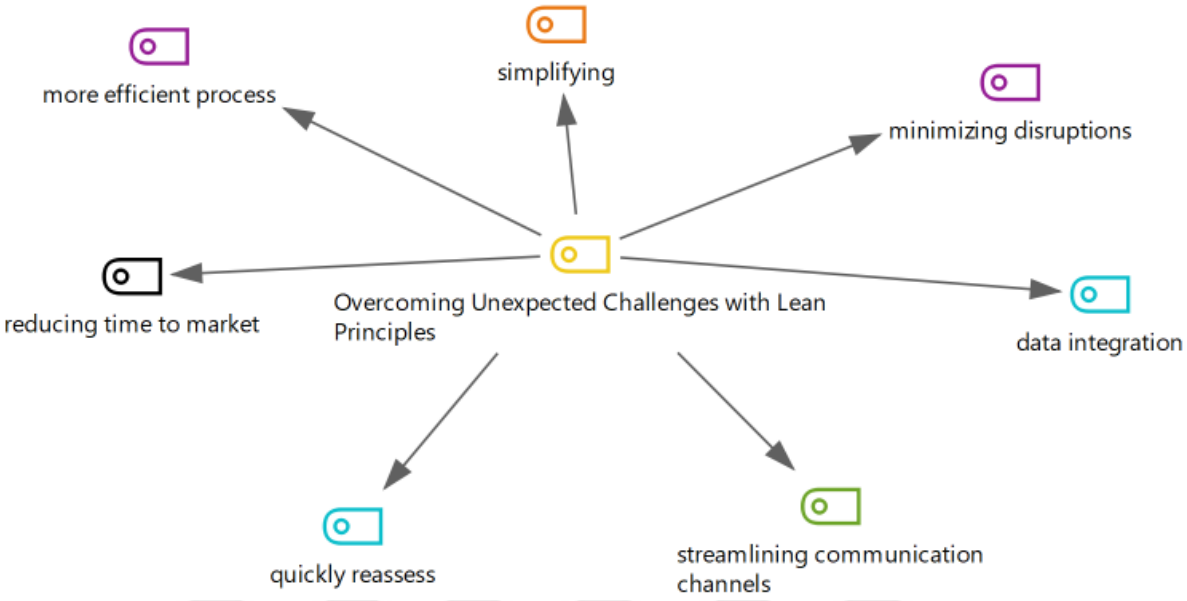

Figure 3. Hierarchical code-subcode model for the Theme of Overcoming Unexpected Challenges with Lean Principles

Participant 4 gave the best example answer in this regard and it is as follows.

Participant 4: "When a product delivery was delayed, lean principles helped us reassess and optimize our existing inventory, ensuring uninterrupted service. We implemented a just-in-time inventory system as a result, which improved our response to future supply chain challenges."

1.1.4. Findings Regarding the Theme of Aligning Project Plans with Strategic Vision

In the fourth question of the interview, the participants were asked whether they ensured alignment with the long-term goals and strategic vision of the company when developing project plans and schedules. Table 6 and Figure 4 contain the codes obtained within the scope of the research regarding the theme of aligning project plans with strategic vision.

Table 6. Codes for the Theme of Aligning Project Plans with Strategic Vision

	N	%
Long-term objectives	7	19,44
Regular communication	7	19,44
Sustainability	6	16,67
Incorporating flexibility	5	13,89

Market leadership	4	11,11
Innovation	4	11,11
Improving accessibility	3	8,33
TOTAL	36	100,00

Codes related to the theme of aligning project plans with strategic vision are long-term objectives, regular communication, sustainability, incorporating flexibility, market leadership, innovation, and improving accessibility. In Table 6, various contributors who participated in the survey identified long-term objectives and regular communication to be the main key factors in the success of projects. 7 participants mentioned each factor: both long-term objectives and regular communication, thus having a total of 19.44% response rate for each of them. Sustainability comes next which was noted by 6 participants i.e., 16.67%. Flexibility was identified as involving 5 participants i.e., 13.89%. Four participants mentioned market leadership and innovation respectively which represent 11.11% of the responses whereas three participants noted improving accessibility representing 8.33% of all the responses.

The same accentuation on long-term goals and steady communication underscores two crucial dimensions for strategic project triumph. Clear strategic goals guiding project undertakings so that they do not deviate from the major organizational vision and guarantee that projects are completely in line with it and are stressed by long-term goals. This concentration lies in the fact that projects are not successful only in the short run but also help prop up growth and perpetuation. Continuous conversation emphasizes the need for regular dialogue connecting stakeholders, team members, and any other concerned parties. Good communication ensures that information is well understood and shared so that all are in line with each other and hence continue working together without any conflicts or disagreements that might impede progress in completion of tasks. The reason why consistency has become so crucial lately is that more people appreciate the importance of incorporating environmental, social, and financial aspects in projects. This criterion hints that individuals appreciate projects, which not just meet their immediate objectives, but likewise carry them out in a way that is responsible and will endure.

Flexibility should also be included where adaptation is glamorously important in project management highlighted its reason. This essence speaks to the essence of projects remaining agile and capable of responding to unexpected challenges consequent upon changing circumstances. Four participants talked of both innovations in market leading. It is essential to

realize that for projects to have a competitive advantage and creativity among them maintained there should be market leading in them. This means that the project should be positioned as a leading organization in its area according to participants' view about competitive projects whereas when it comes to new effective ways then creativity has no ends as indicated by the word "innovation". Improving accessibility, although less frequently mentioned, still remains a significant point, from these ensuring projects are accessible to a broader audience becomes important to some of them implying inclusion and a user-centered approach amongst other things.

In their study, Filippov et. al. (2012) emphasizes the importance of aligning projects with strategic goals to ensure long-term success and efficiency. Also, their study shows how crucial matching project plans with an organization's strategic vision can be in enhancing efficiency, creating value, and allocating resources effectively. There is a possibility of future research looking into the influence exerted by strategic alignment practices in different industry contexts to establish trends as well as challenges specific to sectors. By adding more respondents and using qualitative techniques such as interviews and conducting case studies, it will enable to understand better about the way through which bodies put into use or rank their strategies.

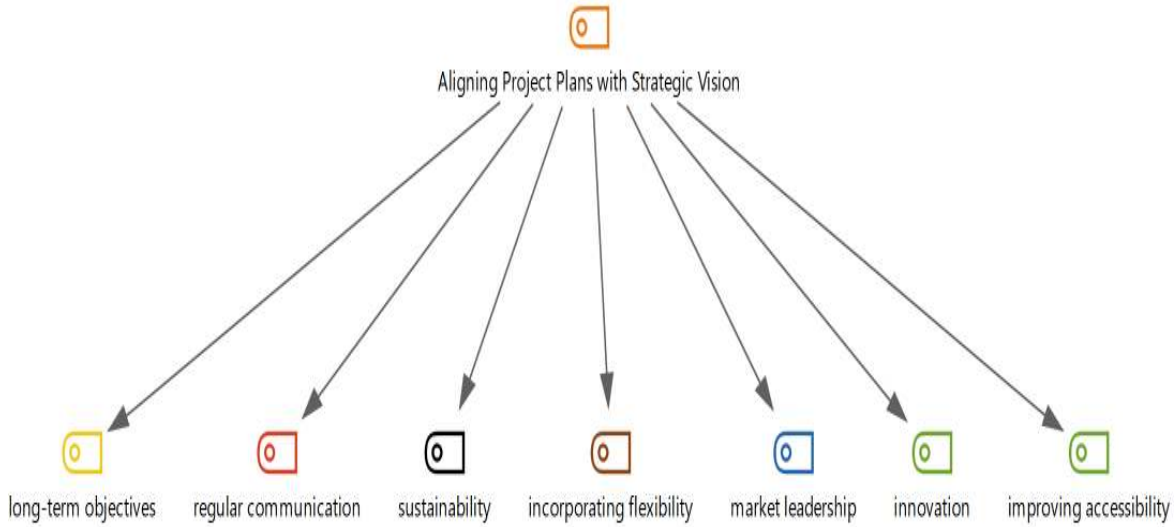

Figure 4. Hierarchical code-subcode model for the Theme of Aligning Project Plans with Strategic Vision

Participant 3 gave the best example answer in this regard and it is as follows.

Participant 3: "We align project plans with our company's strategic vision by ensuring each event supports our overarching goals of quality, innovation, and

customer satisfaction. Regular reviews with key stakeholders ensure that every event contributes to these long-term objectives."

1.1.5. Findings Regarding the Theme of Effective Communication and Relationship Building

In the fifth interview question the participants were asked how can effective communication and relationship building plays a role in establishing trust and credibility with team members, stakeholders, and customers. Table 7 and Figure 5 contain the codes obtained within the scope of the research regarding the theme of effective communication and relationship building.

Table 7. Codes for the Theme of Effective Communication and Relationship Building

	N	%
Transparency	7	20,00
Clear expectations	5	14,29
Regular update meetings/strong communication	5	14,29
Garnering support	5	14,29
Managing stakeholder expectations	5	14,29
Minimizing resistance	4	11,43
Mutual feedback	4	11,43
TOTAL	35	100,00

Codes related to the theme of effective communication and relationship building are transparency, clear expectations, regular update meetings/strong communication, garnering support, managing stakeholder expectations, minimizing resistance, and mutual feedback. In Table 7 participants identified key stakeholder management factors. According to 7 respondents, transparency was the most frequently mentioned issue which accounted for 20.00% of all responses. Five individuals mentioned clear expectations, regular update meetings, strong communication, garnering support, and managing stakeholder expectations, each representing 14.29% of the responses. Minimizing resistance and mutual feedback were noted by four participants equally constituting 11.43% of all responses. Since transparency is deemed the most important reason, then it means that the stakeholders value openness and honesty.

The implication is that in their considerations, the stakeholders emphasized on simple and visible communication that would help in building trust and promoting good relations with other parties involved in a project. This is because it helps in bringing stakeholders on board regarding project objectives and contributes towards achieving any other results without making any assumptions, corruption, or even distortion of information. It is also very important to set and make clear anticipations with all stakeholders so that conflicts can be avoided and project execution goes on smoothly. Having a clear way to anticipate actions decreases the likelihood of conflict and improves projects efficiency. It is necessary to have regular update meetings and maintain constant and effective communication through which the relevance of maintaining nonstop and efficient dialogue with shareholders is communicated. This is done in order to keep them aware of the progress of the ventures and to deal with their worries before they become uncontrollable; besides, it makes them always be part of the project until the end of the project.

Garnering support as well as managing stakeholder expectations are equally critical, as they show that the participants have acknowledged the necessity of actively involving shareholders and making their expectations coincide with the reality of the project. While Garnering support entails winning the approval and support of stakeholders that are likely to be very essential for a successful project, managing expectations will in turn harmonize stakeholders' perceptions with project realities by reducing dissatisfaction. Another important aspect is to minimize resistance. This indicates that there is some worth for participants when they face that head-on by taking measures before to overcome any opposition coming from stakeholders. It requires understanding the worries of stakeholders as well as addressing the same to ensure the continuity of projects without stoppages. Mutual feedback, although mentioned less frequently, remains significant. Hence the relevance of establishing two-way communication channels through which feedback and input from stakeholders could be received by the project team who in turn respond positively to them. As a result, more effective collaboration in addition to improved project results may be realized through such reciprocal communication.

A study conducted by Eller et. al. (2014) revealed 8 themes that describe the key components of an effective mentoring relationship. One of the components are similar to our study like open communication and accessibility, but the other is different like goals and challenges, passion and inspiration, caring personal relationship, mutual respect and trust,

exchange of knowledge, independence and collaboration; and role modeling. In the field of project management in various industries it would be beneficial to establish the best practices through which their success could be enhanced by way of numerous communication strategies. For example, by increasing the number of samples and adding interviews and case studies to them, one could better understand how communication elements are implemented and prioritized by different organizations.

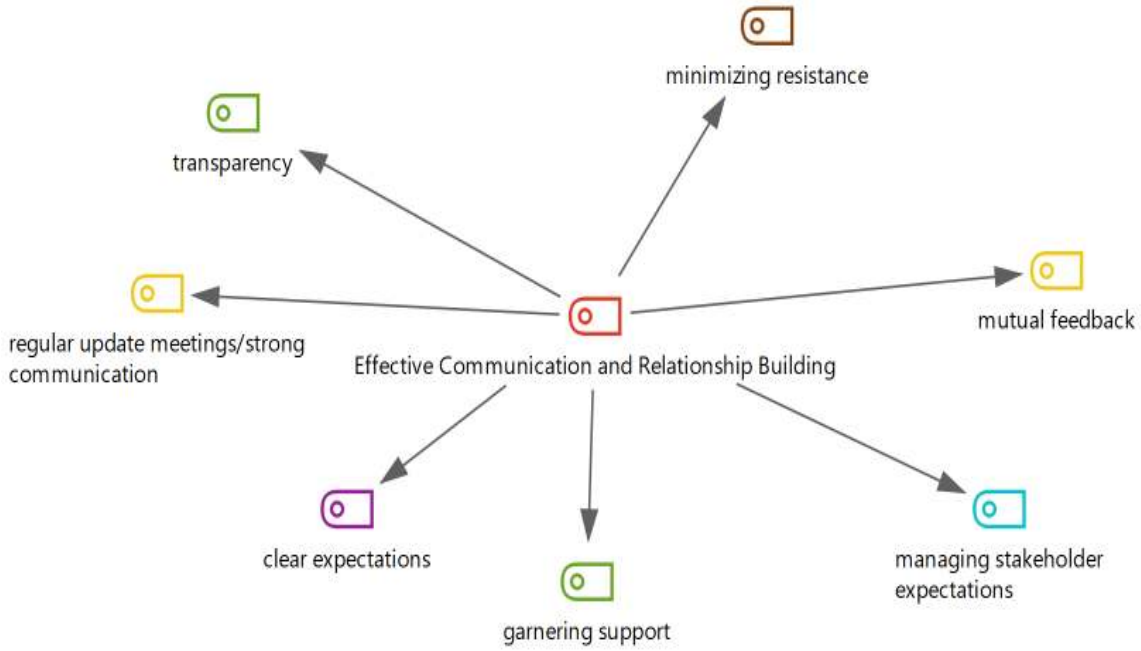

Figure 5. Hierarchical code-subcode model for the Theme of Effective Communication and Relationship Building

Participant 9 gave the best example answer in this regard and it is as follows.

