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Business Process Management

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MASTER THESIS

TITLE IN LITHUANIAN	TITLE IN ENGLISH
"LEAN" PRINCIPŲ POVEIKIS DARBUOTOJŲ ISITRAUKIMUI, PASITENKINIMUI DARBU IR INDIVIDUALIEMS VEIKLOS REZULTATAMS	**THE IMPACT OF LEAN PRINCIPLES ON EMPLOYEE ENGAGEMENT, JOB SATISFACTION AND INDIVIDUAL PERFORMANCE**

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INTRODUCTION

Topic relevance

Companies and institutions constantly strive for improved individual performance, job satisfaction and employee engagement. In most companies, employees are vital assets, and Human Resource Management aims to enhance their potential for job satisfaction and optimal individual performance. Job satisfaction has become a key concern for managers, especially in industries with high labor turnover rates or high levels of burnout (Karunarathne & Samarasinghe, 2019). The results of numerous studies proved direct impact of lean principles implementation on employees' job satisfaction and well-being (Rodríguez *et al*., 2017; Schwarz *et al*., 2016; Varadaraj & Ananth, 2020; Müller & Leyer, 2022).

The inception and widespread adoption of lean principles have marked a major milestone in the evolution of companies' management (Hasle, 2012; Hines *et al*., 2018). The implementation of lean principles is changing the way employees carry out their roles. While the adoption of lean management rooted in manufacturing with numerous positive results, it is not surprising to see its implementation spread to health care, service organizations such as call centers, banks, and public administration among many other contexts (Kilroy & Flood, 2022). Even though there is increasing optimism about the potential performance effects of lean management, its impact on employees' individual performance and job satisfaction is still under thorough ongoing research following ambiguous and even contradictory results of numerous studies on lean (Kilroy & Flood, 2022; Beraldin *et al*., 2019; Minh *et al*., 2019; Tajri *et al*., 2013).

Furthermore, one of the most crucial factors of any company's performance is employee engagement. Representing employee's willingness and ability to contribute to company success by giving extra effort on an ongoing basis (Weerasooriya & Alwis, 2017), employee engagement is, on the one hand, an indispensable condition for successful implementation of lean management in any company. On the other hand, dynamic changes brought about by the adoption of lean management principles have significant impact on recognized employee engagement increasing commitment, loyalty, productivity, and ownership of the staff of all levels (Hawarna *et al*., 2023; Beraldin *et al*., 2019; Kleeff *et al*., 2023).

Current state of scientific research and scientific novelty of the thesis

Firstly, among numerous studies on the subject, many of them investigated the impact of lean on employees of only one or two companies (Burchardt & Löfström, 2022; Barber, 2011). This approach makes the results of research very dependent on the local conditions (Bouville & Schmidt, 2019).

Secondly, many of the studies rest on the research conducted among the employees within only one professional sector, e.g. medicine (Hawarna *et al*., 2023; Hammoudeh *et al*., 2020; Kaltenbrunner *et al*., 2019; Mahmoud *et al*., 2021), education (Barber, 2011), textile (Hussain *et al.*, 2019; Karunarathne & Samarasinghe, 2019), public sector (Ingelsson & Bäckström, 2017), manufacturing (Seppälä and Klemola, 2004). The results of these studies and recommendations based on them can be applicable only to the lean organizations within the professional sphere under analysis.

Thirdly, a number of studies on the subject focus on only one fundamental concept of lean and its impact on employees' outcomes (Bouville & Schmidt, 2019; Hussain *et al*., 2019) which restricts the possibilities of implementation of the research results to the organizations which adopted the same fundamental concepts.

Fourthly, most of the studies aiming at the investigating of the impact of lean on employees examine its influence on only one or two characteristics, e.g. empowerment (Barber, 2011), well-being (Kilroy & Flood, 2022; Hasle, 2012), engagement (Hawarna *et al*., 2023), stress (Burchardt & Löfström, 2022; Conti *et al*., 2006; Dombrowski *et al*., 2017), engagement and exhaustion (Beraldin *et al.,* 2019), job satisfaction (Cullinane *et al.,* 2014; Hammoudeh *et al*., 2020; Karunarathne & Samarasinghe, 2019), well-being and exhaustion (Huo *et al*., 2022), job satisfaction and stress (Mahmoud *et al.*, 2021; Seppälä & Klemola, 2004). The outcomes of these studies may be misleading while deciding on adoption of the principles of lean management in organizations.

Finally, these research studies conducted on the subject of lean and its impact on employees showed ambiguous results. For example, findings in some of them proved positive impact on employee engagement, job satisfaction, and individual performance in lean organizations (Cullinane *et al.,* 2014; Müller & Leyer, 2022), in some others the results showed negative influence (Huo *et al*., 2022). Still some studies proved no conclusive evidence of lean impact on employee engagement, job satisfaction, or individual performance (Beraldin *et al*., 2019; Kleef at al., 2023).

The current study aims at providing a contribution to the investigation of lean impact on employees in conducting a thorough theoretical and empirical analysis of its influence on three different elements (employee engagement, job satisfaction, and individual performance) among employees of numerous lean organizations in various professional sectors. The relevance of the research is also supported by the absence of consensus in literature as to whether lean management has a positive or negative effect on employees (Kilroy & Flood, 2022).

The problem of the research

The lack of research on the impact of lean on employee engagement, job satisfaction, and individual performance.

The research question

What is the impact of lean on employee engagement, job satisfaction, and individual performance?

The object of the research is the impact of lean on employee engagement, job satisfaction, and individual performance.

The aim of the research is to theoretically and empirically identify and assess the impact of lean on employee engagement, job satisfaction, and individual performance.

The objectives of the research are:

1. To systematize lean principles and the consequences of their implementation for employees.
2. To identify relevant framework to enhance the investigation of employee engagement.
3. To identify and analyze main factors of employees' job satisfaction.
4. To identify and analyze criteria and dimensions of employees' individual performance.
5. Upon investigating the level of employee engagement after the implementation of lean principles, to evaluate the impact of lean on employee engagement.
6. Upon investigating the level of employees' job satisfaction after the implementation of lean principles, to evaluate the impact of lean on job satisfaction of employees.
7. Upon investigating the level of individual performance after the implementation of lean principles, to evaluate the impact of lean on individual performance.

Research methodology

In current research, the deductive approach was utilized. The approach was employed with a view to testing concept model of the research as well as confirming or refuting the research hypotheses. Based on the principles of the deductive approach, a thorough review of related literature and recent findings was conducted which helped to derive specific conclusions.

To tackle the research question of the impact of lean on employee engagement, job satisfaction, and individual performance, a cross-sectional design was applied which, contrary to

longitudinal design, suggests data collection at a single point in time from a sample representing a population (Saunders *et al*., 2016).

This research study can be classified as explanatory as it aims to explain why certain phenomena occur. The current research delves into the underlying reasons and causes behind the relationships under analysis, thus providing both the investigation of the impact of lean on the three dependent variables (job satisfaction, employee engagement, and individual performance) and thorough explanation and analysis of the relationships between all the variables.

Research methods

Methods for literature review were the systemic, comparative analysis and the synthesis of scientific literature. Methods for the empirical data collection were questionnaire-based surveys since questionnaires are applicable for analyzing and assessing population responses. Methods for the empirical data analysis were quantitative statistical methods.

Structure of thesis

The current Master thesis consists of the list of figures, the list of tables, the glossary, the list of abbreviations, the introduction, three main chapters, the conclusions, limitations and recommendations for practitioners and future research, references, summary, and the appendix. The first chapter of the main part provides the theoretical analysis of scientific literature on lean, employee engagement, job satisfaction, and individual performance. Then, it presents the review of scientific literature on the impact of lean on employee engagement, job satisfaction, and individual performance. The second chapter presents methodology for the empirical research of the impact of lean on employee engagement, job satisfaction, and individual performance. The third chapter presents the empirical results, the analysis of the data collected, and the outcomes of the research.

The total volume of the Master thesis is 97 pages. It includes 35 tables, 7 figures, 137 references, and 1 appendix.

1. LITERATURE REVIEW

1.1 Review of literature on lean

1.1.1 Lean and its principles

The concept of Lean originated from a manufacturing strategy developed by Japanese engineers Taiichi Ohno and Shigeo Shingo. Although Krafcik (1988) was the first to coin the term "lean", the concept truly gained momentum with the release of "The Machine That Changed the World" in 1990 (Åhlström *et al.,* 2021). In the International Journal of Operations and Production Management, the earliest mention of lean is attributed to Carr and Truesdale (1992) (Åhlström *et al.*, 2021). From that point on, many studies on lean have been conducted and their results have been published in many different journals. For the time being, almost 900 lean articles can be found published in the International Journal of Operations and Production Management (IJOPM, 2024).

There are various definitions of "lean" in academic publications. As the primary goal of lean practices is to maintain or enhance performance levels while reducing input requirements, including time, space, workforce, resources, equipment, and expenses (Womack & Jones, 2003), one of the most comprehensive and detailed definitions of lean as a managerial concept was given by Shah and Ward (2002). According to them, "lean manufacturing is an integrated socio-technical system, whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability" (as cited in Alefari *et al*., 2020, p.222).

Lean is seen by various researchers as "a way, a process, a set of principles, a set of tools and techniques, an approach, a concept, a philosophy, a practice, a system, a program, a manufacturing paradigm, or a model" (Bhamu & Sangwan, 2014, p.878).

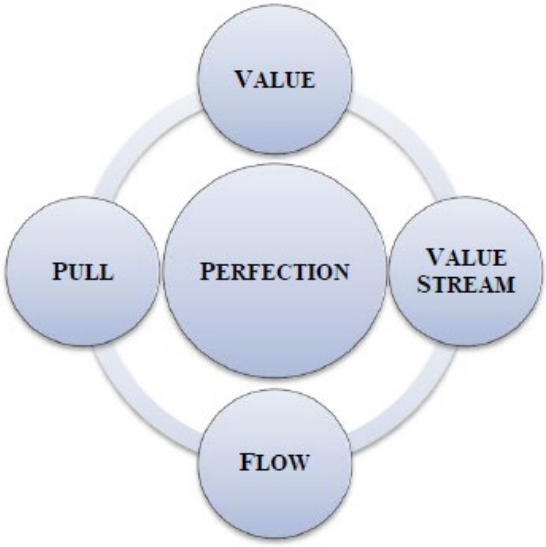
Companies are advised to adopt lean tools, principles, and philosophy in their operations, with a primary focus on implementing the principles at the core. Instead of solely focusing on implementing specific methods or tools, it is more beneficial to create an integrated system that aligns with and fulfills the underlying principles (Ruželė, 2020).

The core of lean principles is a fundamental philosophy that emphasizes constant improvement, efficiency, and minimizing waste (Ahmad & Ahmad, 2024). The essence of lean thinking involves defining value, organizing value streams logically, preventing interruptions in actions, delivering goods upon request, and operating with greater efficiency. The lean thinking theory is underpinned by five key principles, as shown in *Figure* 1. These principles encompass

defining value, mapping the value stream, creating flow, using a pull system, and pursuing perfection (Göthberg & Simonchik, 2013). *Figure* 1 reveals the interconnected nature of these principles, with four principles supporting the central one of perfection. Essentially, lean philosophy aspires towards perfection by emphasizing value, value stream, flow, and pull, all in an effort to minimize waste and concentrate on activities that enhance customer value (Womack & Jones, 2003).

Figure 1

Lean principles



Source: Göthberg & Simonchik, 2013, p.13

Organizations embarking on the lean journey should prioritize **defining value** from the customers' viewpoint. This value creation should focus on specific products and align with what customers truly value. Challenges can arise when different stakeholders, like engineers, prioritize over-engineering or when top management focuses solely on immediate financial returns, potentially neglecting customer needs. Understanding where value is created is crucial. It's essential to define value based on the market perspective of where the product will be sold, avoiding pitfalls of producing without considering customer perception (Ahmad & Ahmad, 2024).

A **value stream** represents the sequence of tasks required to produce a specific product, typically consisting of problem-solving, information management, and physical transformation stages. Identifying a value stream often reveals opportunities to eliminate waste. Actions within a value stream can be categorized into those that create value, support value-adding activities, or add no value. Lean thinking emphasizes assessing a product's value across its entire life cycle, from raw material acquisition to recycling (Womack & Jones, 2003).

The principle of **creating flow** seeks to enable uninterrupted value-adding activities by eliminating waiting times. Traditional organizations operate in batches with different departments performing various tasks. The goal of a new organizational approach is to maximize resource utilization. Lean thinking prioritizes the product and aims for a seamless flow of activities from design to final product (Barber, 2011; Göthberg & Simonchik, 2013). Implementing this change is challenging due to deeply ingrained batch processes and functional divisions that have developed over time (Womack & Jones, 2003).

The principle of **a pull system** ensures that production is initiated by customer demand instead of companies pushing products onto customers. By effectively implementing this principle, companies can create products based on customer preferences without the need for forecasts, resulting in a more customer-centric approach to manufacturing (Göthberg & Simonchik, 2013).

Pursuing perfection is the final principle that aims to optimize the preceding four principles. Through close customer engagement, teams can refine value specification, improving flow and pull. Enhanced flow and pull help identify areas of waste, with transparency playing a key role in achieving perfection. In a lean environment, all stakeholders can observe the entire process, fostering innovation and efficiency in value creation (Göthberg & Simonchik, 2013). Encouraging perfection cultivates creativity, flexibility, and adjustability, empowering businesses to efficiently address changing customer demands and market trends (Ahmad & Ahmad, 2024; Barber, 2011).

Implementation of lean principles have proved favorable outcomes, which are widely recognized globally for benefiting both customers and businesses (Lima *et al*., 2023). The implementation of lean practices has consistently enhanced operational processes and overall organizational performance. This includes reductions in lead time and setup time, improvements in quality, productivity, and product reliability, enhanced customer satisfaction, decreased work in progress, minimized inventory and floor space usage, lowered production costs, increased flexibility and efficiency, as well as enhanced profitability and competitiveness (Vienažindienė & Čiarnienė, 2023). The sustained success achieved indicates that lean practices are universally applicable and not merely a passing trend.

On the other hand, the principles of lean manufacturing provoke debate regarding human well-being. On one side, lean production highlights virtues like teamwork, a variety of skills, increased responsibilities, innovation, collaboration, which are qualities associated with fulfilling work (Beraldin *et al*., 2019; Cullinane *et al*., 2014; Kleef *et al*., 2023). On the other side, organizations that implement lean principles could face a variety of unexpected or negative outcomes (Barber, 2011). Performance success of companies after the implementation of lean

management concepts is countered by evidence of high stress among employees (Bouville & Alis, 2014; Burchardt & Löfström, 2022; Dombrowski *et al*., 2017). Scholars focused on sociotechnical systems argue that certain aspects of lean production, like continuous production flow and minimal buffers, lead to time constraints and stress, sometimes labeled as "management by stress". Workers operate under constant time pressures and stress levels. They engage in repetitive tasks, promoting multitasking instead of developing a wide range of skills (Seppälä & Klemola, 2004).