Participant 9: "A key example of effective communication was during our initiative to integrate technology in classrooms. By engaging teachers, parents, and students through workshops, surveys, and meetings, we built a strong consensus on the approach, establishing trust and ensuring the initiative's success."

1.1.6. Findings Regarding the Theme of Lean Principles in SMEs' Future Viability and Expansion

In the sixth interview question the participants were asked how they foresee the integration of lean principles contributing to the future viability and expansion of SMEs. Table 8 and Figure 6 contain the codes obtained within the scope of the research regarding the theme of lean principles in SMEs' future viability and expansion.

Table 8. Codes for the Theme of Lean Principles in SMEs' Future Viability and Expansion

	N	%
Sustainable growth	9	20,00
Customer satisfaction	6	13,33
Efficiency	6	13,33
Improving processes	5	11,11
Eliminating waste	5	11,11
Adaptability	4	8,89
Higher productivity	4	8,89
Establishing alternative suppliers	3	6,67
Reducing costs	3	6,67
TOTAL	45	100,00

Codes related to the theme of lean principles in SMEs' future viability and expansion are sustainable growth, customer satisfaction, efficiency, improving processes, eliminating waste, adaptability, higher productivity, establishing alternative suppliers, and reducing costs. Table 8 shows how important certain things are in terms of making a group successful. The thing that got mentioned the most is sustainable growth, with 9 people saying so, which is equal to 20.00% of all answers given. After this, there are even more people who talk about customer satisfaction or effectiveness (13.33%), where both are rated the same by six respondents. Five people noticed the importance of process improvement as well as the need for wastage reduction representing 11.11% on each. Adaptation level and the ability to be more productive were also said to be the main causes of poor performance in a number of companies by four participants (8.89% each).

However, there is an opinion that introducing new suppliers together with cost controls could help improve quality and eventually increase market share, albeit minimally as three respondents believed these factors to be less significant compared to others. The top importance of sustainable growth factors shows that participants value development and stability for eternity more than short-term benefits. Such an assumption means that for a business to have a better tomorrow then it has to keep moving ahead through sustainable means. Sustainable growth means method of doing things that will not just keep up with the current performance but also guarantee that they will still be in operation years to come. At the same level of importance are customer satisfaction and efficiency, hence they illustrate critical aspects of the success of an organization. Making sure that customer expectations are met or surpassed is the

main concern for customer satisfaction, and this can result in repeat business as well as customer loyalty achieved by good word of mouth.

On the other hand, efficiency deals with saving resources and time by maximizing the output or result at least for a given situation thereby enhancing general performance levels for an organization as a whole. There is a close relationship between improving processes and eliminating waste; these two factors underscore the significance of continuous advancement in management techniques for lean production systems. Improving processes would necessitate regular analysis of workflow patterns aimed at improving effectiveness as well as efficiency levels while eliminating any unused resources at once." Another critical factor is adaptability which emphasizes the significance of being alert to and ready for changes in market conditions, customer demands, etc. This in turn means that companies that are more adaptable to change have a better chance of surviving in turbulent environments. According to 4 participants, increased productivity relates to maximizing employee and other resource's output and performance. Achieving business objectives efficiently and effectively depends on this. As postulated by four participants, higher productivity involves increasing workforce and other resource output and performance. This is important in ensuring that business processes are conducted efficiently and effectively. The significance of supply chain management and cost control has been underlined by three of our participants, all citing the establishment of alternative suppliers as well as lowering costs to this effect.

King and Lenox (2001) provided robust evidence that the measures of lean production, like the adoption of ISO 9000 and reduced chemical inventories, complement both waste reduction and pollution reduction. This shows that Lean Principles not only assign value to reducing waste or improving environmental performance but are also efficient in doing so. Also, Dora et al. (2013) emphasized that, through empirical studies on lean manufacturing, it impacted operational variables quite positively with regards to productivity, quality of delivery, and customer and employee satisfaction, hence further reinforcing the application of Lean Principles in the enhancement of SME performance.

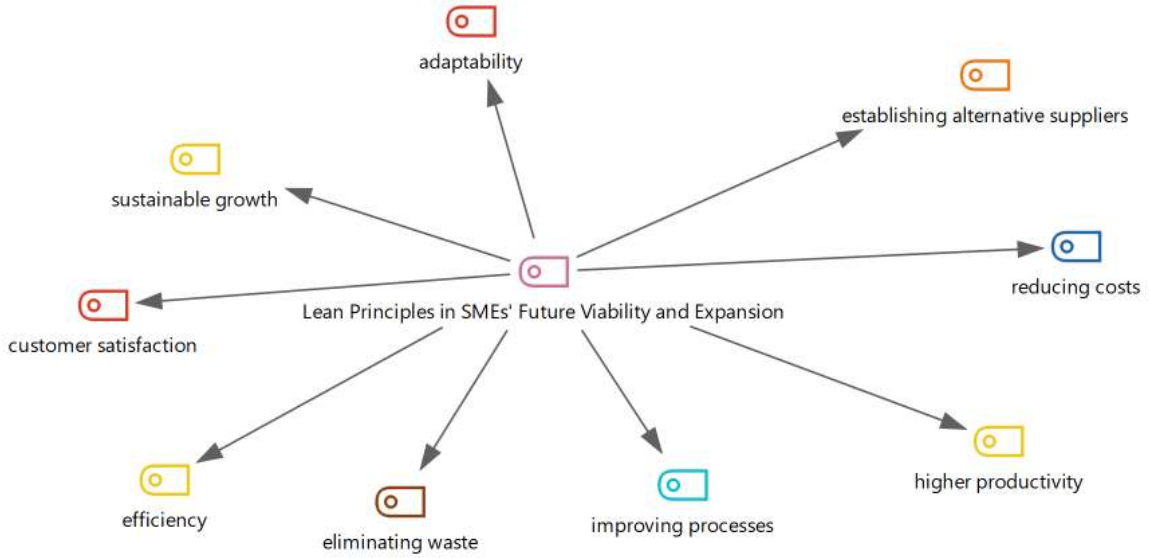

Figure 6. Hierarchical code-subcode model for the Theme of Lean Principles in SMEs' Future Viability and Expansion

Participant 6 gave the best example answer in this regard and it is as follows.

Participant 6: "The integration of lean principles is essential for SMEs to enhance efficiency, reduce costs, and improve customer satisfaction. These practices will be crucial for adapting to market changes, fostering innovation, and ensuring sustainable growth in the competitive fashion industry."

1.1.7. Findings Regarding the Theme of Effective Risk Management Guided by Lean Principles

In the seventh interview question the participants were asked to describe a situation where effective risk management, guided by lean principles, played a significant role in the success of a project they managed. Table 9 and Figure 7 contain the codes obtained within the scope of the research regarding the theme of effective risk management guided by lean principles.

Table 9. Codes for the Theme of Effective Risk Management Guided by Lean Principles

	N	%
Identifying potential bottlenecks	8	21,62
Ensuring the project's success	7	18,92
Focusing on critical path activities	5	13,51
Minimizing impacts	5	13,51
Ensuring on-time completion	4	10,81
Optimizing resource allocation	4	10,81

Positive customer feedback	4	10,81
TOTAL	37	100,00

Codes related to the theme of effective risk management guided by lean principles are identifying potential bottlenecks, ensuring the project's success, focusing on critical path activities, minimizing impacts, ensuring on-time completion, optimizing resource allocation, and positive customer feedback.

The table shows all the key factors that they consider most important to apply successfully when managing a project. The highest number of participants cite identifying potential bottlenecks (21.62 percent). The information is followed closely by one about guaranteeing its success that had been given 7 times equaling 18.92% of all answers. There were 5 responses mentioning each of focusing on critical path activities and minimizing impacts, constituting 13.51% each. Each of ensuring on-time completion, optimizing resource allocation, and positive customer feedback had 4 mentions thus forming 10.81% each.

It suggests that in order to avoid holdups in the project process and keep the project going, it is important to have the ability to anticipate these holdups beforehand so they can be dealt with. It is also essential for ensuring the success of projects since they have set general objectives that they aspire to achieve besides delivering value to interested parties. Hence, by this token, it underscores why it is necessary to coordinate efforts in the pursuit of such ends and ascertain whether a given projects makes any sense after all. 5 participants have mentioned focusing on critical path activities and minimizing impacts which emphasize the importance of prioritizing crucial tasks for timely completion of a project and minimizing any negative impacts that may occur during the project lifecycle. It is essential to focus on critical path activities so that core tasks are completed on time. At the same time, minimizing impacts means dealing with issues that might interfere with the project or cause significant delays. On-time completion, resource allocation optimization, and positive feedback from customers are all ways in which project management can be considered, each of which is discussed by four participants. The significance of following project plans and delivering the project within the stipulated time frame is emphasized by ensuring on-time completion. Helping to optimize resource allocation is the emphasis put on ensuring that resources are used effectively hence increasing productivity and efficiency of the process as well as ensuring that the project functions in a cost-effective manner. Positive client feedback ones in on the necessity of

ensuring that key stakeholders are satisfied and ensure that the project meets customer expectations.

According to a study Cubucku et. al. (2017), applying lean principles can help startups manage risks better. The study shows that startups are much more likely to succeed when they use lean methods. This is because lean startups focus on what customers want instead of just the product itself. They save time and money by getting feedback from customers at every key stage of product development. By the time the product is launched, it effectively solves customers' problems. As a result, these startups can sell their products and become successful. The study explains different lean strategies with examples. For Dropbox, it highlights the importance of a Minimum Viable Product (MVP). In the case of Zappos, it talks about the Build-Measure-Learn method. Lastly, for Groupon, it describes the importance of pivoting. Thanks to these strategies, all three companies significantly reduced their risks and became the successful businesses we know today.

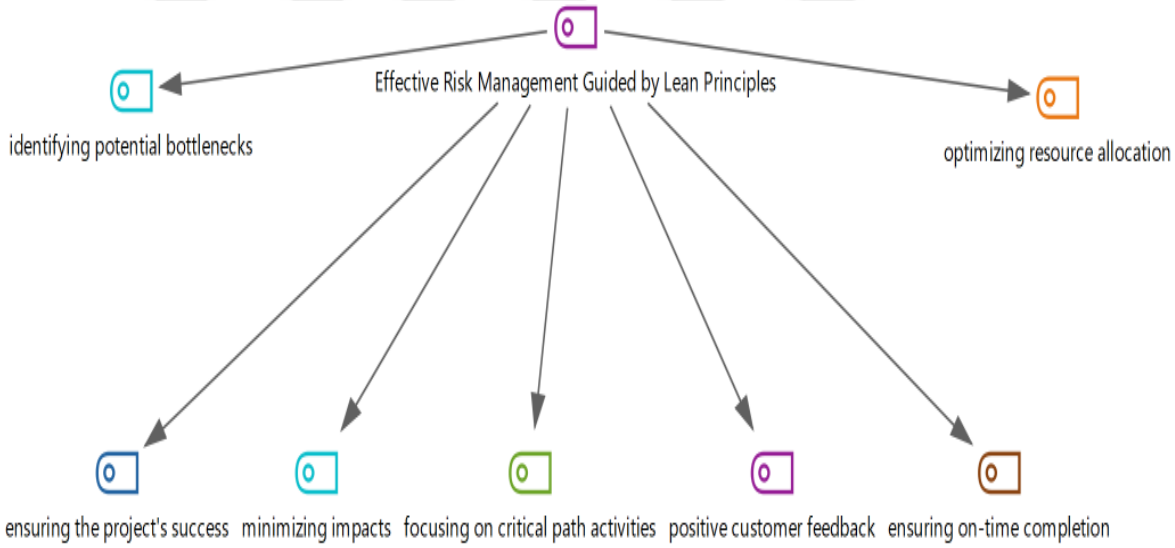

Figure 7. Hierarchical code-subcode model for the Theme of Effective Risk Management Guided by Lean Principles

Participant 8 gave the best example answer in this regard and it is as follows.

Participant 8: "In a manufacturing project, effective risk management guided by lean principles played a significant role in its success. The team identified potential risks such as supply chain disruptions, machine breakdowns, and quality control issues using lean tools like value stream mapping and continuous improvement practices. By proactively addressing these risks through measures such as establishing backup suppliers, implementing preventive maintenance schedules,

and refining quality control processes, the project was able to mitigate potential setbacks. This proactive risk management approach helped maintain project timelines, reduce costly downtime, and ensure consistent product quality, ultimately contributing to the project's success."

1.1.8. Findings Regarding the Theme of Addressing Key Challenges with Lean Project Management

In the eighth interview question, the participants were asked to identify key challenges in their industry today and how they see lean project management addressing or mitigating these challenges. Table 10 and Figure 8 contain the codes obtained within the scope of the research regarding the theme of addressing key challenges with lean project management.

Table 10. Codes for the Theme of Addressing Key Challenges with Lean Project Management

	N	%
More readily adapt	9	18,00
Sustainability concerns	6	12,00
Flexibility	6	12,00
Continuous improvement	5	10,00
Focusing customers strongly	5	10,00
Budget	4	8,00
Cost overruns	4	8,00
Project delays	3	6,00
Employee empowerment	2	4,00
Culture of problem-solving	2	4,00
Fluctuating demand	2	4,00
Minimizing environmental impact	2	4,00
TOTAL	50	100,00

Codes related to the theme of addressing key challenges with lean project management are more readily adapt, sustainability concerns, flexibility, continuous improvement, focusing on customers strongly, budget, cost overruns, project delays, employee empowerment, culture of problem-solving, fluctuating demand, minimizing environmental impact.

What is seen is the fact that adaptability is a priority as 18% of participants who responded pointed out how crucial it is to remain adaptable and responsive to alterations in event circumstances. It now conforms closely to lean principles that give more importance to

efficiency and waste reduction through iterative adjustments and also focuses on sustainability and flexibility as it gives 12% of its concern to both showing an environmentally responsible and operationally agile commitment. Lean project management's focus on providing value through continuous improvement and knowledge of customer needs is highlighted by both continuous improvement and customer-centricity at 10% each. Moreover, issues such as budgeting, overspending, and lateness in projects are the most significant elements in running a project on time and under budget. Finally, less frequent words associated with employee empowerment; a problem-solving culture; a demand/supply mismatch; or concern with environmental issues represent alternative facets of lean project management which places emphasis on team motivation as well as creativity. Altogether, the table gives a complete outline of the many-sided obstacles that lean project management faces focusing on comprehensive methods for advancing processes, economical resource management, and conformity with substantial global organization objectives.

Asif et al. (2010) conducted an in-depth study on the application of lean principles in a knowledge-intensive service firm, shedding light on several challenges and types of waste that come with these services. Their case study focuses on the difficulties encountered when implementing lean principles in such environments. Key challenges identified include managing knowledge, coordinating activities, standardizing customized services, ensuring continuous improvement, and managing external parties. These challenges can be effectively tackled through a strategic approach to waste reduction. Instead of striving for complete waste elimination, organizations should aim to optimize waste reduction. This nuanced approach helps manage the complexities of different knowledge types and the intangible nature of services, allowing for an acceptable level of waste. As a result, processes are streamlined, costs are reduced, and overall efficiency is improved, giving organizations a competitive edge.

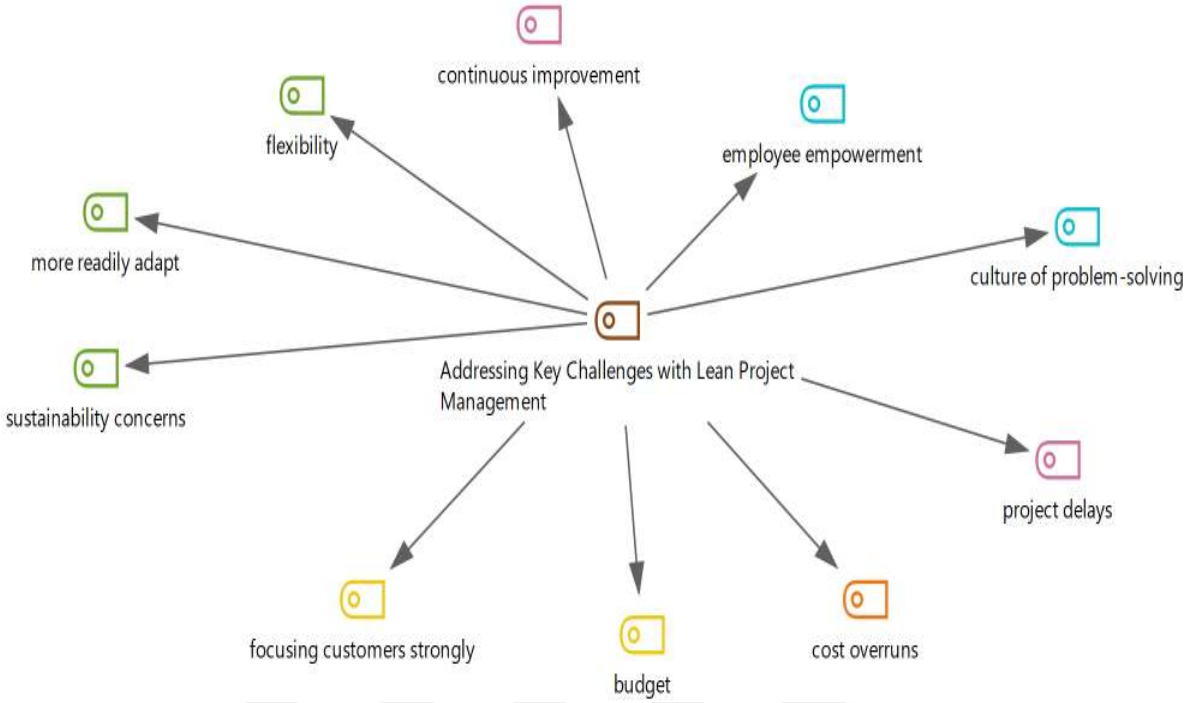

Figure 8. Hierarchical code-subcode model for the Theme of Addressing Key Challenges with Lean Project Management

Participant 5 gave the best example answer in this regard and it is as follows.

Participant 5: "Key challenges in the hospitality industry, such as fluctuating demand, high operational costs, and customer service quality, can be effectively addressed through lean project management. By focusing on process improvement and waste reduction, hotels can become more agile, reduce costs, and improve service quality, enhancing their competitive edge."

1.1.9. Findings Regarding the Theme of Lean Project Management Evolution in the SME Sector

In the ninth interview question the participants were asked to how they envision the evolution of lean project management practices in the SME sector with the consideration of future trends. Table 11 and Figure 9 contain the codes obtained within the scope of the research regarding the theme of the evolution of lean project management in the SMEs.

Table 11. Codes for the Theme of Evolution of Lean Project Management in the SMEs

	N	%
Continuous adaptability	8	19,51
Data Analytics	6	14,63
Continuous improvement	6	14,63
Remote Collaboration	5	12,20
Quickly respond	5	12,20
Decision-making processes	4	9,76
Process automation	4	9,76
Optimizing resource allocation	3	7,32
TOTAL	41	100,00

Codes related to the theme of the evolution of lean project management in the SMEs are continuous adaptability, data analytics, continuous improvement, remote collaboration, quick response, decision-making processes, process automation, and optimizing resource allocation.

Critical themes from research into the evolution of lean project management in SMEs include continuous adaptability, 19.51%, elaborating directed adaptation of SMEs under the conditions of change; data analytics, 14.63%, which highlights the role of this tool in informed decisions; and continuous improvement, also 14.63%, signifying the main task of implementing lean in processes of permanent improvements. Other key aspects are remote collaboration and fast reactivity to changes, each of 12.20%. Then there are effective decision-making processes and the automation of processes, each with 9.76%, enabling the Execution according to lean management principles and bringing additional efficiency. At the very end, resource allocation optimization, at 7.32%, ensures productivity maximization while minimizing waste. All these themes together depict aspects influencing the development of lean project management in SMEs. If organizations today are to flourish and compete effectively in the ever-changing market, these factors are essential; they allow firms to keep pace with change and make quick responses.

A study carried out by Majava and Ojanperä (2017) explores a lean development project within a manufacturing SME based in Finland. The study included a current state analysis and development proposals aimed at addressing key challenges such as high levels of work-in-progress (WIP) production, an extensive product portfolio, and an inefficient production layout. These issues were tackled using development proposals grounded in lean manufacturing principles. The project followed a framework derived from existing literature, which proved

effective for the case company. The findings suggest that SMEs can significantly benefit from such frameworks when developing lean-based initiatives. This study's results offer valuable insights for managers in SMEs, helping them to properly plan and execute lean-based production development projects.

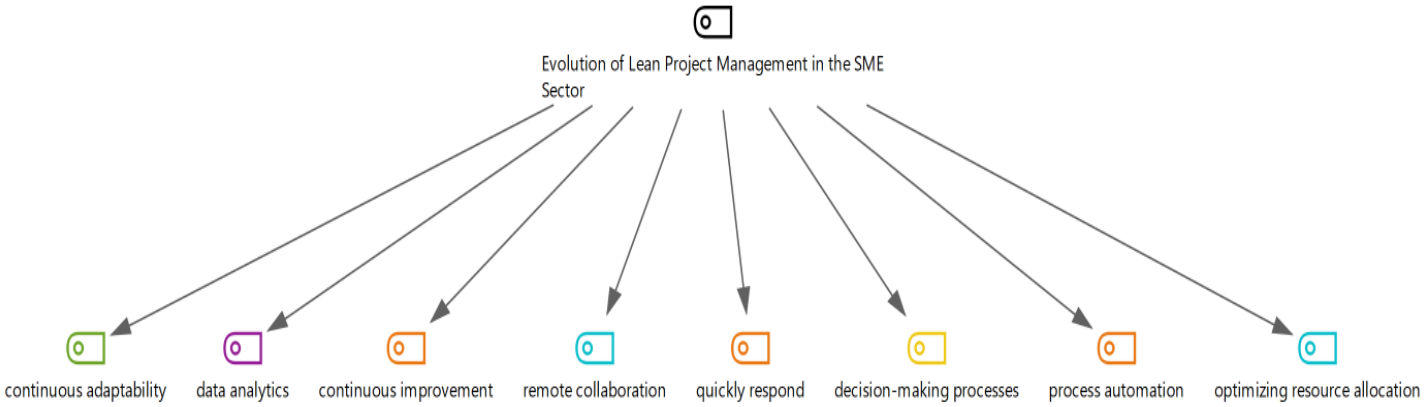

Figure 9. Hierarchical code-subcode model for the Theme of Evolution of Lean Project Management in the SME Sector

Participant 7 gave the best example answer in this regard and it is as follows.

Participant 7: "Future lean practices may incorporate advanced technologies for real-time monitoring and data analytics. This evolution will further enhance decision-making processes, enabling SMEs to respond more swiftly to changes, optimize resource allocation, and maintain a competitive edge."

1.1.10. Findings Regarding the Theme of Project Governance and Oversight with Lean Principles

In the tenth interview question the participants were asked to how lean principles are integrated into their project governance structures effectively. Table 12 and Figure 10 contain the codes obtained within the scope of the research regarding the theme of project governance and oversight with lean principles.

Table 12. Codes for the Theme of Project Governance and Oversight with Lean Principles

	N	%
Transparency	8	20,00
Continuous improvement	7	17,50
Efficiency of processes	5	12,50
Delivering value	5	12,50

Aligning with the company's strategic objectives	4	10,00
Accountability	4	10,00
Stakeholder engagement	4	10,00
Refining governance structures	3	7,50
TOTAL	40	100,00

Codes related to the theme of project governance and oversight with lean principles are transparency, continuous improvement, efficiency of processes, delivering value, aligning with the company's strategic objectives, accountability, stakeholder engagement, and refining governance structures.

Transparency takes the lead, at 20%, as the largest driver of trust and clarity of communication within the project management environment. Closely following is the need for continuous improvement at 17.5%, meaning that there is a need to strive towards better processes and outcomes. Efficiency of process and deliver value to stakeholders are both at 12.5%, building a platform for effective operations that achieve something meaningful. Tier 1: Projects would be aligned with strategic objectives and criteria ensuring accountability in respect of work outcomes; the 10% is important in keeping the works in line with broader business objectives, while the outcome should be responsible. Stakeholder engagement also stands at 10%, putting forth engagement with relevant parties at different phases of a project. Refining governance structures takes 7.5% and underlines an effective framework guiding decision-making and project execution. These findings point out the foundational issues that would be necessary for project governance and oversight within SMEs in the practice of lean.

Pinheiro and Misaghi (2014) explores the integration of corporate governance with enterprise information technology (IT) governance, focusing on strategic alignment across all business units and organizational levels. It highlights the importance of aligning IT strategies with corporate goals, where IT policies guide IT activities and influence other business units. At the same time, IT operations are shaped by broader governance measures like finance and human resources. The study categorizes practices into general good practices for the whole organization and specific practices for IT governance. Despite mature IT standards, many projects still face high costs and low returns. The proposed lean governance framework emphasizes prioritizing people, considering behavioral aspects, and applying lean principles to all processes. The framework offers several benefits:

- Clear identification of IT Governance stakeholders and their needs.

- A robust framework integrated with corporate governance to deliver value.
- Improved IT Governance processes using good practices and lean strategies to reduce waste.
- Continuous improvement of IT Governance processes.

This study provides a comprehensive approach to integrating lean principles with IT governance, enhancing efficiency and stakeholder satisfaction.