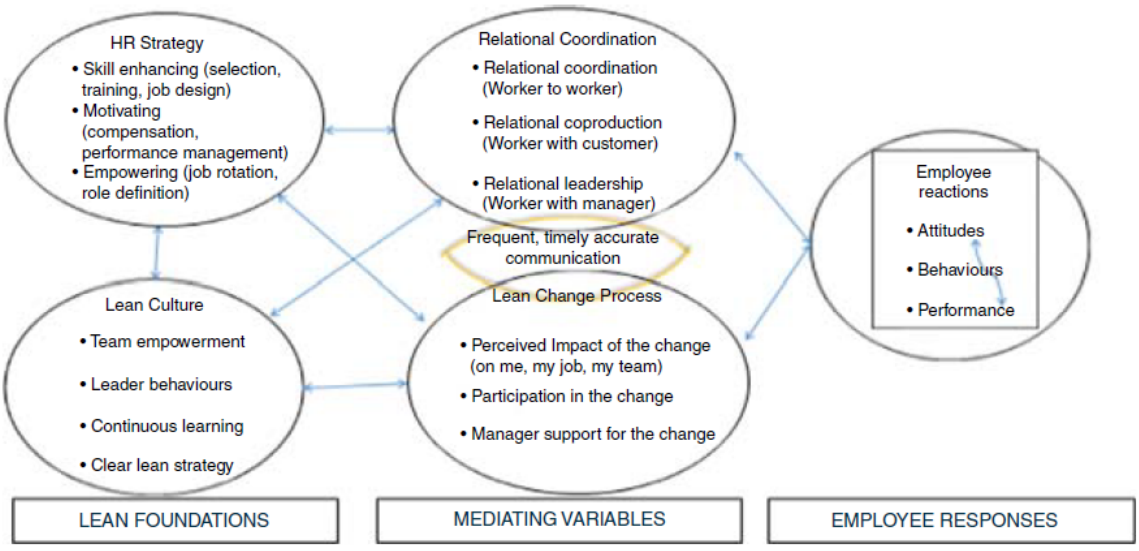
1.1.2 The theory of lean social pillar

The concept of lean and its implementation is highly heterogeneous as lean varies greatly across various organizational settings (Åhlström *et al*., 2021). This makes it extremely difficult, if possible, to frame lean as one universal theory with exact variables and definite relationships. Thus, in the context of the current research the theory of lean social pillar developed by McMackin and Flood (2019) was chosen as a part of theoretical framework as it focuses on the importance of human interactions, teamwork, collaboration, and employee empowerment within organizations. It emphasizes creating a supportive and inclusive work environment where employees are engaged, motivated, and encouraged to participate in continuous improvement efforts. This pillar recognizes that people are a critical component of lean initiatives, and their involvement and well-being are essential for the success of lean practices.

The model comprises five variable categories that are interrelated as depicted in *Figure* 2.

Figure 2

Theoretical framework for the lean social pillar



Source: McMackin & Flood, 2019, p.46

At the heart of the model are the connections between lean fundamentals and how employees react to lean transformations in their attitudes, behaviors, and performance. The framework suggests that two factors act as mediators in this association: the degrees of relational coordination and the lean change process employed.

The foundation of lean principles explored in this framework encompasses organizational culture, leadership, and HR strategy. These variables are included in the lean social pillar model because they have been demonstrated to significantly impact employee attitudes, behaviours, and performance (McMackin & Flood, 2019; Urban, 2015). Culture and HR strategy possess unique qualities that set them apart from other factors in the model. They are closely interconnected concepts, relatively enduring in nature, and they significantly impact the identity of the organization. Having been established, culture starts shaping the leadership style of the organization, being at the same time influenced by the latter itself. The HR system also mirrors and strengthens the culture of the organization in different ways. Thus, shifting from a culture that emphasizes individual performance to one that promotes empowered teams poses greater challenges Notably, these variables are unique in that effecting changes in them necessitates the sustained commitment of both senior management and middle management within the organization (McMackin & Flood, 2019; Urban, 2015). The overlapping diagrams and interconnected arrows in *Figure* 2 symbolize the intricate, mutually dependent relationship between the components of the lean social pillar theory.

1.2 Review of literature on employee engagement

1.2.1 Employee engagement

Employee engagement is a relatively modern concept in the field of organizational behavior that has garnered significant research interest in recent times (Fisher, 2010; Wallace *et al*., 2013). This resulted in an abundance of definitions provided by various researchers, each emphasizing different aspects of this notion (Bornasal, 2024). Thus, among the most significant ones are: commitment (Lockwood, 2007; Mani, 2011; Lewis & Feilder, 2011), passion (Lockwood, 2007; Fleming & Asplund, 2007; Sayyada & Divya, 2023), vigor, dedication and absorption (Witemeyer, 2013; Vazquez *et al*., 2015), excellence (Zinger, 2019; Gallup, 2008) and involvement (Macey & Schneider, 2008; Mani, 2011; Kahn & Fellows, 2013).

Employee engagement can be defined differently depending on the viewpoint of individual experts. Nonetheless, at its core, employee engagement entails actively involving employees in their work and fostering a sense of connection between them and the organization they are affiliated with (Kurnia & Hendriani, 2023). In this research, employee engagement is interpreted as an intricate combination of mental, emotional, and physical participation characterized by vigor, dedication, and absorption and resulting in improved organizational and individual performance and enhanced employee well-being (Gallup, 2013; Basnet, 2023).

There are two viewpoints on the way employee engagement feels: the feel of engagement and the look of engagement. The first one includes four crucial components which are responsible for the employees' feeling of engagement: urgency, focus, intensity, and enthusiasm. The second one is associated with the three basic patterns of engaged employees' behavior: vigor, dedication, and absorption (Kurnia & Hendriani, 2023).

To increase the level of employee engagement it is important to understand the main factors influencing it, namely quality of internal communication and working relationships within the organization, employees' perception of the job, opportunities for career growth, employees' understanding of job demands and expectations, work-life balance and others (Sayyada & Divya, 2023; Salmah *et al*., 2024). Employees who clearly understand their professional responsibilities, who are aware of job expectations, who know that their achievements are valued and encouraged, who feel support and assistance from their superiors, subordinates and peers, demonstrate high levels of engagement (Sayyada & Divya, 2023). Such employees are more likely to show better individual performance and creative thinking, to provide excellent service to customers, and to help the organization meet its objectives in the long run (Karkera, 2023).

Encouraging transparent communication and fostering a culture of dialogue can enhance employees' sense of being heard and valued. Achieving this goal involves conducting regular team building meetings, providing efficient feedback, and carrying out employee surveys. Another key approach is for organizations to invest in employee growth and offer development opportunities. This can encompass training initiatives, mentoring programs, and pathways for career progression. Furthermore, acknowledging and rewarding employees' hard work and accomplishments can significantly boost their engagement levels. Moreover, maintaining a positive work environment is crucial for fostering employee engagement. This entails promoting work-life balance, ensuring the implementation of fair policies, and nurturing a supportive and inclusive workplace culture (Afianti & Azmy, 2023).

1.2.2 Three-dimensional theory of employee engagement

Employee engagement is a lasting and all-encompassing emotional and cognitive state not particularly connected to any specific person, occasion, object, or activity, rather than a temporary, transitory condition.

According to the theory proposed by Schaufeli and Bakker, there are three crucial aspects that constitute the dimensions of employee engagement. The first one is vigor, or enthusiasm, which can be ascribed to employees who are highly energized and willing to do their best at work, who demonstrate high levels of mental resilience and persistence when confronted with challenges or difficulties. The second dimensional characteristic of employee engagement is dedication which describes employees fully engaged in their work and simultaneously feeling a deep sense of significance through meaningful emotions like inspiration, enthusiasm, and pride. The third dimension of employee engagement, namely absorption, refers to the idea of employees' full concentration on work being done. Absorbed employees are completely engrossed in their work, they lose track of time and experience difficulties in detaching themselves from work (Kurnia & Hendriani, 2023).

Researchers conducted by numerous scientists prove that employees with high level of engagement represent proactive agents, who initiate action and create their own positive outcomes (Schaufeli *et al*., 2006; Kurnia & Hendriani, 2023; Mustaqim *et al*., 2023). Their values align well with those of the organization they work for, and they actively participate in activities beyond their professional obligations. While experiencing occasional tiredness or fatigue, these motivated workers view their exhaustion positively, associating it with successful achievements rather than

solely negative experiences like burnt-out individuals. Some of these dedicated employees even mentioned having previously experienced burnout, showcasing their resilience and effective coping mechanisms. Moreover, they are not workaholics; their engagement in work stems from finding enjoyment in their tasks rather than being driven by an intense and compulsive inner urge.

1.3 Review of literature on job satisfaction

1.3.1 Job satisfaction and its factors

Job satisfaction represents a positive feeling towards a job resulting from finding a sense of accomplishment in or recognizing the value of one's work (Locke, 1976). It is seen as a reflection of personal individual perception of work, which is impacted by such factors as salary, incentives, work environment, and communication (Spector, 2008). Job satisfaction is considered being an emotional or affective response to various facets of an individual's job (Schermerhorn, 1993). It can be defined resulting from either positive or negative way an employee evaluates their job (Weiss, 2002).

In this research, job satisfaction is defined as the extent to which an employee is satisfied with the gratification they receive from their job, especially regarding intrinsic motivations. It is the extent of satisfaction an employee gets in the process of carrying out the given task (Muchinsky, 2006). One and the same assignment can be a source of satisfaction for one employee and of dissatisfaction for another one. For instance, when a worker lacks the required skills or knowledge to execute the task efficiently or has little control over work, it can further contribute to job dissatisfaction (Khot, 2010).

In accordance with the absence of unanimity in the definition of job satisfaction, there is an abundance of theories identifying factors which influence its level. Among them some researchers distinguish employee engagement, empowerment, communication, independence, etc. (Marras & Karwowski, 2006; Vidal, 2007; Morse, 2014). According to the researchers, these factors can be divided into environmental and individual aspects. Environmental factors that impact satisfaction result from the physical demands of the job or communication challenges. Implementing ergonomic improvements can mitigate or eliminate these physical demands, thereby positively affecting employee satisfaction through promoting individual health and safety (Morse, 2014). Individual factors like an employee's mood, emotions, genetics, and personality play a significant role in influencing satisfaction at work. The positive and negative moods and emotions of an employee have a direct impact on their overall job satisfaction. When employees choose to suppress negative emotions, it often leads to a decline in job satisfaction (Côté & Morgan, 2002; Weiss, 2002).

The Range of Affect Theory, developed by Locke (1976), propagates the idea that employees' job satisfaction depends on two main factors: what they expect from the job and what they actually obtain from it. The mismatch of the mentioned factors is what ultimately determines the level of their satisfaction (Locke,1976). Therefore, according to the theory, when the gap

between one's expectations and actual outcomes is minimal, the likelihood of achieving job satisfaction is higher. For instance, if an employee highly values career advancement, and the organization provides programs that offer new growth opportunities within the company, this employee is likely to experience a higher level of job satisfaction (Byrne *et al*., 2009).

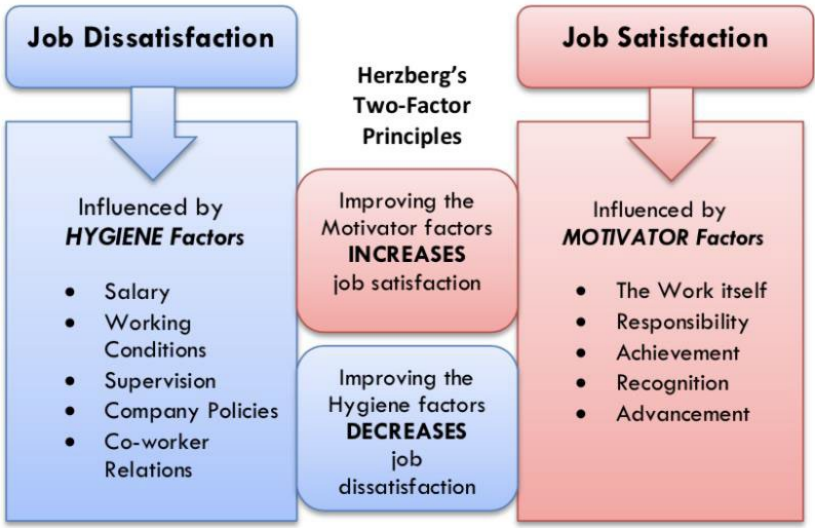
The extent to which a worker values a particular work condition impacts job satisfaction in a positive or negative way, being contingent on whether this condition is present or absent in the work setting (Locke, 1976). For instance, if an employee highly appreciates competitive compensation and benefits like fair pay, bonuses, health insurance, retirement plans, and other perks that help employees feel valued and supported, and the company provides these conditions, then it has a positive impact on the employee's level of job satisfaction as their expectations and demands are met. If the company does not have that developed compensation and benefit plan, then it has a negative impact on the employee's level of job satisfaction, while their demands are not met. On the other hand, the level of job satisfaction of an employee who does not appreciate this working component will be neither positively nor negatively influenced (Teck-Hong & Waheed, 2011).

One more theory elaborating on the factors that may impact the level of employees' job satisfaction – Two-Factor theory – was proposed by Frederick Herzberg and his collaborators in 1959 (Herzberger *et al*., 1959). As the name of the theory presupposes, it embraces two big groups of factors: motivator factor, or so-called intrinsic, and hygiene factor, or so-called extrinsic (Antony & Elangkumaran, 2014). The first group of intrinsic factors refer to motivators that drive an employee's favorable attitude towards their job, fostering positive job satisfaction through the fulfillment of the employee's demands and needs. These factors encompass career opportunities, achievement, the nature of the work, advancement, and recognition (*Figure* 3). They are termed as intrinsic because they significantly encourage employees and reveal their internal mindset concerning definite components of the job (Kreitner & Kinicki, 2013).

The second group of extrinsic (or hygiene) factors represents elements that can either impede or boost employees' job dissatisfaction within the workforce. These factors are termed as extrinsic since they are directly linked to the external job environment (Herzberg, 1974). As illustrated in *Figure* 3 below, extrinsic factors encompass the following aspects: salary, interpersonal relationships with peers, subordinates, and managers, regulations and procedures at work, and oversight.

Figure 3

Two-Factor Theory Model of Job Satisfaction



Source: Reed, 2015

1.3.2 Theory of Work Adjustment (TWA)

To meet the objectives of the current research the theory of Work Adjustment, proposed by Dawis and Lofquist (1984), was chosen as a part of theoretical framework.

This theory highlights the intricate connection between the individual and the workplace, demonstrating why employees adapt to their organizational environment. According to the researchers, the main role of an employee is to meet job demands of the job environment in their workplace whereas the work environment, in turn, satisfies a range of social, financial, and psychological needs of the employee. Dawis and Lofquist (1991) provide the following definition of job satisfaction: "an individual's positive affective evaluation of the target environment; … the individual's appraisal of the extent to which his or her requirements are fulfilled by the environment" (Dawis & Lofquist, 1991, p. 27). The crucial components of this theory are cognitive, perceptual and communication skills of employees, along with their organizational skills due to their great influence on the attainment of job (Dawis *et al.,* 1968; Dawis, 2005).