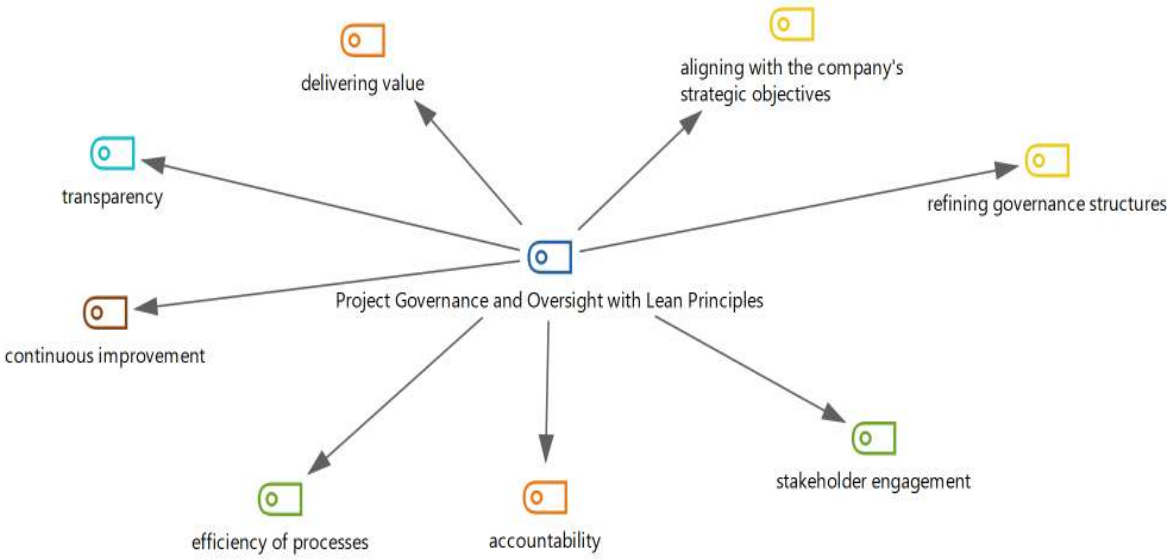

Figure 10. Hierarchical code-subcode model for the Theme of Project Governance and Oversight with Lean Principles

Participant 1 gave the best example answer in this regard and it is as follows.

Participant 1: "My experience with project governance involves establishing clear roles, responsibilities, and processes that reflect lean principles. This includes setting up a governance structure that promotes transparency, continuous improvement, and stakeholder engagement. By integrating lean principles into governance structures, we ensure that projects are executed efficiently, with a focus on delivering value and aligning with the company's strategic objectives."

1.1.11. Findings Regarding the Theme of Navigating and Resolving Conflicts with Lean Principles

In the eleventh interview question the participants were asked to provide an example of successfully navigating and resolving conflicts within a project team, while aligning with lean principles. Table 12 and Figure 11 contain the codes obtained within the scope of the research regarding the theme of navigating and resolving conflicts with lean principles.

Table 13. Codes for the Theme of Navigating and Resolving Conflicts with Lean Principles

	N	%
Optimizing resource	9	22,50
Enhancing project alignment	7	17,50
Enhancing team cohesion	6	15,00
Resolving the conflict	5	12,50
Misaligned priorities	5	12,50
Value stream	3	7,50
Mapping out the value	3	7,50
Area of misalignment	2	5,00
TOTAL	40	100,00

Codes related to the theme of navigating and resolving conflicts with lean principles are optimizing resources, enhancing project alignment, enhancing team cohesion, resolving the conflict, misaligned priorities, value stream, mapping out the value, and area of misalignment.

Of these, 22.5% relate to optimizing resources; this indicates that proper allocation of resources is very important. The second most-mentioned aspect is the need for better project alignment—that is, projects need to be aligned with the business goals of the company. The third is enhancing team cohesion; this shows the importance of establishing a strong team dynamic for successful results on projects. Resolving conflicts and addressing misaligned priorities together take 12.5%, underlining the requirement for focus and harmony within the team. Value stream and Mapping of the value are each at 7.5%. This will go a great way in ironing out processes and bringing forward areas of vital improvement. The identification of areas of misalignment takes 5% and will be very key to ensure that everything about the project is well-coordinated and aligned to the business objectives.

Table 13 highlights different important things that can make projects work well and lead to good performance by companies, such as optimizing resources or enhancing team

cohesiveness. It is only by concentrating on such issues as this that organizations will be able to enhance team cohesiveness, curb conflicts before they escalate, and address those discrepancies in priorities among various stakeholders, among other benefits that this paper will highlight below on further analysis from different sub-sections within it. Concisely speaking, when put into practice, they will bring about an improvement in project results where workers can more easily achieve their objectives because they will be able to have a higher degree of coordination in terms of their work processes. Concentration on these issues will also result in improved team performance while at the same time offering higher chances of matching individual actions' results with strategies for getting to established objectives in a more direct way.

Appell (2011) conducted two comparative case studies analyzing "rational planning" and "disciplined problem-solving" approaches to identify their advantages, disadvantages, and the organizational characteristics that support successful deployment. The first study reveals that for non-routine processes like product development, the disciplined problem-solving approach is more effective, whereas the rational planning approach suits highly routine tasks. The second study provides an in-depth examination of how tools like value stream mapping and *obey* when properly utilized, can enhance coordination, integration, and engagement in cross-functional development teams. These tools facilitate the adoption of lean as a socio-technical system, promoting a culture of problem-solving and people development through effective product development.

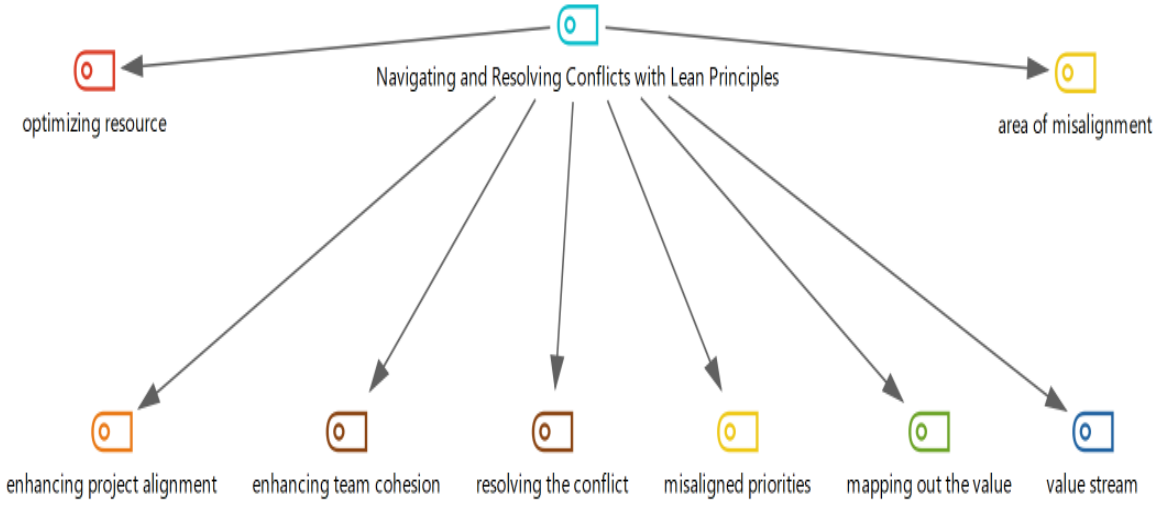

Figure 11. Hierarchical code-subcode model for the Theme of Navigating and Resolving Conflicts with Lean Principles

Participant 11 gave the best example answer in this regard and it is as follows.

Participant 11: "A conflict arose within a team over resource allocation for competing projects. Using lean principles, we conducted a prioritization exercise based on value delivery and impact. This objective approach helped resolve the conflict by aligning team efforts with our strategic goals."

1.1.12. Findings Regarding the Theme of Customizing Lean Project Management for SMEs

In the twelfth interview question the participants were asked to how can SMEs customize and tailor lean project management strategies to address their specific needs and challenges. Table 14 and Figure 12 contain the codes obtained within the scope of the research regarding the theme of customizing lean project management for SMEs.

Table 14. Codes for the Theme of Customizing Lean Project Management for SMEs

	N	%
Flexible planning	9	20,45
Simplifying processes	7	15,91
Execution methods	5	11,36
Market agility	5	11,36
Delivering customer value	5	11,36
Resource constraints	4	9,09
Remaining agile	3	6,82
Improving customer feedback loops	3	6,82
Scalability	3	6,82
TOTAL	44	100,00

Codes related to the theme of customizing lean project management for SMEs are flexible planning, simplifying processes, execution methods, market agility, delivering customer value, resource constraints, remaining agile, improving customer feedback loops, and scalability. Organizations can increase their agility, resilience, and competitiveness in today's dynamic business world by taking into account these factors and putting in place appropriate strategies.

The most significant of the findings is flexible planning, at 20.45%. This, thus, concerns having adaptable strategies to overcome changes in any given circumstance. The next in line is the simplification of processes at 15.91%. This category is all about how operations can be

unfolded towards better efficiency. The methods of execution and market agility both stand at 11.36%, meaning that agile practices should be in place to be able to quickly react to market dynamics and customer needs. Delivering customer value is also 11.36%, thus showing the importance that is placed on customer expectations. Resource constraints - at 9.09% - underline how hard it is to optimize the few resources available. At 6.82% each, keeping agile, improving customer feedback loops, and scalability form important responses for staying responsive and overthrowing sustainable growth. These findings all together represent some of the key strategies in tailoring these lean project management approaches to help SMEs build resilience and competitive advantage within a dynamic business environment.

A study carried out by Sibiya et. al. (2023) explores the benefits of a hybrid project management model for SMEs in infrastructure development, highlighting faster completion, adaptability to changes, and optimized workflows through continuous stakeholder collaboration. The model's effectiveness across planning, initiation, and execution phases is vital for project success, requiring regular assessments to align with objectives and scope.

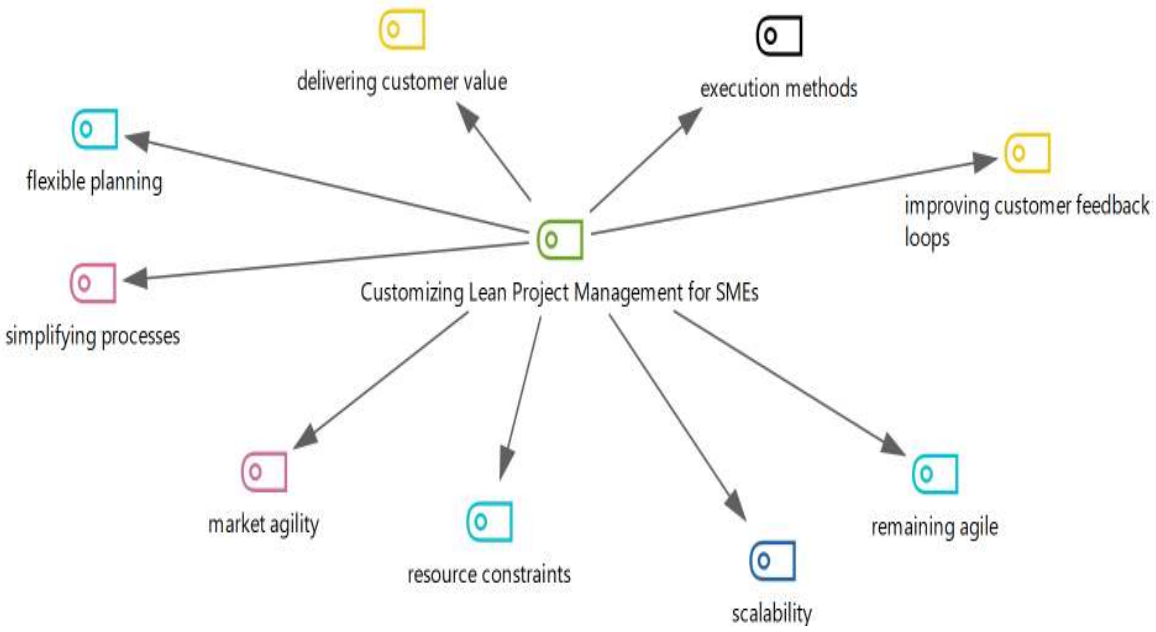

Figure 12. Hierarchical code-subcode model for the Theme of Customizing Lean Project Management for SMEs

Participant 4 gave the best example answer in this regard and it is as follows.

Participant 4: "SMEs can tailor lean project management strategies by focusing on the most critical areas for improvement, such as client wait times or service

quality, and applying lean tools that directly address these areas to enhance overall performance and customer satisfaction."

1.1.13. Findings Regarding the Theme of Differences Between Risk and Issues Lean Management Approach

In the last interview question the participants were asked to elaborate the differences between risk and issues in project management and how does lean principles guide their approaches to manage these aspects in a project. Table 15 and Figure 13 contain the codes obtained within the scope of the research regarding the theme of differences between risk and issues lean management approach.

Table 15. Codes for the Theme of Differences Between Risk and Issues Lean Management Approach

	N	%
Corrective actions	7	18,42
Root cause analysis	6	15,79
Proactively management	6	15,79
Minimizing disruption	5	13,16
Continuous monitoring	4	10,53
Prevent recurrence	4	10,53
Preventing overstocking	3	7,89
Effective issue resolution process	3	7,89
TOTAL	38	100,00

Codes related to the theme of differences between risk and issues lean management approach are corrective actions, root cause analysis, proactively management, minimizing disruption, continuous monitoring, preventing recurrence, preventing overstocking, effective issue resolution process.