The alignment of individuals and organizations and the ongoing interplay between them is examined in the Theory of Work Adjustment (Dawis & Lofquist, 1984). Along with drawing from concepts like two previously mentioned theories, this theory emphasizes the importance of meeting the needs of both employees and their work environment through balanced methods that consider both sides. The cognitive, perceptual, and communication skills that employees utilize in their tasks should align with the performance expectations set by the workplace (Dawis *et al*., 1968).

A match between employees' needs, like approval, respect, success, task variety, authority, and security, and workplace incentives may lead to job satisfaction. On the flip side, dissatisfaction could prompt an employee to seek alternative employment opportunities. Conversely, when an organization perceives that its workforce mandates are being met, it aims for "satisfactoriness". This mutual satisfaction can foster employee retention, potentially leading to longer tenures or promotions (Dawis *et al*., 1968).

To elucidate how an organization can reinforce employees' requirements and values 20 work reinforcements were introduced within the Minnesota Satisfaction Questionnaire (MSQ) (Dawis, 1984). These work reinforcers can be grouped into six value dimensions, including achievement, autonomy, status, altruism, safety, and comfort. A strong correlation between different occupational reinforcer patterns and the six aforementioned dimensions was demonstrated (Shubsachs *et al*., 1978). Understanding these dimensions is crucial in comprehending how employers fulfill their workers' needs.

The six dimensions can be categorized into three factors: environmental, or so-called external (safety and comfort), other people, or also called social (status and altruism), and self, or internal (autonomy and achievement) (Hesketh & Griffin, 2005). Having been validated through academic research (Doering *et al.,* 1988; Dawis, 2005), these three factors proved their importance in contributing to value satisfaction and enhancing the worker-organization correspondence.

Overall, the three theories examined describe job satisfaction in terms of the emotional response a worker has towards their job. This response encompasses attitudes towards various job facets, such as co-workers, management, working conditions, and pay, as well as to the job itself. Consequently, the level of employees' job satisfaction hinges on whether their work expectations are met by their job outcomes.

1.4 Review of literature on individual performance

1.4.1 Individual performance and its dimensions

A commonly accepted definition of individual performance, as proposed by Campbell (1990), is behaviors or actions that align with the organization's objectives. This definition is accompanied by three concepts: 1) defining individual performance based on behavior rather than outcomes, 2) considering only behaviors that are pertinent to the organization's objectives as part of work performance, and 3) recognizing individual performance as having multiple dimensions (Campbell, 1990). While the first concept constitutes difficulty in distinguishing between results and behaviour, some researchers include outcomes in the definition of individual performance. Thus, individual performance represents actions, behaviors, and results that employees perform or achieve in connection with and with a view to contributing to organizational objectives, and that can be expanded effectively (Koopmans *et al.,* 2011). Similarly, individual performance is referred to as the overall anticipated value brought to the organization by employees via their actions (Motowidlo & Kell, 2013). Other researchers adopted a more practical strategy by providing their unique interpretation (Adekiya, 2023).

Recent studies view individual performance as a concept comprising various dimensions of performance behaviour (Stankevičiūtė *et al.,* 2021). In accordance with the absence of unanimity in its definition, researchers' understanding of individual performance dimensions also varies greatly.

The main dimensions of individual performance were determined by Murphy (1989) and Campbell (1990). Murphy's model of individual performance included four major dimensions: 1) task behaviors, 2) interpersonal behaviors (collaborating and interacting with other members of the staff), 3) downtime behaviors (avoiding work), 4) destructive, or hazardous, behaviors (resulting in obvious risks of decreased productivity, harm, or other negative consequences) (Murphy, 1989). Campbell proposed the following eight dimensions, which, according to the researcher, adequately represent the fundamental structure of individual performance: 1) job-specific task proficiency, 2) non-job-specific task proficiency, 3) written and oral communications, 4) demonstrating effort, 5) maintaining personal discipline, 6) facilitating peer and team performance, 7) supervision, and 8) management and administration (Campbell, 1990). More than a decade later, Motowidlo & Kell (2013) noted that all aspects of individual performance could be covered by only two all-encompassing dimensions: task performance and contextual performance.

Task performance can be described as behaviour when employees utilize their technical expertise to complete a task, while **contextual performance** involves interactions with colleagues, managers, or clients that contribute to the organizational, psychological, and social environment of the company. Engaging in contextual performance includes aiding others in task completion, collaborating with supervisors, or proposing enhancements to organizational procedures (Li *et al*., 2019). Following this, Murphy's first dimension (task behaviors) and Campbell's first two dimensions (job-specific task proficiency and non-job-specific task proficiency) could be regarded as task performance. Furthermore, Murphy's second dimension (interpersonal behaviors) and Campbell's six remaining dimensions (written and oral communications, demonstrating effort, maintaining personal discipline, facilitating peer and team performance, supervision, and management and administration) could be considered contextual performance. While the terms are different in various studies, researchers come to the common idea of task performance as competency with which employees meet organizational goals. On the contrary, contextual performance refers to actions that exceed job tasks. Regardless of the diversity of views on the dimensions of individual performance, most researchers also agree that the content of task behaviors can vary across different jobs, while contextual behaviors are universal (Koopmans *et al*., 2011; Koopmans, 2014).

Facilitated by the changes in jobs characteristics, work environment, and type of working tasks, the concept of individual performance has evolved, leading to the introduction of new dimensions related to it, such as organizational citizenship behavior, counterproductive work behaviors, innovative work behaviour etc. (Hernaus *et al*., 2022).

The concept **of organizational citizenship behaviour** was developed by Organ (1988) who defined it as "individual behaviour that is discretionary, not directly or explicitly recognized by the formal reward system, and in the aggregate promotes the efficient and effective functioning of the organization" (as cited in Organ, 1997, p.86). In his later research, Organ offered a more detailed explanation of organizational citizenship behaviour defining it as "performance that supports the social and psychological environment in which task performance takes place" (Organ, 1997, p. 95). Employees demonstrate organizational citizenship behavior when they exceed their normal job duties to help colleagues who are falling behind, maintain positive working relationships, meet deadlines by putting in extra effort, and perform tasks that are not part of their formal job description. Organizational citizenship behavior is crucial for enhancing overall organizational effectiveness as it influences the organizational, social, and psychological environment that can support task performance (Stankevičiūtė *et al*., 2021).

Employee innovative behavior involves the entire process within a workplace where individuals come up with, advocate for, and put into action new ideas (Wang *et al*., 2022). Studies

on employee innovative behavior have significantly increased in the past few decades (Deng *et al*., 2022; Hernaus *et al.*, 2022; Middlekoop, 2016; Möldner *et al.,* 2018; Tan *et al*., 2023). It is widely acknowledged that employee innovative behavior is a valuable asset for gaining a competitive edge for organizations and fostering their growth.

Employee innovative behavior represents a three-step process, which includes idea generation, idea promotion, and idea implementation. In the initial phase, the process begins with addressing the problem using a solution that already exists, one that has been adopted, or a completely new one. Next, the employee looks for support for their innovative concept from within or beyond the organization. The concluding stage involves implementing the idea, where the employee creates prototypes that can be practically applied (Hamid *et al*., 2020; Simoncini & Socci, 2017). Some studies (Leong & Rasli, 2014) distinguish one more separate step in employee innovative behavior – problem recognition – which is included in the initial phase by most researchers (Deng *et al*., 2022; Middlekoop, 2016; Simoncini & Socci, 2017; Tan *et al*., 2023). Generally, the tasks involving the recognition of problems and the generation of ideas represent the phase of work behavior oriented towards creativity. The final two tasks are known as behavior oriented towards implementation, where individuals aim to advocate for a new idea to their co-workers and managers, and to bring to life ideas that are eventually utilized within the organization, team, or overall company. Research indicates that individuals who are ready to innovate not only exceed their job expectations but also consistently produce new ideas (Leong & Rasli, 2014).

The general concept of individual performance thus represents a multi-dimensional construct which is influenced by a variety of factors which can be divided into two main groups: internal (such as communication skills, personality, adaptability, flexibility, motivation etc.) and external (including teamwork, leadership, cooperation, work environment etc.) Both groups are claimed to impact individual performance (Ariani, 2023; Memon *et al*., 2023).

1.4.2 Employee job performance theory and Multi-dimensional theory of innovative work behaviour

Na-Nan, Chaiprasit, Pukkeeree (2018) created employee job performance theory based on its concepts and theories by numerous researchers in the field (Na-Nah *et al*., 2018). The theories underlying the development of the theory are presented in Table 1. They synthesized and defined three employee job performance factors – job time, job quality and job quantity.

Table 1

Identification of significant constructs of employee job performance

Aspects of employee job performance	Authors
Job quality	Chen *et al*. (1997), Fynes and Voss (2001), Gilmore (1985), Liu and Xu (2006), Peterson and Plowman (1953)
Job quantity	Cheng and Kalleberg (1996), Flap and Völker (2004), Furnham and Stringfield (1998), Koopmans *et al*. (2014), Peterson and Plowman (1953), Petsri (2014)
Job time	Ahmad *et al*. (2012), Na-Nan and Chalermthanakij (2012), Njagi and Malel (2012), Peterson and Plowman (1953)

Source: Na-Nah *et al*., 2018, p. 2438

Employee job performance measures if workers do their role at a job efficiently. To be more precise, the individual productiveness of the employees as well as the corporate lasting prosperity are both marked by this variable. In order to boost individual job performance of workers and also to attain company's objectives successfully, the application and facilitation of a well-crafted assessment instrument may greatly benefit this matter (Star *et al*., 2016; Stanislav & Walter, 2002).

Work performance focuses mainly on individuals' behaviors and their reactions to their assigned job obligations as well as to the company targets (Petsri, 2014). Generally, the employees' behaviors are classified into two categories. The first category includes behaviors closely related to employees' responsibilities at their workplace. The behaviors initiated as a result of activities rather than straightforward job commands pertain to the second category. Job performance is measured by the degree of employees' efficient ability to accomplish their work-related tasks and responsibilities along with achieving corporate targets (Na-Nan et.al, 2018).

A set of various aspects, such as satisfaction, work atmosphere, variation of talents and professional skills, as well as motivation and managerial tactics applied at the work setting – all together impact job performance of employees. In such a way, the concept of job performance is stated as follows: "the behaviors that employees display at work that amount to the delivery of outcomes desired by the organization in terms of job quality, job quantity and job time." (Na-Nan *et al*., 2018, p. 2437).

Job quality encompasses an array of standards that are applied for different managerial processes (manufacturing, quality control, shipping, and so on) and in the scope of inspection could also be taken as a method of process control and predictor of quality (Chen *et al*., 1997; Petsri, 2014). Job quantity can be defined as a volume of production (products or wastes) that results from employees' behaviors. The sum of hours spent on carrying out a number of specific job obligations and duties with regard to the level of their complexity is named job time. The job

time objectives are considered to be fulfilled if the following two cases are accomplished: 1) workers complete the assigned job-related activities effectively in proper span of time and 2) products and services are shipped in timely manner (Na-Nan *et al*., 2018). It is suggested to take job time into account when it comes to evaluating job performance of employees (Na-Nan & Chalermthanakij, 2012).

Multi-dimensional theory of innovative work behavior was proposed and developed by De Jong and Den Hartog in 2010 (De Jong & De Hertog, 2010). The theory includes the following four innovative work behavior dimensions: the idea of exploration, generation, championing and the idea of implementation.

The process of innovation usually commences with the recognition of opportunities and identification of potential issues. The reason for these actions usually comes upon a possibility to modify or enhance certain processes or to eliminate risks. Opportunities emerge in various ways and the main sources are considered to be unforeseen triumphs or collapses, discrepancy between the real surrounding and the desirable scenario, remarkable shifts in the market, modifications in demographics, formation of a new value-system and new set of data. The exploration of ideas means chasing the possibilities to make processes or items better in various contexts (De Jong & De Hertog, 2010; Basadur, 2004).

The idea generation is the dimension associated with fresh starts, the enhancement of processes, and also tackling existing problems in general. The essence of this dimension lies in the conjunction of restructured data and already established ideas to make performance improvements (Leong & Rasli, 2014; Middlekoop, 2016).

The third dimension, which is idea championing, comes after the generation step. Due to the fact that most ideas differ greatly from what actually exists in the working environments, there is an urge to spread it effectively in the companies. In addition, it is hard to predict the ratio between gains and the actual expenses from the ideas' execution, even despite their potential full performance gap covering. As a result, numerous publications on innovation provide close attention to people who take informal role positions since they are more prone to inventing original solutions despite corporate setbacks. Thus, the formation of strong connections and unions based on peoples' mutual motivation to bring innovation and success to work concludes the full idea of championing (Howell *et al*., 2005; De Jong & De Hertog, 2010).

Lastly, the implementation idea, which is the fourth work behavior dimension, involves incorporating innovations into everyday working tasks and behaviors (product or process creation) and ensuring their permanent updating and adaptation. These all necessitates substantial dedication and a focus on outcomes (Tan *et al.,* 2023; Wang *et al*., 2022).

Thus, Multi-dimensional theory proposes that defining innovative work behaviors as a multi-dimensional construct helps accurately portray its' nature and phenomenon. Each one of the above presented dimensions constitutes the overall organization of innovative work behavior and, at the same time, all stand as peculiar elements (De Jong & De Hertog, 2010).

1.5 Relationships between the variables

1.5.1 Relationships between lean principles and job satisfaction

Following the results of the literature review research, implementation of lean principles has its main purpose in eliminating waste, increasing customer satisfaction, utilization of worker's capabilities, and continuous improvement (Göthberg & Simonchik, 2013; Barber, 2011; Ruželė, 2020; etc.), which all together can have a significant impact on job satisfaction in the workplace.

According to Shah and Ward (2002), lean principles often emphasize involving employees in problem-solving, decision-making, and process improvement initiatives. When employees have the opportunity to contribute ideas, make decisions, and take ownership of their work processes, they are more likely to experience engagement, to feel valued, and satisfied in their jobs (Rodríguez, 2015). Furthermore, lean encourages a culture of continuous improvement, where employees are encouraged to identify opportunities for enhancing processes, increasing efficiency, and delivering better results. Encouraging employees to engage in ongoing learning opportunities and development initiatives not only enhances their skills but also contributes to job satisfaction. When employees feel challenged, have room for growth, and can see the impact of their contributions, it boosts their motivation and satisfaction at work (Müller & Leyer, 2022; Varadaraj & Ananth, 2020; Schwarz *et al.,* 2016; Seppälä & Klemola, 2004). Effective implementation of lean principles in organization includes positive feedback form the leaders of the company as well as recognition of an employee's individual efforts and achievements, which improves the employee's self-value and results in increased job satisfaction.

On the other hand, some studies have shown negative impact of lean principles on job satisfaction through increased stress, increased workload, lack of recognition, or resistance to change (Bouville & Alis, 2014; Huo *et al.,* 2022; Hasle, 2012; Tajri *et al*., 2013). The results of these studies highlight that successful implementation of lean principles leading to increased job satisfaction is strongly influenced by the positive attitude of employees to the changes following and the leadership style adopted in the organization (Varadaraj & Ananth, 2020). So, it's crucial for organizations implementing lean principles to be aware of the potential negative impact on job satisfaction in case of poor communication and management mistakes.

Based on the analyzed studies and assumption of successful managerial implementation of lean principles, the first hypothesis of the current research was formulated.