Corrective actions, accounting for 18.42% of the findings, rated as essential emphasize proactive measures of the steps to correct issues once they are identified. Root cause analysis and proactive management, each accounting for 15.79%, refer to the identification and mitigation of the underlying causes, prevention of recurrence, and minimization of disruption (13,16%). This results in ensuring continuing monitoring and preventing recurrence of the same, at 10.53% each, exercises continuous oversight and prevention of such issues in times to come. Notable among these are the identification and prevention of overstocking at 7.89%, purely effective processes for the resolution of various issues raised, and disruption reduction.

On the whole, these findings have shown the disciplined approach of lean management in clearly making out a differentiation between risks and issues, hence laying emphasis on prevention, root cause analysis, and proactive management toward their resolution for improved project deliverables and resilience in organizations. Organizations must put in place mechanisms that enable them to detect problems early enough for correction to be made there and then leading to less time lost during operation due to breakdowns like those arising from poor quality services or goods, breakdown machines among others so as they can repair them before they get out hand.

Pearce and Pons (2013) explores the integration of risk management with lean implementation, addressing the gap in existing research. Their work demonstrates that risk management methods can support lean implementation success. They developed a qualitative method to prioritize lean tools for specific organizational settings and applied it to a case study. This case study offers insights for high-variety, low-volume manufacturers and other operation modes like low-variety, high-volume manufacturing, service organizations, and administration. The study emphasizes that the effectiveness of lean tools depends heavily on the organization's situational variables. Each aspect of lean implementation should undergo risk assessment and analysis to determine necessary treatments. Their approach prioritizes lean tools that not only enhance performance but also foster a strong organizational culture.

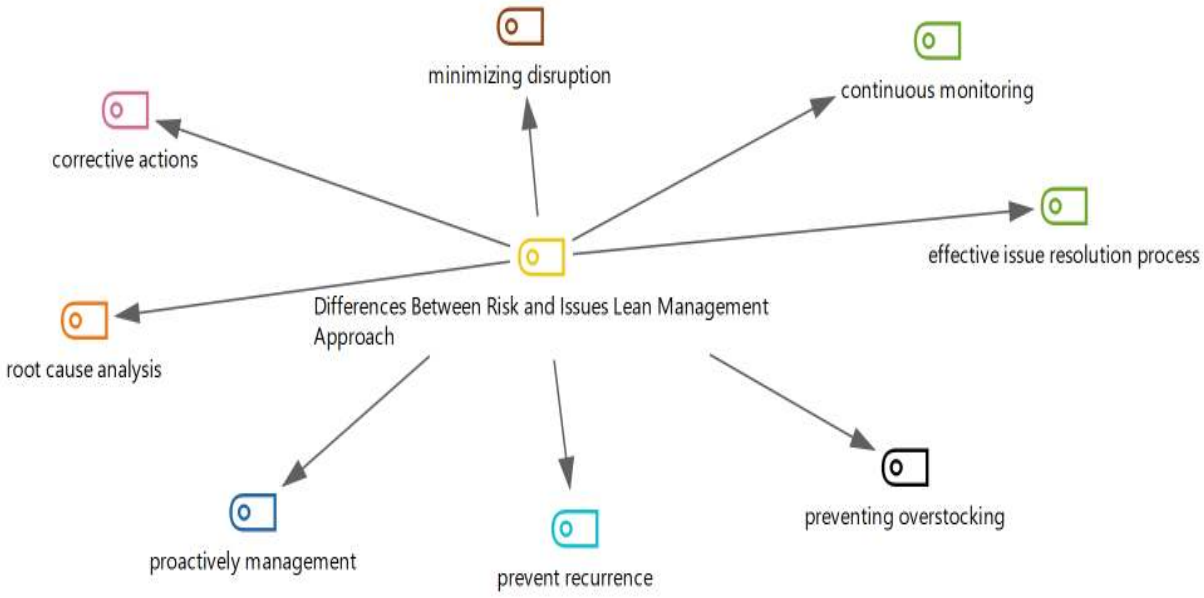

Figure 13. Hierarchical code-subcode model for the Theme of Differences Between Risk and Issues Lean Management Approach

Participant 6 gave the best example answer in this regard and it is as follows.

Participant 6: "Risks are potential problems that could impact a project's future success, while issues are current problems that need immediate attention. Lean principles guide us to proactively identify and mitigate risks through continuous monitoring and to address issues promptly by analyzing their root causes and implementing effective solutions."

1.1.14. Findings Regarding the Theme of Anticipating Risks with Lean Principles

In the last interview question, the participants were asked what major types of risks they anticipate in project management and how they proactively address them for optimal results. Table 16 and Figure 14 contain the codes obtained within the scope of the research regarding the theme of anticipating risks with lean principles.

Table 16. Codes for the Theme of Anticipating Risks with Lean Principles

	N	%
Minimizing waste	8	17,39
Meeting objectives	6	13,04
Customer value	6	13,04
Supply chain disruptions	5	10,87
Maintaining flexibility	5	10,87
Resource constraints	5	10,87
Continuous improvement	4	8,70
Technological changes	4	8,70
Safety concerns	3	6,52
TOTAL	46	100,00

Codes related to the theme of anticipating risks with lean principles are minimizing waste, meeting objectives, customer value, supply chain disruptions, maintaining flexibility, resource constraints, continuous improvement, technological changes, and safety concerns. Through the concentration on these elements as well as putting in place applicable mechanisms, businesses can increase their productivity, strength, and competitiveness in their current business setup.

Reducing waste, at 17.39%, emphasizes the efficiency of resources optimization and, second, meeting chosen objectives and delivering customer value to the customer at 13.04%, which emphasizes goal completion and satisfying the customer's needs in the project. The next

two codes on the list, supply chain disruptions and flexibility, both at 10.87%, deal with the management of unexpected obstacles and making sure that operations are resilient. Resource constraints and continuous improvement, both at 8.70%, are some of the aspects that drive productivity improvement in facing technological changes. The concerns over safety aspects also emerge as important, at 6.52%, pointing out the safe working environment. All these findings demonstrate how it applies lean principles to the effective anticipation and mitigation of risks and allows proactive management, which in turn enhances overall project success and organizational resilience.

Anticipating risks in lean implementation is crucial for ensuring success, as demonstrated by the work of Pearce and Pons (2013). Their study highlights the importance of integrating risk management with lean principles, emphasizing that the efficacy of lean tools is highly dependent on the specific situational variables of an organization. By applying a qualitative method to prioritize lean tools through risk assessment and analysis, they show that it is possible to mitigate potential failures and enhance performance. This approach not only focuses on delivering performance gains but also on building a resilient organizational culture, ensuring that lean tools are effectively tailored to the unique needs and risks of different operational environments.

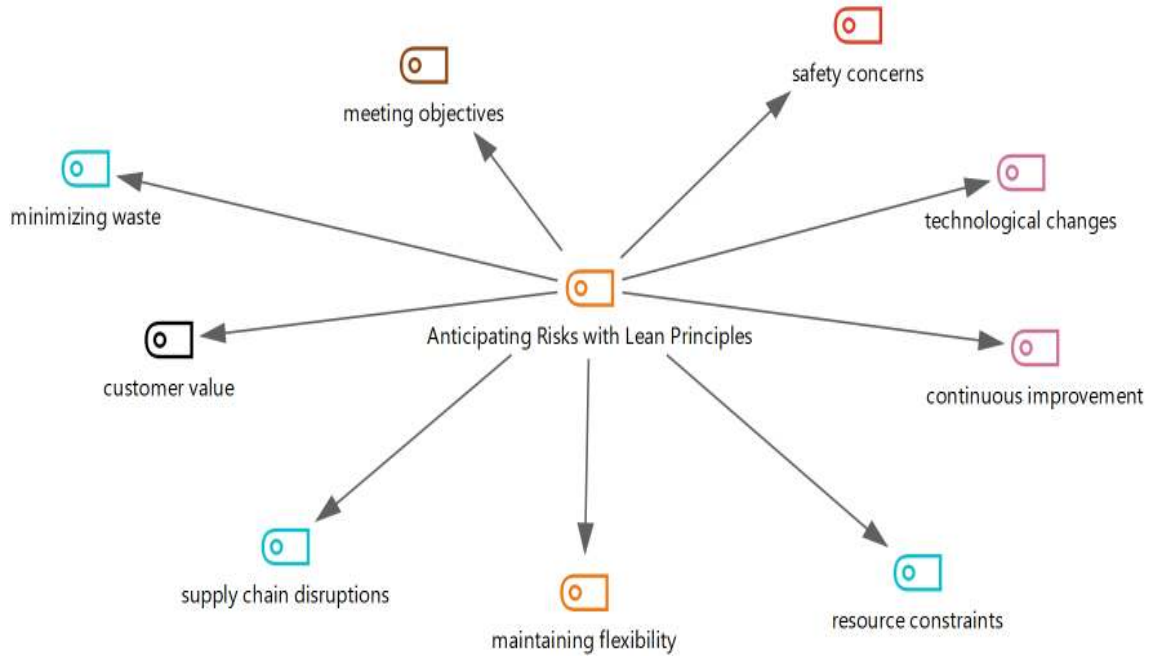

Figure 14. Hierarchical code-subcode model for the Theme of Anticipating Risks with Lean Principles

Participant 2 gave the best example answer in this regard and it is as follows.

Participant 2: "Major risks in project management include supply chain disruptions, technological obsolescence, and regulatory changes. Lean principles help anticipate these risks through continuous environmental scanning and stakeholder engagement. We proactively develop contingency plans and foster a culture of flexibility and innovation, ensuring we can respond effectively to challenges and maintain project momentum."

3.2. Cross-Tables Analysis

Table 17 lists the most frequently given codes according to the (age, and gender) variables taken as demographic variables of the participants within the scope of the study.

Table 17. Results Regarding Cross-Tables

	Female	**Male**
Lean Project Management and Cost Productivity Increase		
allocating more resources	5	2
cost saving	7	4
reduction in development time	5	3
Integrating Cost Considerations into Project Plan, Execution		
cost-benefit ratio	3	4
Overcoming Unexpected Challenges with Lean Principles		
reducing time to market	4	3
more efficient process	4	4
Aligning Project Plans with Strategic Vision		
long-term objectives	5	2
regular communication	4	3
Effective Communication and Relationship Building		
transparency	4	3
Lean Principles in SMEs' Future Viability and Expansion		
sustainable growth	7	2
Effective Risk Management Guided by Lean Principles		
ensuring the project's success	5	2
identifying potential bottlenecks	6	2
Addressing Key Challenges with Lean Project Management		
more readily adapt	6	3
Evolution of Lean Project Management in the SME Sector		
continuous adaptability	5	3

Project Governance and Oversight with Lean Principles		
continuous improvement	5	2
transparency	5	3
Navigating and Resolving Conflicts with Lean Principles		
optimizing resource	5	4
enhancing project alignment	5	2
Customizing Lean Project Management for SMEs		
flexible planning	6	3
simplifying processes	3	4
Differences Between Risk and Issues Lean Management Approach		
corrective actions	4	3
Anticipating Risks with Lean Principles		
minimizing waste	5	3

As seen in the cross table in Table 17, under the theme of lean project management and cost productivity increase, female is more likely to mention allocating more resources, cost saving, reduction in development time than male. Under the theme of integrating cost considerations into project plan, execution male is more likely to mention cost-benefit ratio than female. Under the theme overcoming unexpected challenges with lean principles female are more likely to mention reducing time to market, more efficient process than male. Under the theme aligning project plans with strategic vision female are more likely to mention long-term objectives, regular communication than male. Under the theme effective communication and relationship building female are more likely to mention transparency than male. Under the theme lean principles in SMEs' future viability and expansion female are more likely to mention sustainable growth than male. Under the theme effective risk management guided by lean principles female are more likely to mention ensuring the project's success, identifying potential bottlenecks than male. Under the theme addressing key challenges with lean project management female are more likely to mention more readily adapt than male. Under the theme evolution of lean project management in the SME Sector female are more likely to mention continuous adaptability than male. Under the theme project governance and oversight with Lean Principles female are more likely to mention continuous improvement, transparency than male. Under the theme navigating and resolving conflicts with lean principles female are more likely to mention optimizing resource, enhancing project alignment than male. Under the theme

customizing lean project management for SMEs female are more likely to mention flexible planning, simplifying processes than male. Under the theme differences between risk and issues lean management approach are more likely to mention corrective actions than male. Under the theme anticipating risks with lean principles are more likely to mention minimizing waste than male.

3.3. The Code Matrix Browser Analysis

Figure 15 shows the code matrix browser. As a result of the content analysis of the answers given by the participants, a code matrix browser was obtained.

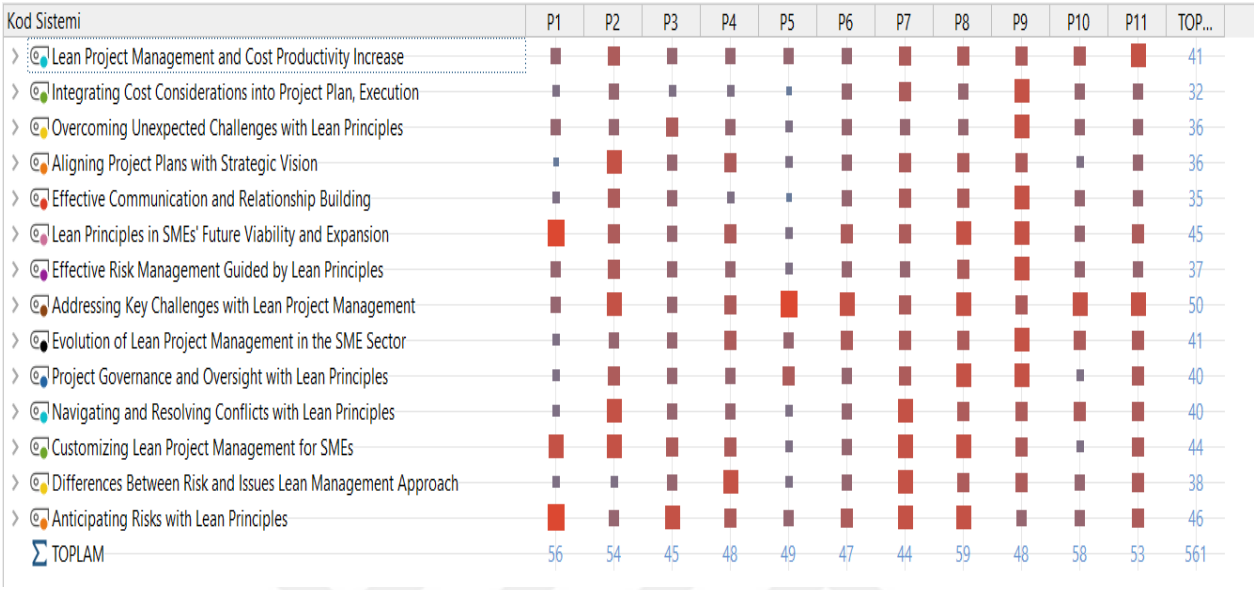

Figure 15. Code Matrix Scanner Related Code Matrix Scanner

According to Figure 15, Participants 8 and 10 contributed the most. This was followed by the other participants.

3.4. Analysis of the Two Cases Model According to Gender

Figure 16 presents two case models according to gender, which is the demographic information received from the participants within the scope of the study.

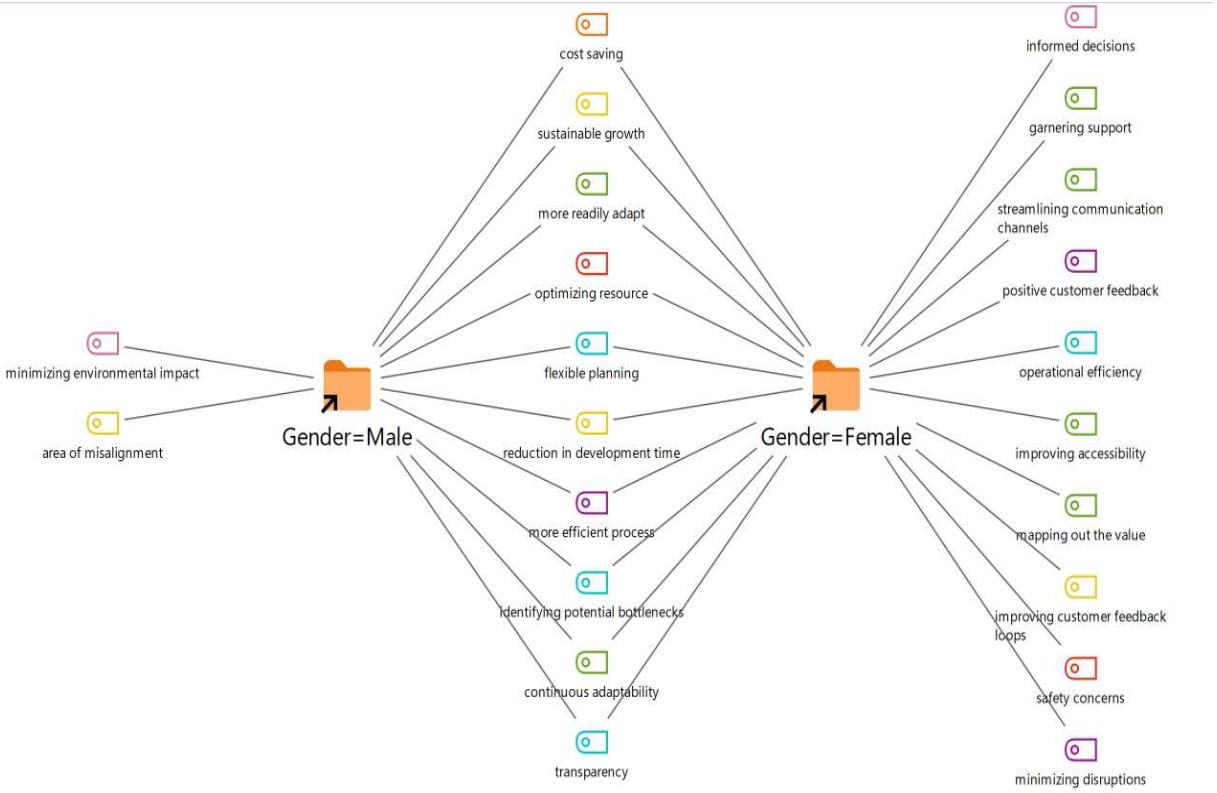

Figure 16. Two Cases Model for the Gender Variable

Results of the Two Cases Model analysis identify another clear view of priorities and views of female and male students on the principles of lean management. The themes of female participants are cost savings, sustainable growth, and optimization of resources, which show attention to effectiveness and viability for the long run. They also underline flexible planning and continuous adaptability, emphasizing their readiness to adjust for changeable conditions and receipt of an optimum project result. Another strong theme that came through was one of transparency—adequate communication and accountability in managing a project.

In contrast, male participants highlighted themes related to informed decision-making, gathering support, and operational efficiency. This could imply a main interest in the strategic processes of decision-making and how these connect with other goals within the organization. They also focused on improving customer feedback and channeling smooth communication for the realization of customer satisfaction and operational effectiveness. Other issues that arose—of no mean significance—were issues pertaining to safety and reduction of disruptions, to infer an interest in the maintenance of a safe and stable work environment.

Such results depict gender-specific dimensions in lean management: women focus on issues of adaptability, transparency, and resource optimization, whereas men are more focused

on decision-making, efficiency, and customer-centered strategies. Understanding these differences might be very instrumental in tailoring the lean approach to more suit diverse needs and priorities within an organization.

3.5. Word Cloud Analysis

The most frequently used code in the research, as illustrated in Figure 17, is "cost saving". In the setting of lean project management in SMEs, a "cost-saving" emphasis means taking a strategic approach toward efficiency and waste reduction in all project life cycles. Cost-saving for SMEs, typically operating within limited resources and under financial constraints, is crucial for business competitiveness and sustainability. These principles allow SMEs to have a high probability of attaining serious cost savings through the identification and elimination of non-value-added activities, process optimization, and reinforcement of a culture of improvement. The result of this approach will be not only an improved bottom line and better financial performance but also the delivery of better project outcomes by focusing resources only on such activities that are continually increasing value for the customer and to the organizational goals. Ultimately, this means that the adoption of economical lean project management approaches will result in an increase in the productivity of SMEs, smoothing of operational workflows, and overall better project success.

Figure 17. Word Cloud

4. CONCLUSION

This study focuses on exploring the application and influence of lean principles of project management in SMEs, based on the data obtained from 11 respondents representing different industries through the implementation of semi-structured interviews. To this end, a number of critical themes have been derived from the analysis of the interview data, summarizing some pros and cons related to the diffusion of lean principles within SME contexts. The findings provided a comprehensive understanding of the multifaceted application of lean principles in SMEs and suggest that lean project management provides a robust framework for SMEs in improving efficiency, flexibility, and sustainability amidst modern business complexities.

First of all, “lean project management and cost productivity increase” emerged as a central theme, highlighting benefits such as cost savings, reduced development time, efficient resource allocation, elimination of unnecessary features, improved team morale, and a focus on value-adding activities. The frequent mentioning of cost-saving measures, development time reduction, and value-adding activities perhaps indicates that lean principles are very highly efficient in pursuing the twin goals of optimizing resource utilization and enhancing financial performance. It much goes in line with the basic tenets of the lean philosophies.

Another significant theme, “integrating cost considerations into project plan and execution”, underscored the importance of a value-driven approach, efficient resource allocation, upfront planning, and informed decision-making to enhance operational efficiency. Bringing into focus the cost-benefit analysis and value-driven approaches underlines the strategic role that financial planning can play in lean project management. The second theme points to upfront planning and informed decision-making as a means of efficiently driving operations.

The theme of “overcoming unexpected challenges with lean principles” emphasized the need for streamlined processes, rapid reassessment capabilities, effective communication channels, and data integration to minimize disruptions and reduce time to market. This flexibility and resilience that lean can impart to SMEs come out very powerfully in responding quickly to the challenges by reassessing and streamlining processes. Efficient data integration

and communication are important in minimizing disruptions and keeping up the momentum of a project.

Moreover, “aligning project plans with strategic vision and effective communication and relationship building” themes illustrated the importance of long-term objectives, regular communication, sustainability, flexibility, innovation, transparency, clear expectations, and strong stakeholder engagement in achieving project success. It is through regular communication, attention to issues, and the development of long-term objectives that lean project management instills in SMEs the need for projects to align with company-wide business goals, whose alignment is paramount if a competitive advantage is to be maintained and cultivated through innovation. Emphasis on transparency, clarity of expectations, and stakeholder involvement indicates that strong communication strategies are to be followed in project management. This will reduce most of the resistance, build support, and enable mutual feedback.

The study also explored the “future viability and expansion of SMEs” through lean principles, emphasizing sustainable growth, customer satisfaction, process improvements, waste elimination, adaptability, and cost reduction. Themes such as sustainable growth, customer satisfaction, and adaptability clearly show that lean principles are fruitful for SMEs who wish to achieve long-term success and scalability. Continuous improvement and the elimination of waste are indispensable for running an SME in order to maintain efficiency and competitiveness.

The theme of “effective risk management guided by lean principles” was identified as crucial for ensuring project success, focusing on critical path activities, minimizing impacts, and optimizing resource allocation. The fact that lean risk management is proactive can be inferred from the identification of possible bottlenecks and the focusing of activities on the critical path. Optimization of resources and on-time completion are important for risk minimization in a project and for attaining positive outcomes.

“Addressing key challenges” theme indicated the importance of more readily adapt, sustainability, flexibility, continuous improvement, focusing customers, budget, cost overruns, project delays, employee empowerment, culture of problem-solving, fluctuating demand, minimizing environmental impact. This emphasizes how SMEs can adapt to fluctuating demands and budget constraints through lean practices, fostering employee empowerment and efficient project management to mitigate delays and overruns.

The theme of “evolution of lean project management in SMEs” revealed the significance of continuous adaptability, data analytics, continuous improvement, remote collaboration, quickly respond, decision-making processes, process automation, optimizing resource allocation. This theme focuses on SMEs' continuous adaptation to technological advancements and market changes, optimizing resource allocation, enhancing scalability, and delivering greater customer value through customized lean practices.

The theme of “project governance and oversight” highlights the importance of transparency, efficiency, and alignment with strategic objectives in lean project management. It emphasizes continuous improvement, stakeholder engagement, and refining governance structures to ensure accountability and value delivery. These findings show that effective lean project management requires clear and transparent processes, aligning projects with strategic business goals, and ensuring accountability. It emphasizes the need for continuous improvement, stakeholder engagement, and refining governance structures to deliver consistent value and maintain organizational efficiency.

“Navigating and resolving conflicts” theme highlights the importance of addressing misaligned priorities and optimizing resource allocation in lean project management. It emphasizes enhancing team cohesion, using value stream mapping to identify and resolve areas of conflict, and promoting effective issue resolution processes to maintain project alignment and efficiency. Based on these results, it could be stated that effective lean project management requires identifying and addressing misaligned priorities and conflicts promptly. It underscores the need for optimizing resource allocation, enhancing team cohesion, and using tools like value stream mapping to resolve conflicts efficiently, ensuring project alignment and smooth progress.

The theme of “customizing lean project management for SMEs” emphasizes the importance of tailoring lean practices to fit the specific needs and constraints of small and medium-sized enterprises. It highlights the need for flexible planning, simplified processes, market agility, and delivering customer value while addressing resource limitations and scalability. Another words, lean management must be adapted to the unique needs and constraints of SMEs. It highlights the importance of flexible planning, simplifying processes, ensuring market agility, and delivering customer value, all while addressing the resource limitations and scalability challenges specific to SMEs.

Lastly, the theme of "differences between risk and issues management" emphasizes that risk management focuses on proactively identifying and mitigating potential problems before they occur, while issues management deals with addressing and resolving problems that have already arisen. It highlights the importance of continuous monitoring, root cause analysis, and implementing corrective actions to prevent recurrence and minimize disruptions. The results demonstrated that effective lean project management involves both proactively managing potential risks and resolving issues that arise. It underscores the importance of continuous monitoring, conducting root cause analysis, and implementing corrective actions to prevent recurrence and minimize disruptions.

Managerial Implications

These findings, from the research, have a number of important implications for managers seeking to implement lean project management within SMEs. The interests of managers should align with cost-reduction practices, save time during development, and foster efficient use of resources by identifying and eliminating activities that are not adding value. In addition, effective communication and stakeholder involvement are important, requiring regular updates, clearly set expectations, and an active engagement process to minimize potential resistance and align project goals with the strategic intent.