Hypothesis 1: Lean principles implementation in an organization positively impacts employees' job satisfaction.

1.5.2 Relationships between lean principles and employee engagement

Lean principles and employee engagement are closely interconnected, and it seems obvious that the principles of lean management often lead to higher levels of employee engagement. Still, this type of relationships seems one of the most arguable for the current research. Most researchers come to a conclusion that lean principles implementation has a twofold impact on employee engagement. Thus, principles based on problem-solving demands are positively correlated with employee engagement, while principles of lean management based on quantitative demands show negative influence on the level of employee engagement through the increased level of exhaustion or stress (Huo *et al.,* 2022; Beraldin *et al.,* 2019; Kleef *et al*., 2023). Mostly that negative influence is explained by mistakes in the process of lean implementation such as communication issues or low level of employee involvement. If employees are not aware of the reasons for implementing lean principles or the possible changes that may occur after it, or if employees are not involved in the decision-making process, this can hinder employee engagement. But if implemented thoughtfully and with consideration for the workforce, lean principles can contribute greatly and improve employee engagement within an organization in the following ways (Hamid *et al.,* 2020; Ahmad & Ahmad, 2024).

Firstly, as one of the basic principles of lean management is continuous improvement, employees are actively involved in defining organizational mistakes, providing solutions, and suggesting ways of putting their ideas into practice in order to improve results. Motivating employees to participate in these processes increase their engagement (Sayyada & Divya, 2023; Kurnia & Hendriani, 2023; Ritu, 2024).

Secondly, successful implementation of lean principles often requires efficient teamwork and collaboration which in their turn promote effective problem-solving. Understanding the role of an individual involvement in this process helps employees to build strong relationships based on trust and a sense of common purpose and shared goals, which leads to higher levels of employee engagement (Sayyada & Divya, 2023; Salmah *et al.,* 2024).

Lean organizations prioritize noticing and rewarding employees for their role in making processes better and achieving goals. Regular feedback, praise, and acknowledgment of employees' efforts and achievements helps to boost morale, keep motivation high, and make employees feel valued. This appreciation and recognition of employees' valuable contributions can sufficiently increase employee engagement and create a positive work environment (Kleef *et al*., 2023; Simoncini & Socci, 2017; Weerasooriyan & Alwis, 2017).

Based on the results of the research on the relationship of lean principles and employee engagement, we predict that the main characteristics of lean management such as empowerment,

continuous improvement, focus on value, feedback, recognition etc. have a positive impact on employee engagement within an organization.

Hypothesis 2: Lean principles implementation in an organization positively impacts employee engagement.

1.5.3 Relationships between lean principles and individual performance

The relationships between lean principles and individual performance are significant and can have a profound impact on an organization's overall effectiveness and efficiency (Hamid *et al.*, 2020; Tan *et al.,* 2023; Möldner *et al*., 2018).

Every principle of lean management and every step of its implementation is based on the need for employees who are highly skilled, easily trained and possess creative thinking (Hamid *et al.,* 2020). As a result, employee involvement is a key factor of the successful implementation of lean principles which require continuous improvement and full utilization of employee's capabilities. The ability of employees to be trained in order to meet all the requirements of the five lean principles can increase their autonomy and empower them to implement their knowledge and efforts with the view of achieving higher performance (Odero & Makori, 2018). Thus, employee involvement increases empowerment which in turn promotes employee innovative behaviour and, as a result, enhances individual performance.

While lean implementation requires from employees of all levels to develop new skills including teamwork and collaboration, problem-solving and decision-making, communication and others, employees acquire these skills through training and continuous improvement which lead to the improved individual performance and better results for the company (Leong & Rasli, 2014; Kennedy & Brewer, 2007).

Furthermore, lean principles include standardized work processes aimed at defining value, mapping the value stream and creating flow. These processes are clearly defined and must be followed consistently. While employees have standardized procedures in their job places and they know how and what they must do to achieve results, they can work more efficiently, minimize errors, and thus increase a higher level of individual performance (Hamid *et al*., 2020; Hasle, 2012; Tan *et al.,* 2023).

A thorough analysis of the research papers on the relationships between lean principles and individual performance showed that the adoption of lean principles in an organization can positively impact individual performance by fostering a culture of continuous improvement, empowerment, standardized work, skills development, and customer focus. This positive correlation was supported by the empirical studies of Möldner and the colleagues (2018), Hamid

and co-authors (2020), Kennedy & Brewer (2007) and other researchers, which helped to formulate the third hypothesis for the current research.

Hypothesis 3: Lean principles implementation in an employee workplace positively impacts individual performance.

1.5.4 Relationships between individual performance and job satisfaction

For a long time, researchers failed to find any correlation between the concepts of individual performance and job satisfaction which according to Organ (1997) could be explained by a very narrow definition of individual performance as performing a specific task. Broadening the definition of individual performance and defining task performance, contextual performance, adaptive performance and counterproductive work behaviour as its significant parts can provide evidence of a stronger relationship between individual performance and job satisfaction. This evidence can be found in numerous works of the last two decades.

Noticeably, the ambiguity of the results gained by researchers investigating the relationships between individual performance and job satisfaction is similar to that of employee engagement and job satisfaction discussed in part 1.5.4 of this chapter. On the one hand, it may be unexpected that the outcomes of these studies are quite ambiguous while the relationship between individual performance and job satisfaction may appear simple and logical. Satisfied employees should excel in their job tasks. However, numerous studies reveal that this correlation is multi-faceted and two-directional (Platis *et al*., 2015; Yanchovska, 2021).

Some scientific studies have found that individual performance influences job satisfaction. They claim that job satisfaction can be a consequence of an employee individual performance since those employees who perform well and show better outcomes are likely to feel satisfied in the jobs especially if their performance is recognized and valued (Singh, 2017; Ariani, 2023). On the other hand, the level of satisfaction employees experience in their job greatly influences various aspects of organizational life, such as productivity, financial growth, career and professional opportunities, etc. (Memon *et al*., 2023; Ariani, 2023, Rehman & Solikhah, 2023). Satisfied employees demonstrate higher levels of individual performance in comparison with dissatisfied colleagues which makes it essential for every organization to implement strategies to motivate their employees and increase their level of job satisfaction (Memon *et al.,* 2023).

Effective implementation of lean principles in organization includes positive feedback form the leaders of the company as well as recognition of an employee's individual efforts and achievements, which improves the employee's self-value and results in increased job satisfaction

(Müller & Leyer, 2022; Varadaraj & Ananth, 2020; Schwarz *et al.,* 2016). Based on this, the fourth hypothesis of the research can be developed.

Hypothesis 4: Job satisfaction mediates the relationship between lean principles and individual performance.

1.5.5 Relationships between employee engagement and individual performance

Employee engagement acts as a mediator between job satisfaction and individual performance. High levels of job satisfaction can lead to increased employee engagement (Memon *et al.,* 2023, Ariani, 2023; Rehman & Solikhah, 2023). Some studies suggest that increased job satisfaction results in higher levels of employee engagement while employees satisfied with their jobs are more likely to demonstrate better engagement (Schaufeli & Bakker, 2004; Shabane *et al*., 2022). They claim that the demanding aspects of a job can increase employees' potential and unfold their hidden abilities leading to a feeling of fulfillment among them, which in turn enhances employee engagement. But there is no unanimity in the degree of influence of job satisfaction on employee engagement since some researchers prove it to be moderate and others believe that job satisfaction is a crucial driver of employee engagement (Singh, 2017).

Engaged employees are more likely to put in the effort to excel in their roles, go above and beyond job requirements, and actively contribute to achieving organizational objectives. By mediating the relationship between job satisfaction and individual performance, employee engagement plays a crucial role in enhancing individual performance. Engaged employees who are satisfied with their job are more likely to demonstrate higher levels of productivity, creativity, quality of work, and overall performance (Singh, 2017; Simanjuntak *et al.,* 2023). To sum up, the positive relationship between job satisfaction, employee engagement, and individual performance forms a continuous improvement cycle within the organization. When employees are satisfied, engaged, and perform well individually, it often leads to a more productive and thriving work environment, benefiting both the employees and the organization. This conclusion helps to develop hypothesis 5.

Hypothesis 5: Employee engagement mediates the relationship between job satisfaction and individual performance.

After a thorough analysis of both theoretical literature reviews and empirical studies on the relationships between lean principles, job satisfaction, employee engagement and individual performance, it can be concluded that employee engagement plays a mediating role in the

relationships between lean principles and individual performance, as well as between job satisfaction and individual performance.

When a company successfully implements lean principles, it can create a work environment that promotes clear communication, empowerment and involvement, teamwork and collaboration, recognition and continuous improvement (Göthberg & Simonchik, 2013; Barber, 2011; Ruželė, 2020; Shah & Ward, 2002). These factors can contribute to increased employee engagement as employees feel empowered, involved in decision-making process, and recognized and valued for their contributions (Rodríguez, 2016; Müller & Leyer, 2022; Schwarz *et al.,* 2016). Through the mediation of employee engagement, the positive effects of lean principles on individual performance are amplified. Engaged employees who work in a lean environment are more likely to be committed, productive, and focused on achieving high levels of performance. They are also more inclined to embrace change, take ownership of their work, and continuously seek opportunities for improvement (Schaufeli & Bakker, 2004; Shabane *et al.,* 2022; Bornasal, 2024). To sum up, the combination of lean principles, employee engagement, and individual performance forms a continuous improvement cycle within the organization. As employees become more engaged through the implementation of lean practices, they are likely to drive improvements in individual performance, ultimately benefiting the organization as a whole. This outcome helps to develop hypothesis 6.

Hypothesis 6: Employee engagement mediates the relationship between lean principles and individual performance.

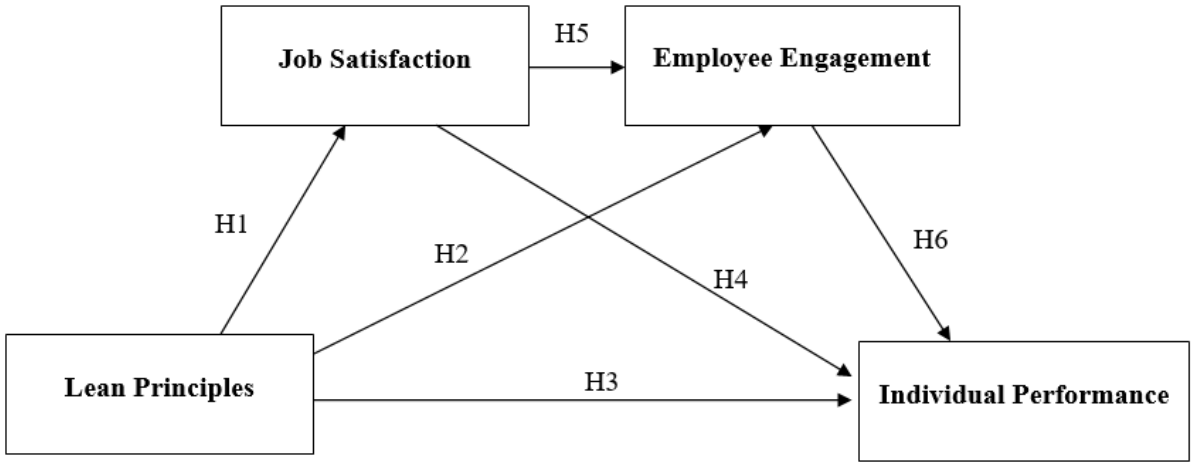
1.5.6 Conceptual framework

Based on the ideas discussed in parts 1.5.1-1.5.5, a complex conceptual framework of lean principles, job satisfaction, employee engagement, and individual performance was developed (*Figure* 4). The framework includes the following variables:

1. Lean Principles as independent variable which represents the implementation of lean principles within an organization.
2. Job satisfaction as dependent variable and mediating variable which is both directly influenced by lean principles and directly influencing individual performance.
3. Employee engagement as dependent variable and mediating variable which is both directly influenced by lean principles and directly influencing individual performance.
4. Individual performance as dependent variable which is widely influenced by lean principles and job satisfaction (directly and through mediating role of employee engagement) and by employee engagement directly.

Figure 4

Complex conceptual framework for possible relationships between lean principles, job satisfaction, employee engagement and individual performance



Source: author

As this study examines the impact of lean on employee engagement, job satisfaction, and individual performance, this research paper is guided by 4 theoretical frameworks respectively: Lean Social Pillar Theoretical Framework (McMackin & Flood, 2019), Three-dimensional theory of employee engagement (Schaufeli & Bakker, 2004), the Theory of Work Adjustment (Dawis & Lofquist, 1984), and Employee job performance theory and Multi-dimensional theory of innovative work behaviour (Na-Nah *et al.,* 2018; De Jong & De Hertog, 2010).

All of five theories are significant to this research since they accurately represent and anticipate the phenomena of lean, employee engagement, job satisfaction, and individual performance, and thus, were discussed in greater detail in sections 1.1 – 1.4 of this chapter.

Lean Social Pillar Theoretical Framework (McMackin & Flood, 2019) integrates empirical lean research with research on organizational culture, leadership, HR strategy, change management and the relational coordination theory (RCT). This framework adopts a linkages perspective (Goodman, 2000), which recognizes that organizational context factors (foundations) affect behaviours at the group (relational coordination) and individual levels (employee responses) (McMackin & Flood, 2019).

Three-Dimensional Theory of Employee Engagement (Schaufeli & Bakker, 2004) provides the definition of work engagement including the three constituting aspects of it: vigor, dedication, and absorption. Based on the definition, a self-report questionnaire – called the Utrecht Work Engagement Scale (UWES) – has been developed. The survey is in line with the research objective of evaluating the impact of lean practices on employee engagement.

The Theory of Work Adjustment (Dawis & Lofquist, 1984) was chosen to steer the study as it provides a foundation for evaluating employees' job satisfaction level. The theory played a major role in the development of the Minnesota Satisfaction Questionnaire (MSQ). Whilst the MSQ was meant to assess job satisfaction based on particular features of job and work environment, it also determines general/total job satisfaction (Weiss *et al.,* 1967), which is a perfect fit for the goals of this study, which includes evaluating how lean practices affect employees' job satisfaction.

Employee job performance theory and Multi-dimensional theory of innovative work behaviour (Na-Nah *et al*., 2018; De Jong & De Hertog, 2010) which serve as a guide toward understanding the construct of individual work performance. The first theory accounts for the task performance factor of the overall individual performance of an employee, which is substantial in job performance ratings. The second theory played an important role in the development of four dimensions of innovative work behaviour. The importance of these dimensions, and the exact indicators associated with each dimension, may differ depending on the context involved. Based on the ideas of Employee job performance theory and Multi-dimensional theory of innovative work behaviour the authors of the theories created questionnaires the Employee job performance scale (EJPS) and Innovative work behaviour measure (IWBM), which fit one of the objectives of the current research, namely to evaluate the impact of lean on individual performance.

2. METHODOLOGY

2.1 Research design, approach and strategies

As the main purpose of this research was to evaluate the impact of lean (independent variable) on employee engagement, job satisfaction, and individual performance (dependent variables) the following designs were utilized in the current research.