Moreover, flexibility and adaptability should be encouraged for continuous improvement, but most importantly, rapid responses to changes in markets or certainly to any unexpected challenges. This integration helps in supporting sustainability, innovation, and market leadership by incorporating lean principles with a long-term strategic vision—that is, ensuring that project plans are aligned to broader business goals for sustainable growth. It has also been observed from the results that employees perform at their best if they are involved in decision-making and problem-solving activities. This can enhance their team morale and job satisfaction.

Proactive risk management, advantage from new technologies, work customization, and lean practice in the specific SME context—building a lean culture with commitment from the top management level—are prominent for resource optimization to deliver successful outcomes of any project. Moreover, putting in place performance measurement systems to trace and measure the ripple effects of such lean practices ensures data-driven decisions toward continuous improvement. The managerial implications that leaders of SMEs have to understand and apply in adopting this framework are: only then can managers of SMEs exploit the complete

potential of lean project management to create efficiency, encourage innovation, and foster sustainable growth within the organization.

Future Directions

The insights from this research remain crucial considering the issues, benefits, and contextual nuances surrounding the use of lean project management at SMEs. The findings come up with a set of different avenues that can be opened or revisited for future investigation and practical application in the realm of lean project management, particularly in SMEs.

In this regard, future research should focus on carrying out longitudinal studies for the establishment of long-term effects of lean project management practices on SMEs. This will help and add great insight into the sustainability and evolution of the lean principle over time. Also, given the diverse industries represented in this study, future research could delve deeper into sector-specific applications of lean principles. This will give meaning to the challenges existing in industries and, accordingly, adapt the principles of lean to maximize their effectiveness in each. In addition, complementing qualitative findings with quantitative data could provide a more comprehensive understanding of the financial and operational benefits of lean project management. Metrics such as ROI, time savings, and productivity improvements could be quantified to strengthen the cases for lean adoption. Lastly, studies could focus on how to implement lean project management within different cultures and geographical regions, thereby establishing the role of cultural factors in the acceptance and success of lean practices. This could lead to the development of culturally adaptive lean strategies.

Limitations

Several limitations should be considered when interpreting the findings. First, it was based on the fact that the study was based on semi-structured interviews with 11 participants, and this might not be a representative sample of all SMEs. This would be more enhanced and better understood if the sample size was enlarged to include other industries and regions. Second, the research paid attention to internal organization perspectives as they did not much delve into external issues including marketing conditions, supplier relationships, or even the regulatory conditions that may have a great effect when implementing and how effective lean project management could be in small-scale enterprises. Moreover, the qualitative nature of the research provides insurance for the findings through subjective experiences and views

expressed by participants. This subjectivity could introduce bias and limit generalizability. Also, the results obtained from this study are considered a snapshot of the current view of lean project management practices within an organization at any one time. Longitudinal studies are needed to understand the long-term impact and sustainability of lean practices in SMEs.

REFERENCES

Abdelkader, H., Love, P. E. D., & Matthews, J. (2015). Lean construction and its adoption within the Australian construction industry. *Engineering, Construction and Architectural Management, 22*(4), 442-460.

Al-Baldawi, Z. (2024). Assessment the level of importance of SME lean activities using an integrated model based on fuzzy logic. *Management and Production Engineering Review.*

Ali, Y., Younus, A., Khan, A., & Pervez, H. (2020). Impact of lean, six sigma and environmental sustainability on the performance of SMEs. *International Journal of Productivity and Performance Management, 70*(8), 2294-2318.

Al-Sinan, M. A., & Bubshait, A. A. (2022). The procurement agenda for the transition to a circular economy. *Sustainability, 14*(18), 11528.

Anderson, D. J. (2010*). Kanban: Successful Evolutionary Change for Your Technology Business.* Blue Hole Press.

Ansah, R. H., Sorooshian, S., & Mustafa, S. B. (2016). Lean construction: An effective approach for project management. *ARPN Journal of Engineering and Applied Sciences, 11*(3), 1607-1612.

Appell, K. M. (2011). *A contingency theory approach to the deployment of lean principles: The case of advanced research and complex product development environments* [Unpublished doctoral dissertation]. University of Michigan.

Aragón-Correa, J., Hurtado-Torres, N., Sharma, S., & Morales, V. (2008). Environmental strategy and performance in small firms: A resource-based perspective. *Journal of Environmental Management, 86*(1), 88-103.

Asif, M., Lowik, S., Wouter, W., & Bruijn, E. (2010). Challenges in lean implementation in knowledge-intensive processes. *In Proceedings of the 15th Cambridge International Manufacturing Symposium,* 1-17.

Baines, D., Charlesworth, S., Turner, D., & O'neill, L. (2014). Lean social care and worker identity: The role of outcomes, supervision and mission. *Critical Social Policy, 34(*4), 433-453.

Ballard, G. (2000). *The last planner system of production control* [Unpublished doctoral dissertation]. University of Birmingham.

Ballard, G., & Howell, G. (1998). Shielding Production: Essential Step in Production Control. *Journal of Construction Engineering and Management, 124*(1), 11-17. http://doi.org/10.1061/(ASCE)0733-9364

Beckmann, M., Garkisch, M., & Zeyen, A. (2023). Together we are strong? A systematic literature review on how SMEs use relation-based collaboration to operate in rural areas. *Journal of Small Business & Entrepreneurship, 35*(4), 515-549.

Belout, A., & Gauvreau, C. (2004). Factors influencing project success: the impact of human resource management. *International journal of project management, 22(*1), 1-11.

Bicheno, J. & Holweg, M., (2008). The Lean Toolbox: The essential guide to Lean Transformation (4th ed.) *PICSIE Books*.

Burnard, P. (1996) Teaching the analysis of textual data: An experiental approach. *Nurse Education Today, 16,* 278-281.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel F. (2016). Bilimsel Araştırma Yöntemleri (20. Baskı), *Pegem Akademi, Ankara*.

Caldera, S., Desha, C., & Dawes, L. (2019). Evaluating the enablers and barriers for successful implementation of sustainable business practice in 'lean' SMEs. *Journal of Cleaner Production, 218,* 575-590.

Calof, J. (2020). The impact of firm size on competitive intelligence activities. *Foresight, 22*(5/6), 563-577.

Cameron, S., & Angela, H., (2009). The causal relationship inherent in the alliance of lean infrastructures, employee engagement, leadership impact, and team dynamics in modern manufacturing environments. *Capella University ProQuest Dissertations & Theses.*

Cao, L., & Connolly, T. (2008). A systematic review of lean in healthcare. *Journal of Healthcare Engineering, 10*(4), 491-505.

Chinn, P. L., & Kramer, M. K. (1999). Theory and nursing: Integrated knowledge development. *St. Louis: Mosby 5th ed.*

Creswell, J. W., & Miller, D. L. (2000). Determining qualitative research methods. *Theory into Practice, 39,* 124-130.

Cubucku, C., Gülsecen, S., & Tolum, S. (2017). Risk management in startups: How using lean principles helps startups manage their risks more efficiently. *International Conference on Engineering Technologies (ICENTE'17).*

De, D., Chowdhury, S., Dey, P., & Ghosh, S. (2020). Impact of lean and sustainability-oriented innovation on sustainability performance of small and medium sized enterprises: a data envelopment analysis-based framework. *International Journal of Production Economics, 219,* 416-430.

DeCarlo, D. (2010). *Extreme project management: Using leadership, principles, and tools to deliver value in the face of volatility*. John Wiley & Sons.

Demirkan, I., Srinivasan, R., & Nand, A. (2021). Innovation in SMEs: The role of employee training in German SMEs. *Journal of Small Business and Enterprise Development, 29*(3), 421-440.

Dennis, N., Lydia, N., James, M., David, M., Jeffrey, M., & Peterson, O., M., (2018). Lean supply chain management practices and procurement performance of leading supermarkets in Nairobi, Kenya. *Noble International Journal of Business and Management Research, 02(*12),101-112.

Dora, M., Goubergen, D., Kumar, M., Molnár, A., & Gellynck, X. (2013). Application of lean practices in small and medium-sized food enterprises. *British Food Journal, 116*(1), 125-141.

Douglas, J., Antony, J., & Douglas, A. (2015). Waste identification and elimination in HEIs: the role of lean thinking. *International Journal of Quality & Reliability Management, 32(*9), 970-981.

Drew, J. McCullum, B. & Roggenhofer, S., (2016). *Journey to lean: Making operational change stick.* Springer.

Earl, B. (2004). *The Practice of Social Research* (10 ed). Thomson, Wadsworth.

Ekström, J. (2024). *Lean project management: Implementing lean principles to a service industry organization* [Unpublished Master dissertation]. Digital Business Management, Vasa.

Eller, L. S., Lev, E. L., Feurer, A., Eller, L. S., Lev, E. L., & Feurer, A. (2014). Key components of an effective mentoring relationship: A qualitative study. *Nurse Education Today*, *5*(34), 815-820.

Elonen, S., & Artto, K. A. (2003). Problems in managing internal development projects in multi-project environments. *International Journal of Project Management, 21*(6), 395–402.

Eroglu, C. and Hofer, C. (2011). Lean, leaner, too lean? The inventory-performance link revisited. *Journal of Operations Management, 29*(4), 356-369.

Fagarasan, C., Cristea, C., Cristea, M., Popa, O., & Pisla, A. (2023). Integrating sustainability metrics into project and portfolio performance assessment in agile software development: a data-driven scoring model. *Sustainability, 15(*17), 13139.

Fawcett, S. E., Magnan, G. M., & McCarter, M. W. (2008). Benefits, barriers, and bridges to effective supply chain management. *Supply chain management: An international journal, 13(*1), 35-48.

Filippov, S., Mooi, H. G., Weg, R., & Westen, L.-J. (2012). Strategic alignment of the project portfolio: an empirical investigation. *Paper presented at PMI® research and education Conference, Limerick, Munster, Ireland. Newtown Square, PA: Project Management Institute.*

Fullerton, R. R., & McWatters, C. S., (2001). The production performance benefits from JIT implementation. *Journal of Operations Management, 19*(1), 81–96.

Gerardo, P., (2004). Organizational knowledge in the making: how firms create, use, and institutionalize knowledge. *Oxford University Press, 48*(4).

Ghofirin, M. and Wahyuningtyas, E. (2021). Simple accounting for Surabaya's SMEs from accounting equations to financial statements. *Community Development Journal, 5*(1), 219-225.

Guijarro, A., García, D., & Auken, H. (2009). Barriers to innovation among Spanish manufacturing SMEs. *Journal of Small Business Management, 47*(4), 465-488.

Hasanain, K., Alhuseein, I., Hussein, F., Ali, S., Ayad, H., Haydar, S., Noor, Q., Ridah, R., & Alhasan, H. (2023). Identifying key performance indicators (KPIs) and measurement frameworks to assess and improve the performance of construction supply chains. *International Journal of Construction Supply Chain Management, 13*(1), 260-275.

Hindarto, D. (2023). The management of projects is improved through enterprise architecture on project management application systems. *International Journal Software Engineering and Computer Science (IJSECS), 3(*2), 151-161.

Hines, P., & Taylor, D. (2000). Going lean. Lean enterprise research Centre. *Cardiff Business School, 3*-43

Hosono, A. (2020). Kaizen toward learning, transformation, and high-quality growth: insights from outstanding experiences. *Workers, Managers, Productivity: Kaizen in Developing Countries,* 45-67.

Humble, J., Molesky, J., & O'Reilly, B. (2020). *Lean enterprise*. O'Reilly Media, Inc.

Ilias, V., (2015). Applying lean thinking in the food supply chains: a case study. *Production Planning & Control, 26*(16), 1351- 1367.

Ishikawa, K. (1976). *Guide to Quality Control*. Asian Productivity Organization.

Jasti, N. V. K., & Kodali, R. (2015). Lean production: Literature review and trends. *International Journal of Production Research, 53*(3), 867–885.

Jeffrey, K., L., & James, K., F., (2011). The Toyota way to continuous improvement: linking strategy and operational excellence to achieve superior performance. *McGraw-Hill.*

Jenkins, H. (2009). A 'business opportunity' model of corporate social responsibility for small and medium-sized enterprises. *Business ethics: A European Review, 18*(1), 21-36.

Joseph, E., A., (2019). Optimizing project management efficiency through scrumBan: A comprehensive analysis of best practices and use cases. *Journal of Human Behavior and Social Science, 3*(1), 15-29.

Karasar, N. (2007). *Bilimsel araştırma yöntemi.* Nobel Yayın Dağıtım.

Kerzner, H., & Saladis, F. P. (2011). *Value-driven project management*. John Wiley & Sons.

Khalique, M., Bontis, N., Shaari, J., Yaacob, M., & Ngah, R. (2018). Intellectual capital and organisational performance in Malaysian knowledge-intensive SMEs. *International Journal of Learning and Intellectual Capital, 15*(1), 20.

Khan, M. & Khalique, M. (2014). An overview of small and medium enterprises in Malaysia and Pakistan: Past, present and future scenario. *Business and Management Horizons, 2*(2), 38.

King, A. & Lenox, M. (2001). Lean and green? An empirical examination of the relationship between lean production and environmental performance. *Production and Operations Management, 10*(3), 244-256.

Klefsjö, B. (2011). Toyota Kata: Managing people for improvement, adaptiveness and superior results. *Quality Progress, 44*(11), 63.

Knapić, V., Rusjan, B., & Božič, K. (2022). Importance of first-line employees in lean implementation in SMEs: A systematic literature review. *International Journal of Lean Six Sigma, 14*(2), 277-308.

Koskela, L. (1992). Application of the new production philosophy to construction Stanford. *Stanford University, 72*(39).

Koskela, L. (2000). An exploration towards a production theory and its application to construction. *VTT Technical Research Centre of Finland.*

Koskela, L., & Howell, G. (2002). The underlying theory of project management is obsolete. *Proceedings of the 2002 PMI Conference, 1*(2), 28-37.

Koskela, L., (2008). Which kind of science is construction management? *16th Annual Conference of the International Group for Lean Construction,* pp. 51-60

Kot, S. (2018). Sustainable supply chain management in small and medium enterprises. *Sustainability, 10*(4), 1143.

Krippendorff, K. (2004). *Content analysis: An introduction to its methodology* (2nd ed.). Sage Publications.

Kuzel, A., J. (1992). Sampling in qualitative inquiry. In B. F. Crabtree & W. L. Miller (Eds.), *Doing qualitative research.* Sage Publications, Inc.

Lander, E., & Liker, J. K. (2007). The Toyota production system and art: making highly customized and creative products the Toyota way. *International Journal of Production Research, 45*(16), 3681–3698. about:blank

Lanz, R., Lundquist, K., Mansio, G., Maurer, A., & Teh, R. (2018). E-commerce and developing country-SMEs participation in global value chains. *WTO Staff Working Papers* ERSD-2018-13.

Laureani, A., & Antony, J. (2019). Leadership and lean six sigma: a systematic literature review. *Total Quality Management & Business Excellence, 30*(1-2),53-81.

Le, P. X. N. (2023). How team-level lean startup facilitates firm-level transforming capability in SMEs. *(Master's thesis, University of Twente).*

Lima Jr, O., Fernandes, G., & Tereso, A. (2023). Benefits of adopting innovation and sustainability practices in project management within the SME context. *Sustainability, 15*(18).

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage Publications.

Linderman, K., Schroeder, R. G., & Choo, A. S. (2006). Six sigma: The role of goals in improvement teams. *Journal of Operations Management, 24*(6), 779-790.

Majava, J., & Ojanperä, T. (2017). Lean production development in SMEs: A case study. *Management and Production Engineering Review, (2).*

Maletič, D., Maletič, M., Al-Najjar, B., & Gomišček, B. (2014). The role of maintenance in improving company's competitiveness and profitability: A case study in a textile company. *Journal of Manufacturing Technology Management, 25*(4), 441-456.

Mary, P., M., & Tom, P., (2003). *Lean software development: An agile toolkit*. Addison-Wesley.

Maware, C., & Parsley, D. M. (2022). The challenges of lean transformation and implementation in the manufacturing sector. *Sustainability, 14(*10), 6287.

Mazzocato, P., Savage, C., Brommels, M., Aronsson, H., & Thor, J. (2010). Lean thinking in healthcare: A realist review of the literature. *BMJ Quality & Safety, 19*(5), 376-382.

Mike C., (2006). *Agile estimating and planning*. Prentice Hall Professional Technical Reference.

Mohammad, R., (2018). *Risk management and measurement of risk management performance in complex projects* [Unpublished doctoral dissertation]. University of Oulu, Faculty of Technology.

Mossman, A., Ballard, G., & Pasquire, C. (2013). lean project delivery–innovation in integrated design and delivery. In J. Eynon (Ed.), *The Design Manager's Handbook,* (pp. 164-192), Wiley Blackwell.

Ohno, T., (1982). How the Toyota production system was created. *Japanese Economic Studies, 70*(4), 83-101.

Ohno, T. (1988). *The Toyota production system: Beyond large-scale production.* Productivity Press.

Padachi, K. & Bhiwajee, S. (2016). Barriers to employee training in small and medium sized enterprises. *European Journal of Training and Development, 40*(4), 232-247.

Parasuraman, K. P. (2020). *Effectiveness of agile project management methodologies in small and medium-sized IT organizations in India* [Unpublished doctoral dissertation]. Dublin, National College of Ireland.

Patton, Q., M. (1990). Qualitative evaluation and research methods (2nd Ed.). *Sage Pub.*

Pearce, A., & Pons, D. (2013). Research article implementing lean practices: Managing the transformation risks. *Journal of Industrial Engineering, (1*), 790291.

Pedro, S., & Jeffrey, K., P., (2015). Does agile work? — a quantitative analysis of agile project success. *International Journal of Project Management, 33*(5), 1040-1051.

Perrini, F. (2006). SMEs and CSR theory: Evidence and implications from an Italian perspective. *Journal of Business Ethics, 67*(3), 305-316.

Pinheiro, M. G., & Misaghi, M. (2014). Proposal of a framework of lean governance and management of enterprise IT. *In Proceedings of the 16th International Conference on Information Integration and Web-based Applications & Services* (pp. 554-558).

Piotrowicz, W. D., Ryciuk, U., & Szymczak, M. (2021). Lean and agile metrics. Literature review and framework for measuring agile supply chain. *International journal of productivity and performance management, 72(*6), 1560-1583.

Poppendieck, M., & Poppendieck, T. (2003). *Lean software development: An agile toolkit.* Addison-Wesley.

Psomas, E., Antony, J., & Bouranta, N. (2018). Assessing lean adoption in food SMEs: evidence from Greece. *International Journal of Quality & Reliability Management, 35*(1), 64-81.

Pulka, B., Ramli, A., & Mohamad, A. (2021). Entrepreneurial competencies, entrepreneurial orientation, entrepreneurial network, government business support and SMEs performance. The moderating role of the external environment. *Journal of Small Business and Enterprise Development, 28*(4), 586-618.

Quan, Z., Harlod, K., & Marjolein, C., (2018). Supply chain integration: value creation through managing inter-organizational learning. *International Journal of Operations and Production Management, 38*(1), 211-229.

Radnor, Z., & Boaden, R., (2008). Editorial: lean in public services—panacea or paradox? *Public Money & Management, Taylor & Francis Journals, 28*(1), 3-7.

Radnor, Z., Osborne, S. P., Kinder, T., & Vidal, I. (2015). The service framework: A public-service-dominant approach to sustainable public services. *British journal of management, 26(*3), 424-438.

Reifer, D. J. (2011). *Software change management: Case studies and practical advice*. Pearson Education.

Reijers, H. A., & Mansar, S. L. (2005). Best practices in business process redesign: An overview and qualitative evaluation of successful redesign heuristics. *Omega, 33*(4), 283-306.

Rene, M., (2022). Deep learning-based models for software effort estimation using story points in agile environments [Unpublished doctoral dissertation]. *Department of Mathematical and Physical Sciences Concordia University of Edmonton*. about:blank

Rother, M., & Shook, J. (1999). Learning to see: Value stream mapping to add value and eliminate Muda. *Lean Enterprise Institute.*

Rubin, H. J. & Rubin, I. S. (1995), *Qualitative interviewing: The art of hearing data*. Sage Publications.

Sahoo, S. & Yadav, S. (2018). Lean implementation in small- and medium-sized enterprises. *Benchmarking an International Journal, 25*(4), 1121-1147.

Saja, A., A., Jiju, A., Norin, A., & Abhijeet, G., (2017). Implementation of Six Sigma in Saudi Arabian Organization: Findings from Survey. *International Journal of Quality & Reliability Management*.

Schofield, J. W. (1990). Increasing the generalizability of qualitative research. In W. W. Eisner & A. Peshkin (Eds.). *Qualitative inquiry in education: The continuing debate* (s.201-232). Teachers College Press.

Schonberger, R. J. (2007). Japanese production management: An evolution—with mixed success. *Journal of Operations Management, 25*(2), 403–419.

Schultz, A. L. (2016). Integrating lean visual management in facilities management systems. *University of Salford (United Kingdom).*

Sezen, B., & Erdogan, S. (2009). Lean philosophy in strategic supply chain management and value creating. *Journal of Global Strategic Management, 3*(1), 68-73.

Shah, R., & Ward, P. (2003). Lean manufacturing: context, practice bundles, and performance. *Journal of Operations Management, 21*(2), 129-49.

Shah, R., & Ward, P. T. (2007). Defining and developing measures of lean production. *Journal of Operations Management, 25*(4), 785-805.

Shingo, S. (2019). A *revolution in manufacturing: the SMED system.* Routledge.

Sibiya, A., Sibiya, B., Jordaan, J., & Mahosi, B. N. (2023). Enhancing project management for SMEs: A hybrid approach. *Journal of Management and Entrepreneurship Research, 4*(2), 106-122.

Sitharam, S. & Hoque, M. (2016). Factors affecting the performance of small and medium enterprises in KwaZulu-Natal, south Africa. *Problems and Perspectives in Management, 14*(2), 277-288.

Sobek, D. K., & Smalley, A. (2008). *Understanding A3 thinking: A critical component of Toyota's PDCA management system.* Productivity Press.

Sohal, A. S., & Egglestone, A. (1994). Lean production: experience among Australian organizations. *International journal of operations & production management, 14*(11), 35-51.

Strucker, T. (2018). *Application of project management standards in small and medium-sized enterprises (SMEs)* [Unpublished Doctoral dissertation], Kauno technologijos universitetas.

Sugimori, Y., Kusunoki K., Cho, F., & Uchikawa, S., (1977). Toyota production system and kanban system, materialization of just-intime and respect-for-human system. *International Journal of Production Research, 15*, 553-564.

Toussaint, J., Gerard, R. A., & Adams, E., (2010). *On the mend: revolutionizing healthcare to save lives and transform the industry.* Lean Enterprise Institute. pp.9-61.

Türnüklü, A. (2000). Eğitimbilim araştırmalarında etkin olarak kullanılabilecek nitel bir araştırma tekniği: Görüşme. *Kuram ve uygulamada eğitim yönetimi, 24(*24), 543-559.

Ufua, D., Olujobi, O., Ogbari, M., Dada, J., & Edafe, O. (2020). Operations of small and medium enterprises and the legal system in Nigeria. *Humanities and Social Sciences Communications, 7*(1).

Vargo, J., & Seville, E. (2011). Crisis strategic planning for SMEs: Finding the silver lining. *International Journal of Production Research, 49*(18), 5619-5635.

Vikram, S., Amit, R. D., & Mohammad. A. Q. (2015). Impact of lean practices on performance measures in context to Indian machine tool industry. *Journal of Manufacturing Technology Management, 26*, 1218-1242.

Vrečko, I., Tominc, P., & Širec, K. (2023). Enhancing the performance of high-growth small- and medium-sized enterprises through effective project-management processes and stakeholder engagement: A systems perspective. *Systems, 11*(10), 511.

Weber, R.P. (1990) *Basic content analysis.* Sage Publications.

Widayati, Q., Effendy, I., & Nurhayati, S. (2023). My Bengkel application to facilitate bookkeeping for small and medium enterprises in the automotive sector. *Journal of Computer Networks Architecture and High-Performance Computing, 5*(1), 241-250.

Wilson, L., (2010). *How to implement lean manufacturing.* McGraw-Hill.

Womack, J. P., & Jones, D. T. (1997). Lean thinking—banish waste and create wealth in your corporation. *Journal of the Operational Research Society, 48*(11), 1148-1148.

Womack, J. P., Jones, D. T., & Roos, D. (2007). The machine that changed the world: The story of lean production--Toyota's secret weapon in the global car wars that is now revolutionizing world industry. *Simon and Schuster.*

Womack, J. P., Jones, D. T., & Roos, D., (1990). *The machine that changed the world.* MacMillan Press.

Wushishi, M. (2024). Indirect effect of customer relations on leadership/top management, employee relations and process management in examining the readiness of SMEs to implement lean initiatives. *International Journal of Management Finance and Accounting, 5*(1), 85-110.

Yadav, V., Jain, R., Mittal, M., Panwar, A., & Lyons, A. (2019). The impact of lean practices on the operational performance of SMEs in India. *Industrial Management & Data Systems, 119*(2), 317-330.

Yıldırım, A. ve Şimşek, H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri.* Seçkin Yayınevi.

Yuqiuge, H., & Petri, I., (2017). Cloud manufacturing system for sheet metal processing. *Production Planning & Control, 28*, 524-537.

Zaied, A. and Mohmed, S. (2020). ERP implementation road map for small and medium size enterprises (SMEs). *JISIoT,* 14-25.

Zangiacomi, Andrea, Elena P., Rosanna F., Massimiliano B., & Marco S. (2020). Moving towards digitalization: A multiple case study in manufacturing. *Production Planning & Control 31, 2*(3), 143-157.

Zhang Y. and Wildemuth, B. M. (2009). Qualitative analysis of content. In B. M. Wildemuth, (Ed.), *Applications of social research methods to questions in information and library science* (pp. 1-12), Libraries Unlimited,

Zoe, J., R., Nicola, B., Ann, E., Maneesh, K., Sharon, J., W., & David, M., U., (2016). Public service operation management. *Routledge, Taylor & Francis Group, vol.01*.

Zoe, R., & Paul, W., (2008). Learning to walk before we try to run: Adapting lean for public sector. *Public Money & Management, 28*(1), 13-20.

Zwikael, O., & Globerson, S. (2006). From critical success factors to critical success processes. *International journal of production research, 44*(17), 3433-3449.