A regression design was applied in the research to explore the relationship between an independent variable (lean principles) and dependent variables (job satisfaction, employee engagement and individual performance). It helped to understand how changes connected with the implementation of lean principles are associated with changes in employees' job satisfaction, engagement and individual performance. Regression analysis allowed us to model the relationship between variables, make predictions, and infer causal relationships.

A mediation regression design was applied in the current research to determine whether the effect of the independent variable (lean principles) on the dependent variable (individual performance) is mediated by the mediator variables (employee engagement and job satisfaction). It helped to provide a better understanding of the underlying processes or mechanisms through which lean principles implementation influences individual performance.

A regression design was applied in this research to answer the question "What is the impact of lean on employee engagement, job satisfaction, and individual performance?" and to meet the following objectives of the research: upon investigating, to evaluate the impact of lean on employee engagement, on job satisfaction of employees, lean on individual performance.

To answer the research question, specifically the impact of lean on employee engagement, job satisfaction, and individual performance, cross-sectional design was applied since all the necessary data were collected at one specific moment from a sample representing a population (Saunders *et al*., 2016).

In this research, the deductive approach was utilized. Following this approach, a developed conceptual framework was tested on the basis of the data collected. The study draws from existing theories, with research questions and objectives formulated subsequent to a detailed literature review and recent research findings (McMackin & Flood, 2019; Schaufeli & Bakker, 2004; Dawis & Lofquist, 1984; Koopmans *et al*., 2011; Memon *et al*., 2023, Ariani, 2023; Rehman & Solikhah, 2023; Huo *et al*., 2022; Beraldin *et al.,* 2019; Kleef *et al*., 2023).

This research paper employed the quantitative method to examine the impact of lean as an independent variable on job satisfaction, employee engagement and individual performance as

dependent variables with employee engagement and job satisfaction also playing the role of mediating variables in the relationships between lean and individual performance. As tools for the research the following survey instruments were used: The Perceived Adoption of Lean Principles Questionnaire (Psomas *et al.,* 2023), Utrecht Work Engagement Scale (Schaufeli & Bakker, 2004), the Minnesota Satisfaction Questionnaire (Maslach *et al.,*1996), the Individual Job Performance Scale (Na-Nah *et al.,* 2018), and the Innovative Work Behaviour Measure (De Jong & De Hertog, 2010). These tools were chosen because they allow researchers to gather quantitative data which can be then analyzed statistically.

This research study is explanatory because its main aim is to explain the reasons and causes behind the analyzed relationships, hence providing both the examination of the impact of lean on job satisfaction, employee engagement, and individual performance and in-depth analysis of the relationships between the mentioned variables.

2.2 Questionnaire Tools

The following tools were used to collect the data for this research: The Perceived Adoption of Lean Principles Questionnaire, Utrecht Work Engagement Scale, the Minnesota Satisfaction Questionnaire (short version), the Individual Job Performance Scale, and the Innovative Work Behaviour Measure.

Beginning from the 1990s researchers in the field of business management have used various instruments for assessing the adoption of lean in organizations. Most of these tools were focused on lean managers, or organization performance. Employees' perceptions regarding the adoption of lean principles were studied by Psomas *et al.* (2023). For that purpose, **the Perceived Adoption of Lean Principles Questionnaire** was developed. This questionnaire consists of the 38 statements specified on the basis of eight fundamental lean principles: 1) understanding the needs of the customers of the public services organization; 2) establishment of value streams in the public services organization; 3) creating flows within the value streams in the public services organization; 4) application of the pull approach in the public services organization; 5) striving for value perfection in the public services organization; 6) leadership style in the public services organization; 7) individual responsibility in the public services organization; 8) continuous improvement in the public services organization (Table 2). The perceived adoption of all the lean principles was evaluated through respective measured variables. The respondents were asked to rate the statements presented in the questionnaire on a scale of 1-5 (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree).

Table 2

Perceived Adoption of Lean Principles Questionnaire

Understanding the needs of the customers of the public services organization
In my area of operations, I know the utility of my activities for external customers
In my area of operations, I am continuously concerned about the utility of my activities for external customers
In my area of operations, I know how satisfied external customers are with the products/services I am involved with
Establishment of value streams in the public services organization
In my area of operations, I know which products/services my activities are contributing to
I broadly know the activities which are necessary to finish these products/services for external customers
I am continuously coordinating the work on these products/services with every relevant employee involved (also outside my area of operations)
There are key performance indicators for my activities which reflect the satisfaction of external customers
In my area of operations, together with colleagues, mainly working on activities for one group of products
Creating flows within the value streams in the public services organization
The reduction of cycle time (not working time) of customer orders, together with my colleagues being involved, is an important goal of my daily work
I collect similar orders for my activities to do batch processing
My workstation is designed by default to ensure that I can perform my activities without delays (e.g. without search times)
There are rules for reaction times in case of internal requests
There is a continuous coordination with every relevant employee (also outside my area of operations) with regard to the products I am involved with to avoid a backlog of work
There are representation rules for the most important activities in my area of operations
There are clear decision-making competencies of my leader or other colleagues in case of uncertainties in the execution of my activities
Application of the pull approach in the public services organization
I work only on demand by internal/external customers
In my area of operations, the capacity planning is based on the demand of internal/external customers
Striving for value perfection in the public services organization
I always check my work results in detail
My work results will not be double checked – except for legal requirements – by colleagues or leaders
There are labelings for my work (e.g. plausibility checks in software programs, clear color markings, . . .) which help me to avoid typical mistakes
Information for the execution of my work (e.g. work instructions) is visualized at my workstation
If I detect possibilities for improvements, I implement these or inform the responsible employee
I use documented customer complaints to improve our operations in my area
In my area of operations, I continuously check implemented improvements to our operations
Information regarding the goal achievement in my area of operations is visible for every employee in this area
Leadership style in the public services organization
My direct leader is a role model regarding changes which affect my area of operations
I am a long way (spatial-related) from my leader
In my area of operations, there are regular discussions during the year between leaders and employees with the goal of personal development
I know the connection between the goals of my area of operations and the company goals
The control of activities in my area of operations is based on key performance indicators
Individual responsibility in the public services organization
I bear the responsibility for the result of my daily work
I have the possibility to implement new ideas to improve the activities in my area of operations during my working time
I discuss the results of our current activities continuously with the team
I discuss the goals of upcoming activities continuously with the team
Continuous improvement in the public services organization
I continuously think about how the existing activities can be improved in my area of operations
In my area of operations, it is of the upmost importance that the person identified as the causer of the problem bears the consequences
There are regular meetings to discuss the avoidance of typical problems in my area of operations
In my area of operations, actions to avoid mistakes are identified with the persons involved

Source: Psomas *et al*., 2023, p. 1542-1543.

The second questionnaire that was applied for the purpose of this research was developed by Schaufeli & Bakker (2004). **Utrecht Work Engagement Scale** (UWES) includes the three constituting aspects of employee engagement – vigor, dedication, and absorption – with a total of 9 statements about how employees feel at work (Table 3). The respondents were instructed to read each statement carefully and decide if they ever feel this way about their job putting numbers from 0 to 6 demonstrating how frequently they feel this way (0 = never, 1 = almost never (a few times a year or less), 2 = rarely (once a month or less), 3 = sometimes (a few times a month), 4 = often (once a week), 5 = very often (a few times a week), 6 = every day). The mean scale score of the three UWES subscales is counted by adding the scores on a particular scale and dividing the sum by the number of items of the subscale involved (vigor, dedication, or absorption). A similar procedure is followed for the total score. Hence, the UWES provides three subscale scores and/or a total score that ranges between 0 and 6.

Table 3

Utrecht Work Engagement Scale

Vigor
At my work, I feel bursting with energy
At my job, I feel strong and vigorous
When I get up in the morning, I feel like going to work
Dedication
I am enthusiastic about my job
My job inspires me
I am proud on the work that I do
Absorption
I feel happy when I am working intensely
I am immersed in my work
I get carried away when I'm working

Source: Schaufeli & Bakker, 2004, p. 21.

The third questionnaire that was used in the current research is the short version of **Minnesota Satisfaction Questionnaire** (MSQ) developed by Maslach *et al.* (1996). This tool was used to meet the objectives of this research due to its extensive application and considerable value in the assessment of employees' job satisfaction. The MSQ is a survey that is inclusive of all genders and assesses overall job satisfaction levels along with its intrinsic and extrinsic components. Intrinsic elements of job satisfaction encompass the following factors: acknowledgement, personal social status, authority, etc., whereas extrinsic ones involve inquiries regarding working conditions, prospects of professional growth, workload, remuneration, colleagues, organizational policies, and more. Total job satisfaction accounts for the general level of job satisfaction (Weiss *et al.,* 1967). The statements included in the questionnaire are presented

in Table 4. The survey employed a five-level Likert scale with the following answer options: 1 = very dissatisfied, 2 = dissatisfied, 3 = neither dissatisfied nor satisfied, 4 = satisfied, 5 = very satisfied.

Table 4

Minnesota Satisfaction Questionnaire

On my present job, this is how I feel about…
Intrinsic Aspect
Being able to keep busy all the time
The chance to work alone on the job
The chance to do different things from time to time
The chance to be 'somebody' in the community
Being able to do things that don't go against my conscience
The way my job provides for steady employment
The chance to do things for other people
The chance to tell people what to do
The chance to do something that makes use of my abilities
The freedom to use my own judgement
The chance to try my own methods of doing the job
The feeling of accomplishment I get from the job
Extrinsic Aspect
The way my boss handles his/her workers
The competence of my supervisor in making decisions
The way organization policies are put into practice
My pay and the amount of work I do
The praise I get for doing my job
Total Job Satisfaction (additional)
The working conditions
The way my co-workers get along with each other

Source: Weiss *et al.,* 1967

The fourth questionnaire that was utilized for the purpose of this research was the **Individual Job Performance Scale** (EJPS) developed by Na-Nan *et al.* (2018). The scale represents a 13-item questionnaire measuring three main factors of task performance, namely job time, job quality, and job quantity (Table 5). The three target dimensions were assessed with four, five and four questions respectively. In the current procedure, the respondents were asked to categorize items based on how similar they are to construct definitions. Self-reported data was gathered using a five-point Likert scale, where 1 = strongly disagree, 2 = disagree, 3 = indifferent, 4 = agree, and 5 = strongly agree.

Table 5

Individual Job Performance Scale

Job Quality
Tasks are performed attentively and correctly
Tasks are completed as per the specifications and standards
Materials and tools meet the set criteria and standards
Quality inspection is conducted prior to the delivery of goods or services
Products or services meet the expectations of customers
Job Quantity
The units of output are in sync with the number of employees
The units of output meet organizational expectations
The units of output under my responsibility correspond to my skills and ability
The quantity assignment is always fulfilled
Job Time
Tasks are normally completed on schedule
Tasks are carried out within a reasonable amount of time
The delivery of goods or services is conducted in a timely fashion
I achieve time-related organizational goals

Source: Na-Nan *et al*., 2018, p. 2439

The fifth questionnaire used in the research was the **Innovative Work Behaviour Measure** (IWBM) developed by Choi *et al.* (2021). The questionnaire consists of 6 statements, jointly measuring the four dimensions of innovative behaviour of employees – idea exploration, generation, championing and implementation (Table 6). Responses varied from 1 to 5, where 1 = never, 2 = almost never, 3 = sometimes, 4 = often, 5 = always. Cronbach's alpha = 0.89 (Choi *et al*., 2021).

Table 6

Innovative Work Behaviour Measure

I search out new ideas, techniques, processes and technologies
I generate creative ideas
I promote and champion ideas to others
I investigate and secure funds needed to implement new ideas
I develop adequate plans and schedules for the implementation of new ideas
I am innovative

Source: Choi *et al*., 2021, p. 14

2.3 Data collection, population and sampling technique

Since the idea behind this research lies in the addressing the limitations of previous studies in the field of lean management and production, in the current study, the target population was employees of all positions at companies with implemented lean management. The research was conducted at companies from different professional sectors. The empirical research was possible to be conducted among the employees of various organizations in Lithuania and Estonia. The invitations to participate in the survey were distributed via social networks such as LinkedIn, Facebook and via e-mail. The respondents were informed about the purpose of the research, its importance for future research and its possible implications. The participants were informed that the study is entirely voluntary and anonymous, and it was also noted about an option to withdraw from the survey at any moment.

The five online questionnaires were distributed among the employees of lean organizations. The participants were able to choose the language of the questionnaires – English, Lithuanian or Estonian. The original questionnaires were translated from the English into the Lithuanian and Estonian languages.

A non-probability convenience and a snowball sampling were applied to reach the participants of the research. Non-probability convenience sampling is a method used when participants are selected based on their availability and ease of recruitment, rather than through random selection from the entire population (Saunders *et al.,* 2016). The current research aimed to select only employees of lean organizations from the whole population of the working population across Lithuania and Estonia. Maximizing the number of responses was a priority, thereby boosting the chances of credibility. That is the ground for another technique that was used in this research – a snowball sampling. It was applied as the population of interest could be hard to reach.

Overall, 230 employees filled out online surveys created in the Google forms. All the forms were filled out correctly by employees from lean organizations. The survey specifically targeted only employees of lean organizations as its primary criterion.

2.4 Statistical Analysis

Statistical Package for Social Sciences (SPSS) software was used for the statistical analysis of the collected data. Since 5 surveys consisted of multiple Likert scales and were translated into the other languages (Lithuanian and Estonian), the Cronbach's alpha test was applied to measure the questionnaires' reliability and estimate internal consistency of all scales with Likert-type statements used in the study.

In the next step, descriptive statistical analysis was conducted to calculate the normality distribution of the study variables, such as means and standard deviation. In addition, kurtosis and skewness tests were used to calculate the symmetry distribution of the research variables and graphically represent the level of their 'peakedness'.

Afterwards, the linear regression analysis was used for the purpose of finding out how the independent variable (lean principles) impacts the dependent ones (employee engagement, job satisfaction, and individual performance) and mediator variables (employee engagement and job satisfaction) as well as to examine the correlation between all the variables and determine the predictors of their relationships. The results of the above-mentioned tests helped to accept or reject the established hypotheses in the research model.

3. EMPIRICAL STUDY RESULTS

3.1 Descriptive data statistics

Distribution of the questionnaires chosen for the current study was conducted via social networks LinkedIn and Facebook, and via e-mail. In total, 250 invitations were sent to the staff of lean organizations in Estonia and Lithuania. While 16 employees did not respond, and 4 responses were estimated as invalid, 230 valid responses were received.

In the current research the respondents were asked general questions about the country and industry they work in, and the job position they take in the company. Table 7 provides a breakdown of respondents by these three characteristics.

Table 7

A breakdown of respondents by country, industry, and job position

	Frequency	Percent
Country		
Lithuania	100	43.5
Estonia	**130**	**56.5**
Industry		
Aerospace	**90**	**39.1**
IT	44	19.1
Logistics	38	16.5
Manufacturing	58	25.2
Job position		
Employee	**114**	**49.6**
Manager	59	25.7
Supervisor	57	24.8

Source: own analysis

Table 7 shows that most of the respondents, 130 out of 230 (56.5%), are from Estonia with Lithuania having a slightly lower representation (43.5%).

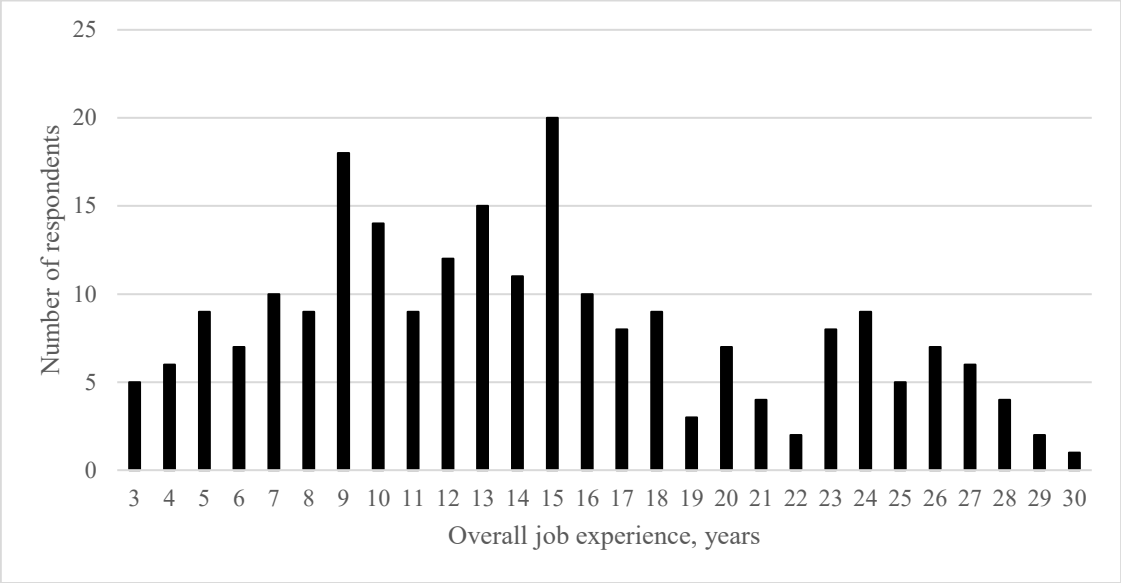
Respondents who participated in the current research include representatives of four industries: aerospace, IT, logistics, and manufacturing. The highest proportion in the industry set is represented by respondents who work in the aerospace industry (39.1%), while personnel of the IT industrial sector constitute the second largest group (19.1%).

As is also shown in Table 7, various organizational levels are represented in the research with employees comprising the largest group of 114 out of 230 respondents (49.6%). Around a quarter of managers (25.7%) and supervisors (24.8%) among the respondents allows for the valuable analysis of data across the organizational hierarchy.

The survey showed that the highest number of respondents (8.7%) have 15 years of overall job experience. 77 out of 230 respondents (33.5%) have 10 or less years of overall job experience. 55 respondents (23.9%) have been employed in organizations for 20 years or more (Figure 5).

Figure 5

Overall job experience of respondents

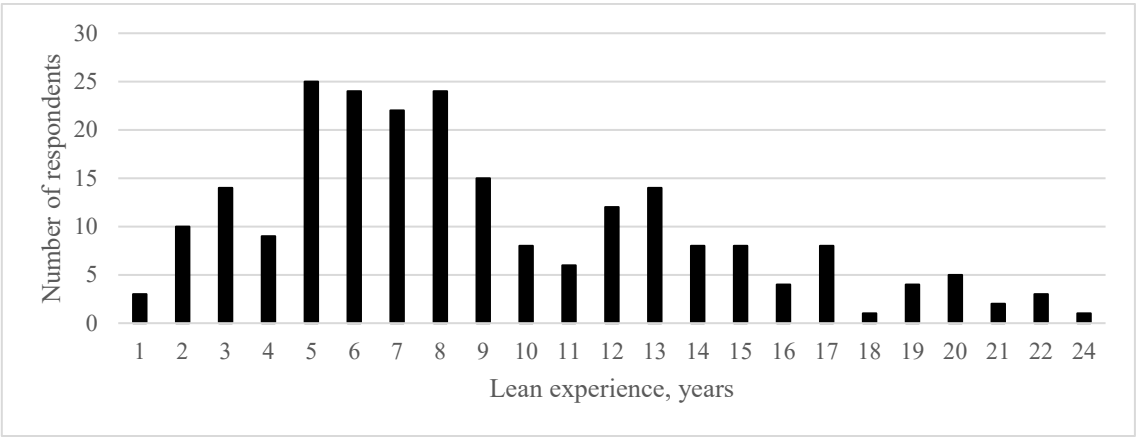


Source: own analysis

The results show that most respondents have 5 years of lean experience in the employing organizations (10.9%). The overwhelming majority of respondents (66.9%) have 10 or more years of lean experience, with only 4.8% of respondents experiencing lean management in their companies for 20 years or more (Figure 6).

Figure 6

Lean experience of respondents



Source: own analysis

Mean of overall job experience and lean experience of respondents of the current research is shown in Table 8.

Table 8

Calculated mean of overall job experience and lean experience of respondents

	Overall job experience	Lean experience
Mean	14.41	9.05

Source: own analysis

Descriptive data statistics can be summarized as follows:

- respondents are fairly distributed between two countries: Estonia and Lithuania;
- most of the respondents work in the aerospace industry;
- respondents are evenly distributed across the organizational hierarchy;
- most of the respondents have 15 years of overall job experience
- most of them have 5 years of lean experience

3.2 Data Normality and Reliability

Among various methods for assessing survey reliability, Cronbach's alpha is considered one of the most prominent and commonly used in research (Saunders *et al.,* 2016). Before analyzing the data, Cronbach's alpha was utilized to evaluate the reliability of a survey that included questionnaires on employee engagement, job satisfaction, innovative work behaviour, job performance and perceived absorption of lean principles. Cronbach's alpha test measures the internal consistency of Likert-type questions designed to assess a specific concept (Saunders *et al*., 2016). For the current research, the questions from the Minnesota Satisfaction Questionnaire (MSQ), the Innovative Work Behaviour Measure (IWBM), the Individual Job Performance Scale (IJPS) and the Perceived Adoption of Lean Principles Questionnaire (PALPQ) used a 5-point Likert scale and the questions from the Utrecht Work Engagement Scale (UWES) used a 7-point Likert scale. The alpha coefficient ranges from 0 to 1, with a value of .7 or higher indicating that the scale's questions effectively assess the same construct (Saunders *et al*., 2016). Generally, a coefficient of .9 or above is deemed "excellent," .80 to .89 is "good," .70 to .79 is "acceptable," and below .70 indicates questionable reliability (Cucos, 2022).

Within the scope of the current research, the reliability results of the questionnaires applied are shown in Table 9. Since all the coefficients are between .80 and .89 – 'good' reliability, – it can be concluded that the statements on the variables measured are consistent and sufficiently reliable.

Table 9

Normality, Reliability and Descriptive Statistics for Latent Variables

	Skewness	Kurtosis	Mean	Std. Deviation	Cronbach's Alpha
LP	-1.323	1.563	3.9134	.32893	.883
IWB	-1.134	.957	3.2754	.74618	.891
JP	-.918	1.001	4.1609	.40209	.856
EE	-.990	.636	3.9145	.76244	.862
JS	-1.279	1.122	3.7498	.37004	.847

Source: own analysis

Table 9 above also shows the results of the distribution analysis which was conducted to check normality of the data. Various acceptable ranges for skewness and kurtosis are suggested by different researchers. Thus, for kurtosis the intervals range from -2 to +2 (George & Mallery, 2019), from -7 to +7 (Byrne, 2016; Kline, 2023), from -10 to +10 (Brown, 2015). For skewness

the intervals range from -2 to +2 (Byrne, 2016; George & Mallery, 2019; Kline, 2023), from -3 to +3 (Brown, 2015). In the current research the skewness of the variables under analysis ranged between -1.323 and -0.990, while the kurtosis ranged between +0.636 and +1.563. This distribution allows for considering the data normally distributed and conducting regression analysis. Standard deviation intervals of the measured variables show high consistency in perceptions. Detailed descriptive statistics of research data on all the variables are given in Appendix.

3.3 Respondents' Level of Perceived Absorption of Lean Principles

To measure the level of the respondents' perceived absorption of lean principles we calculated the mean score on each principle. As the participants' responses were evaluated through a 5-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'), the mean score of 2.5 was considered as corresponding to the average level of perceived absorption of lean principles. The results of the calculated mean for lean principle 1 "Understanding the needs of the customers of the public services organization" are presented in Table 10. It can be seen from the table, that the mean scores on this subscale are very high with the average mean of 4.04 which shows that the companies under research emphasize the importance of recognizing and addressing the expectations, preferences, and requirements of their customers. The respondents engage with their clients for feedback, identify their needs in order to understand what services are the most important ones and what can be done to improve them, and ensure the accessibility of their services for the customers.

Table 10

Calculated Mean for Lean Principle 1 – Understanding the needs of the customers of the public services organization

Item	Skewness	Kurtosis	Mean	SD
1. In my area of operations, I know the utility of my activities for external customers	-1.016	2.048	4.10	.738
2. In my area of operations, I am continuously concerned about the utility of my activities for external customers	-.769	.258	4.08	.824
3. In my area of operations, I know how satisfied external customers are with the products/services I am involved with	-.892	.845	3.93	.831
Average	**-.892**	**1.05**	**4.04**	**.798**

Source: own analysis

The mean scores on the second lean principle, that is the establishment of value streams in the public services organization, show higher than average level of the perceived absorption of this principle among the employees who participated in the current research (Table 11). The average mean of 3.94 proves the systematic and efficient manner of the processes through which value is delivered to customers. The highest mean scores in statements 4 (4.13) and 7 (4.00) demonstrate that the respondents understand what "value" means for the customers and what key activities and steps are involved in delivering this "value". The results also show that the

employees are encouraged to work together to ensure smoother value streams and truly meet the needs of the customers.

Table 11

Calculated Mean for Lean Principle 2 – Establishment of value streams in the public services organization

Item	Skewness	Kurtosis	Mean	SD
4. In my area of operations, I know which products/services my activities are contributing to	-.778	1.593	4.13	.670
5. I broadly know the activities which are necessary to finish these products/services for external customers	-.921	1.982	3.93	.741
6. I am continuously coordinating the work on these products/services with every relevant employee involved (also outside my area of operations)	-.646	-.146	3.80	.882
7. There are key performance indicators for my activities which reflect the satisfaction of external customers	-1.143	2.130	4.00	.812
8. In my area of operations, together with colleagues, mainly working on activities for one group of products	-1.020	.392	3.81	.987
Average	**-.902**	**1.19**	**3.94**	**.818**

Source: own analysis

The calculated mean scores on the third lean principle – creating flows within the value streams in the public services organization – show a high level of perceived absorption of this principle (Table 12). Mean scores exceeding 4.00 in five out of total seven statements representing this principle clearly demonstrate the awareness of the respondents about the efficient processes that enable the effective delivery of services from start to finish. The results prove that the employees participating in the current research know how to minimize delays, reduce obstacles, track progress, manage data, and gather feedback, which all together allow for the consistent and quality flow in the value stream. This helps the companies operate more efficiently, respond more promptly to customer needs, and deliver higher-quality services.

Table 12

Calculated Mean for Lean Principle 3 – Creating flows within the value streams in the public services organization

Item	Skewness	Kurtosis	Mean	SD
9. The reduction of cycle time (not working time) of customer orders, together with my colleagues being involved, is an important goal of my daily work	-.837	.878	3.95	.772
10. I collect similar orders for my activities to do batch processing	-.785	.109	3.70	.955
11. My workstation is designed by default to ensure that I can perform my activities without delays (e.g. without search times)	-.271	1.793	4.08	.543
12. There are rules for reaction times in case of internal requests	-.588	1.697	4.19	.609
13. There is a continuous coordination with every relevant employee (also outside my area of operations) with regard to the products I am involved with to avoid a backlog of work	-.679	2.669	4.11	.585
14. There are representation rules for the most important activities in my area of operations	-.554	2.306	4.10	.576
15. There are clear decision-making competencies of my leader or other colleagues in case of uncertainties in the execution of my activities	-.593	2.416	4.05	.618
Average	**-.615**	**1.688**	**4.02**	**.665**

Source: own analysis

The mean scores on the fourth lean principle – application of the pull approach in the public services organization – are slightly lower than those of most other principles but they are still higher than average with 3.80 (Table 13). As this principle refers to the approach when services are delivered based on actual demand rather than predicted demand, the results prove that in the organizations whose employees participated in the research the resources are allocated more efficiently, and the services effectively meet their customers' needs. Prioritizing customers' requests and feedback, these organizations can better align their services with their clients' needs, can quickly adapt to changing demands or emerging issues, maintaining relevance and responsiveness in a dynamic environment, and can utilize their resources more effectively which in turn helps to reduce waste and improve efficiency.

Table 13

Calculated Mean for Lean Principle 4 – Application of the pull approach in the public services organization

Item	Skewness	Kurtosis	Mean	SD
16. I work only on demand by internal/external customers	-.593	2.416	3.73	1.014
17. In my area of operations, the capacity planning is based on the demand of internal/external customers	-.682	-.142	3.88	.832
Average	**-.638**	**1.137**	**3.80**	**.923**

Source: own analysis

The mean score of 3.88 on the fifth lean principle of striving for value perfection in the public services organization proves that the respondents are committed to delivering the highest possible value to customers with minimum waste and inefficiency (Table 14). The results show that the lean organizations systematically analyze and improve processes, implement strategies to reduce mistakes, and encourage their employees to actively seek excellence in their services. The respondents demonstrated a high level of understanding of their performance indicators based on their customers' feedback, which helps them achieve value perfection and increase customers' satisfaction.

Table 14

Calculated Mean for Lean Principle 5 – Striving for value perfection in the public services organization

Item	Skewness	Kurtosis	Mean	SD
18. I always check my work results in detail	-.379	-.061	4.28	.621
19. My work results will not be double checked – except for legal requirements – by colleagues or leaders	-.529	-.389	3.48	.988
20. There are labelings for my work (e.g. plausibility checks in software programs, clear color markings, etc.) which help me to avoid typical mistakes	-.961	3.875	4.02	.605
21. Information for the execution of my work (e.g. work instructions) is visualized at my workstation	-.944	2.129	4.05	.713
22. If I detect possibilities for improvements, I implement these or inform the responsible employee	-.699	.917	3.94	.719
23. I use documented customer complaints to improve our operations in my area	-.372	-.945	3.49	1.162
24. In my area of operations, I continuously check implemented improvements to our operations	-.771	.757	3.86	.799
25. Information regarding the goal achievement in my area of operations is visible for every employee in this area	-1.068	3.733	3.92	.601
Average	**-.715**	**1.252**	**3.88**	**.776**

Source: own analysis

The calculated mean scores for the sixth lean principle – leadership style in the public services organization – are presented in Table 15. The highest mean of 4.23 for "I know the connection between the goals of my area of operations and the company goals" indicates that the leaders of the companies provide a clear vision and direction for the organization, aligning team efforts toward shared goals and objectives. This helps everyone understand the role of their contributions. Being both role models for their employees and supportive colleagues at the same time, the leaders of the respondents create an environment where the latter feel promoted to communicate openly, to collaborate for better outcomes and to strive for continuous improvement. High mean scores on this principle also prove that adopting an effective leadership style that aligns with lean principles enhances the employees' perceived absorption of these principles.

Table 15

Calculated Mean for Lean Principle 6 – Leadership style in the public services organization

Item	Skewness	Kurtosis	Mean	SD
26. My direct leader is a role model regarding changes which affect my area of operations	-.601	.165	3.79	.795
27. I am a long way (spatial-related) from my leader	1.182	1.470	2.33	.889
28. In my area of operations, there are regular discussions during the year between leaders and employees with the goal of personal development	-1.121	2.487	3.90	.695
29. I know the connection between the goals of my area of operations and the company goals	-.593	3.856	4.23	.564
30. The control of activities in my area of operations is based on key performance indicators	-.605	3.663	4.10	.532
Average	**-.348**	**2.328**	**3.67**	**.695**

Source: own analysis

The high mean score of 4.01 on the seventh lean principle "Individual responsibility in the public services organization" illustrates a high level of understanding among the respondents of the importance of their personal individual work, decisions, contributions and achievements (Table 16). It also shows that the employees who participated in the survey clearly realize their specific responsibilities in delivering services and meeting the companies' goals. They are also encouraged to regularly take the initiative, offer innovative ideas and feel accountable for their work. This feeling of accountability for their performance and contributions allows the employees to see the direct impact of their actions on service delivery and customers' satisfaction. Alongside with the individual responsibility, the high mean scores on statements 33 and 34 demonstrate the importance of collaboration and discussion between team members.

Table 16

Calculated Mean for Lean Principle 7 – Individual responsibility in the public services organization

Item	Skewness	Kurtosis	Mean	SD
31. I bear the responsibility for the result of my daily work	-.797	1.311	4.31	.646
32. I have the possibility to implement new ideas to improve the activities in my area of operations during my working time	-.566	.175	3.70	.816
33. I discuss the results of our current activities continuously with the team	-.485	.691	4.04	.670
34. I discuss the goals of upcoming activities continuously with the team	-.683	.069	3.97	.881
Average	**-.633**	**.562**	**4.01**	**.753**

Source: own analysis

The calculated mean score of 3.93 on the continuous improvement in the public services organization which constitutes the eighth lean principle illustrates an ongoing effort to enhance services, processes, and practices to better meet the needs of customers and increase overall efficiency in the organizations whose employees participated in the survey (Table 17). The environment is created where, on the one hand, the employees are continuously evaluated, and their mistakes are discussed, but on the other hand, the areas for improvement are always identified and their pursuit of perfection is supported and encouraged. The results show that the respondents continuously think of ideas to contribute to the better outcomes of their organizations in order to enhance service quality, increase efficiency, and ultimately provide greater value to the customers.

Table 17

Calculated Mean for Lean Principle 8 – Continuous improvement in the public services organization

Item	Skewness	Kurtosis	Mean	SD
35. I continuously think about how the existing activities can be improved in my area of operations	-.691	.546	3.84	.760
36. In my area of operations, it is of the upmost importance that the person identified as the causer of the problem bears the consequences	-.548	1.758	3.95	.578
37. There are regular meetings to discuss the avoidance of typical problems in my area of operations	-.723	1.425	4.03	.673
38. In my area of operations, actions to avoid mistakes are identified with the persons involved	-.530	1.694	3.90	.636
Average	**-.623**	**1.356**	**3.93**	**.662**

Source: own analysis

The general overview of the mean scores of all the lean principles of the current research is presented in Table 18. Among the lean principles considered in the present study, 'understanding customers' needs', 'creating flows' and 'individual responsibility' are most commonly adopted by organizations according to the perception of their employees participating in the research. Two of these principles emphasize the human aspect of the organization, addressing both external (citizens) and internal (employees) needs. However, although the top management leadership style is well-regarded by the respondents, it is considered less implemented compared to other Lean principles. The emphasis on human-related lean principles is justified by the unique characteristics of these services, including intangibility, variability, and inseparability, which necessitate a high level of human interaction. Furthermore, lean principles related to process management – such as establishing value streams, creating flows within them, continuous improvement, and reducing waste – are also widely adopted according to the perception of the respondents, reflecting a shift towards new management methodologies within organizations. This shift aims to enhance the quality of services provided to citizens by optimizing processes and focusing on value creation. Still, all the mean scores but for 'continuous improvement' are slightly lower than the normative mean scores. The average mean score is 3.91, which is also lower than the normative 4.22. Overall, while the perceived adoption of lean principles is significant, there remains considerable opportunity for further enhancing lean implementation within these organizations.

Table 18

Calculated Mean for Lean Principles

Item	Skewness	Kurtosis	Mean	SD
P1. Understanding the needs of the customers of the public services organization	-.892	1.05	4.04	.798
P2. Establishment of value streams in the public services organization	-.902	1.19	3.94	.818
P3. Creating flows within the value streams in the public services organization	-.615	1.688	4.02	.665
P4. Application of the pull approach in the public services organization	-.638	1.137	3.80	.923
P5. Striving for value perfection in the public services organization	-.715	1.252	3.88	.776
P6. Leadership style in the public services organization	-.348	2.328	3.67	.695
P7. Individual responsibility in the public services organization	-.633	.562	4.01	.753
P8. Continuous improvement in the public services organization	-.623	1.356	3.93	.662
Average	**-.671**	**1.32**	**3.91**	**.761**

Source: own analysis

These results prove that the companies of the respondents adopt lean principles to a high extent, according to the perceptions of their employees who participated in the research. This indicates that these organizations are striving to change their traditional management approaches in line with modern paradigms to minimize waste and costs while enhancing the services they deliver to citizens.

3.4 Respondents' Level of Employee Engagement

To evaluate the level of employee engagement, the mean scores were calculated for each of the three dimensions that constitute the construct of employee engagement: vigor, dedication and absorption.

The mean scores were calculated for the questions of the 'vigor' subscale to estimate the average response rate for each of the provided statements. As the score of each statement can range from 0 (never) to 6 (every day), the score of 3 can be considered as the average mean. The results shown in Table 19 demonstrate that the average mean for the 'vigor' subscale is 3.40 which means that respondents feel bursting with energy, strong, vigorous and willing to go to work in the morning more often than 'a few times a month' but less often than 'once a week'.

Table 19

Calculated Mean for Vigor

Item	Skewness	Kurtosis	Mean	SD
1. At my work, I feel bursting with energy.	-.194	-.028	3.61	0.981
2. At my job, I feel strong and vigorous.	-.041	.026	3.47	1.096
5. When I get up in the morning, I feel like going to work.	-.197	.689	3.11	1.160
Average	**-.144**	**.229**	**3.40**	**1.079**

Source: own analysis

The mean scores for each of the statement of the 'dedication' subscale were calculated accounting for 3 as the average mean score of the questionnaire. As it can be seen in Table 20, the average mean on 'dedication' subscale is 3.81. The highest mean of 4.57 shows that the respondents often feel proud of the work they do. Since dedication involves deep emotions like inspiration, enthusiasm, and pride, the results of the research prove that most respondents demonstrate average engagement in their work and simultaneously experience a sense of significance.

Table 20

Calculated Mean for Dedication

Item	Skewness	Kurtosis	Mean	SD
3. I am enthusiastic about my job.	-.261	.402	3.32	1.114
4. My job inspires me.	.122	-.144	3.53	1.199
7. I am proud on the work that I do.	-.107	-1.066	4.57	1.070
Average	**-.082**	**-.269**	**3.81**	**1.128**

Source: own analysis

Having calculated the mean score for the statements on the 'absorption' subscale, we got the average mean of 4.54. The highest mean of 4.80 on the statements 'I am immersed in my work' and 'I get carried away when I'm working' shows that the participants of the research feel absorbed with their work quite often – more than once a week, and mostly they feel happy about it (Table 21). As absorption involves employees' concentration on their work, we can draw a conclusion that a majority of the respondents are often engrossed in their work and lose track of time riveting their attention on their responsibilities at work.

Table 21

Calculated Mean for Absorption

Item	Skewness	Kurtosis	Mean	SD
6. I feel happy when I am working intensely.	-.264	.366	4.03	1.040
8. I am immersed in my work.	-.437	-.785	4.80	1.085
9. I get carried away when I'm working.	-.772	-.181	4.80	1.197
Average	**-.491**	**-.20**	**4.54**	**1.107**

Source: own analysis

Using the statistical norms of the UWES, we defined that an overwhelming majority of the respondents – 73.91% – have an average level of engagement which suggests that employees are reasonably invested in their roles but may not be fully enthusiastic or proactive. This can impact productivity, retention rates, and overall organizational performance. The total average mean for employee engagement was 3.91 which means that mostly employees are satisfied but not fully motivated or committed.

3.5 Respondents' Level of Job Satisfaction

A statistical analysis and interpretation of the responses to the Minnesota Satisfaction Questionnaire were conducted to define the level of employees' job satisfaction. As part of the current research, the mean scores for each statement of the 'intrinsic' scale of job satisfaction were calculated. As the options ranged between 1 ('very dissatisfied') and 5 ('very satisfied'), the average mean score is 2.5. As it can be seen form the Table 22, the highest mean score of 4.19 indicates that the respondents feel satisfied with the opportunity to be 'somebody in the community', while the lowest mean of 3.50 shows that they often lack the chance to tell other people what to do. The results also show that the employees who participated in the research are often dissatisfied with their career opportunities, achievements, the nature of the work they do, advancement, and recognition.

Table 22

Calculated Mean for Job Satisfaction (Intrinsic)

Item	Skewness	Kurtosis	Mean	SD
1. Being able to keep busy all the time.	-.534	.994	3.53	.796
2. The chance to work alone on the job.	.103	-.569	3.78	.703
3. The chance to do different things from time to time.	-.116	-.789	4.10	.674
4. The chance to be "somebody" in the community.	-.480	.935	4.19	.623
7. Being able to do things that don't go against my conscience.	-.380	1.157	4.03	.598
8. The way my job provides for steady employment.	-.044	-.395	3.95	.656
9. The chance to do things for other people.	-.397	1.201	4.08	.601
10. The chance to tell people what to do.	-.532	.054	3.50	.875
11. The chance to do something that makes use of my abilities.	-.691	3.563	4.02	.576
15. The freedom to use my own judgment.	-.390	.566	3.64	.756
16. The chance to try my own methods of doing the job.	-.419	.063	3.75	.752
20. The feeling of accomplishment I get from the job	-.234	.177	3.62	.799
Average	**-.343**	**.580**	**3.85**	**.701**

Source: own analysis

The mean scores calculated for each statement of the 'extrinsic' scale (with average mean being 2.50) and presented in Table 23 suggest that the participants are less satisfied with the extrinsic aspect of their job that with the intrinsic. The lowest mean score of 2.90 shows that the respondents are dissatisfied with their salary in relation to the amount of work they do. The other results also show that the respondents are sometimes dissatisfied with their job environment,

including interpersonal relationships with peers, subordinates, and managers, regulations and procedures at work, and oversight.

Table 23

Calculated Mean for Job Satisfaction (Extrinsic)

Item	Skewness	Kurtosis	Mean	SD
5. The way my boss handles his/her workers.	-.948	1.848	3.74	.705
6. The competence of my supervisor in making decisions.	-.746	1.372	3.87	.716
12. The way organization policies are put into practice.	-.568	.405	3.58	.852
13. My pay and the amount of work I do.	-.061	.012	2.90	.885
14. The chances for advancement on this job.	-.539	.343	3.53	.769
19. The praise I get for doing my job.	-.164	.043	3.29	.752
Average	**-.504**	**.671**	**3.49**	**.780**

Source: own analysis

The total mean for general job satisfaction is 3.75, which is higher than average. Nevertheless, the raw mean for the general scale is 75, which is lower than the normative mean of 77.88. These results show that the employees who participated in the research are mostly satisfied with their jobs but there is still a lot to be improved.

3.6 Respondents' Level of Innovative Work Behaviour

To measure the level of the respondents' innovative work behaviour, mean scores for all the statements of the IWB questionnaire were calculated (Table 24). The average mean score is 3.28, which is slightly lower than the normative mean score 3.31 (Choi *et al*., 2021). It means that mostly the respondents lack initiative in enhancing processes, tackling existing problems, inventing original solutions and incorporating innovations into everyday working tasks and behaviors. Though, the highest mean score on the statement 'I am innovative', which is 3.35, shows that the respondents are mostly self-aware and self-confident in respect of innovative work behaviour.

Table 24

Calculated Mean for IWB

Item	Skewness	Kurtosis	Mean	SD
1. I search out new ideas, techniques, processes and technologies.	-.385	.366	3.26	.783
2. I generate creative ideas.	-.581	.681	3.32	.847
3. I promote and champion ideas to others.	-.370	.054	3.30	.980
4. I investigate and secure funds needed to implement new ideas.	-.353	-.220	3.09	1.030
5. I develop adequate plans and schedules for the implementation of new ideas.	-.633	.100	3.33	1.005
6. I am innovative	-.744	.651	3.35	.897
Average	**-.511**	**.272**	**3.28**	**0.924**

Source: own analysis

3.7 Respondents' Level of Job Performance

To identify the level of the respondents' job performance, we, firstly, calculated the mean scores on each factor comprising the notion of job performance – job time, job quality and job quantity. We also compared the mean normative scores, which correspond to the high level of job performance (Na-Nah *et al.,* 2018), with the mean scores of the current research. The findings are reflected in Table 25. The mean scores of job quality and job quantity are higher than the normative mean scores, while mean obtained in job time category is slightly lower. Total job performance mean is 4.15, which is higher than the normative mean of 4.11. Such results demonstrate that job time, job quality and job quantity objectives are very often met, while the respondents complete their job assignments in time, fulfilling their duties according to the standards of quality and quantity. The results also prove that most of the employees who participated in the study do their work at a job efficiently and productively.

Table 25

Calculated Mean for Job Performance

Performance Factors	Mean obtained	Mean normative
Job Time	4.06	4.18
Job Quality	4.29	4.10
Job Quantity	4.10	4.06
Total Job Performance	**4.15**	**4.11**

Source: own analysis

3.8 Correlation between the variables

To determine the correlation and strength of the relationship between the five variables of the current study, namely employee engagement (EE), job satisfaction (JS), individual work behaviour (IWB), job performance (JP) and perceived absorption of lean principles (LP), Pearson coefficient test was applied.

Pearson correlation coefficients (r) can be interpreted based on the following guidelines for weak, moderate, and high correlations: weak correlation: $0.1 \leq |r| < 0.3$ $0.1 \leq |r| < 0.3$; moderate correlation: $0.3 \leq |r| < 0.5$ $0.3 \leq |r| < 0.5$; strong (or high) correlation: $|r| \geq 0.5$ $|r| \geq 0.5$ (Bocianowski *et al*., 2024). The results of Pearson coefficient test of the data obtained are presented in Table 26.

Table 26

Pearson Correlation of the Variables

	LP	IWB	JP	EE	JS
LP	**3.91* (.33)*** **				
IWB	.725**	**3.28* (.75)*** **			
JP	.686**	.595**	**4.16* (.40)*** **		
EE	.697**	.743**	.611**	**3.91* (.76)*** **	
JS	.724**	.731**	.670**	.761**	**3.75* (.37)*** **

* Mean
** Correlation is significant at the 0.01 level (2-tailed).
*** Std. deviation
Source: own analysis

All correlations are statistically significant at the 0.01 level (indicated by **), meaning there is a very low probability that these results occurred by chance. These results suggest that all the five variables are positively correlated to each other to a moderate or high degree, with each pair showing a statistically significant correlation.

The **strongest correlation** is between EE and JS (r = .761), suggesting a high association between employee engagement and job satisfaction. The **weakest correlation** among the significant relationships is between JP and IWB (r = .595), though it still represents a moderate positive relationship between job performance and individual work behaviour.

3.9 Hypothesis Testing: Regression Analysis Results

To examine the relationships among perceived absorption of lean principles (LP), job satisfaction (JS), employee engagement (EE) and job performance the regression analysis was conducted employing PROCESS Model 6 framework by A.F. Hayes. As job performance encompasses two dimensions in the scope of the current research – individual job performance (JP) and innovative work behaviour (IWB) – regression analysis was conducted to test the relationship between LP and JP, and LP and IWB with JS and EE being the mediators in both cases.

The relationships between LP and JS as the first mediator are presented in Table 27. With r = 0.724 the correlation between the variables is strong. Approximately 52.5% of the variance in JS is explained by LP ($r^2 = 0.525$). The model is statistically significant ($F = 251.553$, $p < 0.001$). The coefficient b = 0.815 for LP indicates a strong positive relationship, suggesting that a higher level of the perceived absorption of lean principles predicts a higher level of job satisfaction. Standardized coefficient of 0.724 shows a strong effect of LP on JS. Thus, the first hypothesis of the current research *'Lean principles implementation in an organization positively impacts employees' job satisfaction'* is accepted.

Table 27

Relationships between LP and JS

OUTCOME VARIABLE JSm Model Summary						
R	R-sq	MSE	F	df1	df2	p
.724	.525	.065	251.553	1.000	228.000	.000
Model						
	coeff	se	t	p	LLCI	ULCI
constant	.561	.202	2.782	.006	.164	.959
LPm	.815	.051	15.860	.000	.714	.916
Standardized coefficients						
	coeff					
LPm	.724					

Source: own analysis

The relationships between LP and EE as the second mediator are presented in Table 28. With r = 0.790 the correlation between the variables is strong. Approximately 62.3% of the

variance in EE is explained by LP and JS together ($r^2 = 0.623$). The model is also highly significant ($F = 187.914$, $p < 0.001$). The coefficient b = 0.711 for LP indicates a strong direct positive relationship. The coefficient b = 1.110 for JS proves a stronger significant effect on EE, indicating that higher job satisfaction levels lead to an increase in the levels of employee engagement. Standardized coefficients of 0.307 for LP and 0.539 for JS show that JS has a stronger influence on EE than LP. Thus, the second hypothesis *'Lean principles implementation in an organization positively impacts employee engagement'* is accepted.

Table 28

Relationships between LP and EE

OUTCOME VARIABLE
EEm
Model Summary

R	R-sq	MSE	F	df1	df2	p
.790	.623	.221	187.914	2.000	227.000	.000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-3.029	.377	-8.034	.000	-3.772	-2.286
LPm	.711	.137	5.191	.000	.441	.981
JSm	1.110	.122	9.119	.000	.870	1.350

Standardized coefficients

	coeff
LPm	.307
JSm	.539

Source: own analysis

The relationships between LP and IWB with JS and EE included as mediators are presented in Table 29. With r = 0.811 the correlation between the variables is strong. 65.7% of the variance in IWB is explained by LP, JS and EE combined ($r^2 = 0.657$). The model is statistically highly significant ($F = 144.522$, $p < 0.001$). The coefficient b = 0.700 for LP proves that LP has a significant positive effect on IWB even after accounting for the mediators. With coefficients b = 0.505 for JS and b = 0.330 for EE, both mediators also have significant positive effects on IWB. Standardized coefficients of 0.309 (LP), 0.250 (JS), and 0.337 (EE) all have moderate effects, with the strongest effect of EE.

Table 29

Relationships between LP and IWB

OUTCOME VARIABLE
IWBm
Model Summary

R	R-sq	MSE	F	df1	df2	p
.811	.657	.193	144.522	3.000	226.000	.000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-2.651	.400	-6.631	.000	-3.438	-1.863
LPm	.700	.135	5.167	.000	.433	.967
JSm	.505	.133	3.794	.000	.243	.767
EEm	.330	.062	5.316	.000	.208	.452

Standardized coefficients

	coeff
LPm	.309
JSm	.250
EEm	.337

Source: own analysis

The relationships between LP and JP with JS and EE included as mediators are presented in Table 30. With r = 0.733 the correlation between the variables is strong. 53.8% of the variance in JP is explained by LP, JS and EE combined ($r^2 = 0.538$). The model is statistically highly significant (F = 87.667, $p < 0.001$). The coefficient b = 0.476 for LP proves that LP has a significant positive effect on JP even after accounting for the mediators. With coefficients b = 0.334 for JS and b = 0.056 for EE, it can be stated that only JS has a significant positive effect on JP. Standardized coefficients of 0.390 (LP) and 0.308 (JS) have moderate effects, and 0.105 (EE) have the weakest effect.

Table 30

Relationships between LP and JP

OUTCOME VARIABLE
JPm
Model Summary

R	R-sq	MSE	F	df1	df2	p
.733	.538	.076	87.667	3.000	226.000	.000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.825	.250	3.300	.001	.333	1.318
LPm	.476	.085	5.618	.000	.309	.643
JSm	.334	.083	4.013	.000	.170	.498
EEm	.056	.039	1.429	.154	-.021	.132

Standardized coefficients

	coeff
LPm	.390
JSm	.308
EEm	.105

Source: own analysis

The total effect of the perceived absorption of lean principles on the innovative work behaviour is significant with b = 1.645 and a standardized total effect of 0.725, suggesting a strong overall impact of LP on IWB (Table 31).

Table 31

Total Effect of LP on IWB

OUTCOME VARIABLE
IWBm
Model Summary

R	R-sq	MSE	F	df1	df2	p
.725	.526	.265	252.724	1.000	228.000	.000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-3.161	.406	-7.781	.000	-3.962	-2.361
LPm	1.645	.103	15.897	.000	1.441	1.849

Standardized coefficients

	coeff
LPm	.725

Source: own analysis

The total effect of the perceived absorption of lean principles on the job performance is significant with b = 0.839 and a standardized total effect of 0.686, suggesting a strong overall impact of LP on JP (Table 32).

Table 32

Total Effect of LP on JP

OUTCOME VARIABLE
JPm
Model Summary

R	R-sq	MSE	F	df1	df2	p
.686	.471	.086	202.610	1.000	228.000	.000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.879	.231	3.801	.000	.424	1.335
LPm	.839	.059	14.234	.000	.722	.955

Standardized coefficients

	coeff
LPm	.686

Source: own analysis

Thus, hypothesis 3 *'Lean principles implementation in an employee workplace positively impacts individual performance'* is accepted.

After including JS and EE as mediators, the direct effect of LP on IBW is reduced but remains significant with b = 0.700 and a standardized effect of 0.309 (Table 33). This direct effect suggests that increases in the level of the perceived absorption of lean principles directly enhance the level of individual work performance among employees. Total indirect effect of LP on IWB is also significant (b = 0.945) with LLCI = 0.703 and ULCI = 1.189, meaning mediation occurs. While the distance between LLCI and ULCI doesn't hit 0, this indicates that part of the effect of LP on IBW occurs through JS and EE.

Table 33

Total, Direct and Indirect Effects of LP on IWB

Total effect of X on Y						
Effect	se	t	p	LLCI	ULCI	c_cs
1.645	.103	15.897	.000	1.441	1.849	.725

Direct effect of X on Y						
Effect	se	t	p	LLCI	ULCI	c_cs
.700	.135	5.167	.000	.433	.967	.309

Indirect effect(s) of X on Y:				
	Effect	BootSE	BootLLCI	BootULCI
TOTAL	.945	.124	.703	1.189
Ind1	.412	.111	.192	.634
Ind2	.235	.070	.115	.388
Ind3	.299	.079	.159	.465

Completely standardized indirect effect(s) of X on Y:				
	Effect	BootSE	BootLLCI	BootULCI
TOTAL	.416	.050	.317	.510
Ind1	.181	.048	.085	.277
Ind2	.103	.030	.051	.169
Ind3	.132	.034	.070	.204

Indirect effect key:						
Ind1 LPm	→	JSm	→	IWBm		
Ind2 LPm	→	EEm	→	IWBm		
Ind3 LPm	→	JSm	→	EEm	→	IWBm

Level of confidence for all confidence intervals in output:
95.000

Source: own analysis

As it can also be seen from Table 33, all indirect effects are significant, indicating that both JS and EE partially mediate the relationship between LP and IWB, with the path LP → JS → EE → IWB (Indirect Effect 3) also contributing.

After including JS and EE as mediators, the direct effect of LP on JP is reduced but remains significant with b = 0.476 and a standardized effect of 0.390 (Table 34). This direct effect suggests that increases in the level of the perceived absorption of lean principles directly enhance the level of individual work performance among employees. Total indirect effect of LP on JP is also significant (b = 0.362) with LLCI = 0.227 and ULCI = 0.511, meaning mediation occurs. While the distance between LLCI and ULCI doesn't hit 0, this indicates that part of the effect of LP on JP occurs through JS and EE.

While the indirect effect via JS is statistically significant (b = 0.272), illustrating that LP enhances JS, which in turn boosts JP, this is the strongest mediation path, contributing to a significant portion of the indirect effect. However, a minimal indirect effect of LP on JP via EE (b = 0.039), indicates a weaker pathway through EE. So, LP's effect on JP through EE is not statistically significant. Another minimal effect (b = 0.050) suggests that the pathway through both JS and EE contributes little additional impact on JP.

Table 34

Total, Direct and Indirect Effects of LP on JP

OUTCOME VARIABLE
JPm
Model Summary

R	R-sq	MSE	F	df1	df2	p
.686	.471	.086	202.610	1.000	228.000	.000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.879	.231	3.801	.000	.424	1.335
LPm	.839	.059	14.234	.000	.722	.955

Standardized coefficients

	coeff
LPm	.686

TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_cs
.839	.059	14.234	.000	.722	.955	.686

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_cs
.476	.085	5.618	.000	.309	.643	.390

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	.362	.072	.227	.511
Ind1	.272	.074	.126	.420
Ind2	.039	.036	-.022	.121
Ind3	.050	.043	-.029	.140

Source: own analysis

Thus, hypothesis 4 *'Job satisfaction mediates the relationship between lean principles and individual performance',* hypothesis 5 *'Employee engagement mediates the relationship between*

job satisfaction and individual performance', and hypothesis 6 *'Employee engagement mediates the relationship between lean principles and individual performance'* are accepted.

Table 35 shows the results of the hypotheses testing procedures. Summarizing, LP has a positive direct effect on IWB and JP. JS and EE significantly mediate the effect of LP on individual job performance, with multiple indirect pathways. The combination of direct and indirect effects suggests a partial mediation model, where LP affects IWB and JP both directly and indirectly through JS and EE. These results demonstrate that the employees' perceived absorption of lean principles significantly influences both their job satisfaction and engagement, which in turn enhance the respondents' innovative work behaviour and, to a lesser extent, job performance.

Table 35

Hypotheses testing results

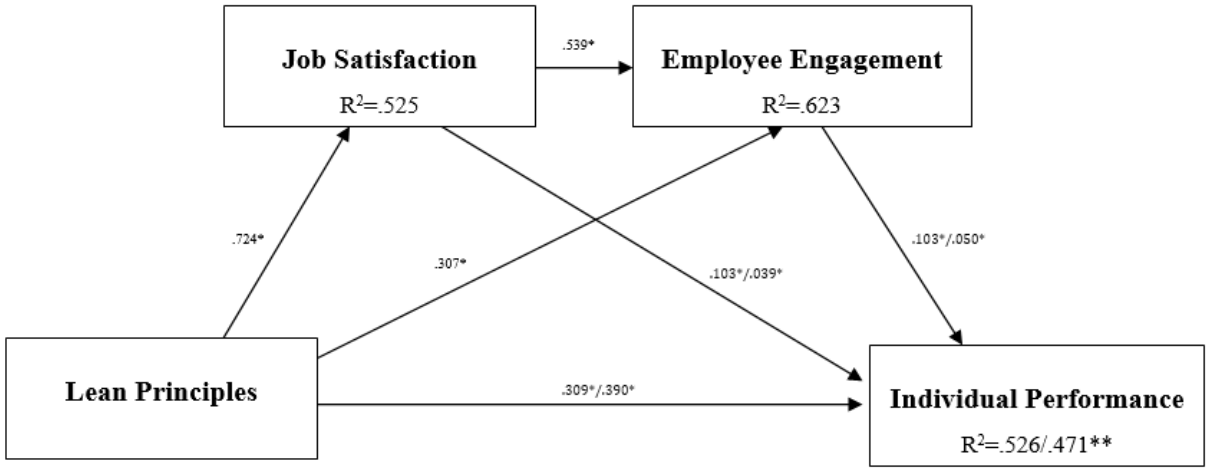
Hx	Relationship	Std.beta	t-value	p-value	Decision
H1	LP→JS	.724	15.860	.006	accepted
H2	LP→EE	.307	5.191	.000	accepted
H3	LP→JP LP→IWB	.390 .309	5.618 5.167	.000 .000	accepted accepted
H4	LP→JS→IWB LP→JS→JP	.181 .272	8.961 9.631	.000 .000	accepted accepted
H5	LP→JS→EE→IWB LP→JS→EE→JP	.132 .039	15.897 14.234	.000 .000	accepted accepted
H6	LP→EE→IWB LP→EE→JP	.103 .050	10.483 7.047	.000 .000	accepted accepted

LP – Lean Principles
EE – Employee Engagement
JP – Job Performance
IWB – Individual Work Behaviour
JS – Job Satisfaction
Source: own analysis

The testing results of the complex conceptual framework for possible relationships between lean principles, job satisfaction, employee engagement and individual performance indicate that strategies aimed at improving the implementation of lean principles could have beneficial impacts on employee satisfaction, engagement, performance and innovation within the organization (Figure 7). All findings are statistically significant, with robust confidence intervals (95%) reinforcing the reliability of the results.

Figure 7

Complex conceptual framework for possible relationships between LP, JS, EE and IP testing results



*Std.beta
**IWB/JP
Source: own analysis

Figure 7 shows a strong positive relation between LP and JS which suggests that the implementation of lean principles has a significant impact on job satisfaction (.724). There is a moderate positive relationship between LP and EE, as well as between LP and JP, LP and IWB. Std. beta of .181 means that LP affects innovative work behavior through job satisfaction, with a relatively small but positive effect. Std. beta of .272 proves similar mediation effect from job satisfaction to job performance. The series of mediations involving employee engagement (LP→EE→IWB (.103) and LP→EE→JP (.050)) indicate that while employee engagement is positively related, its influence is weaker compared to the direct effects of job satisfaction. The paths with lower coefficients, such as LP→JS→EE→JP (.039), imply that while lean principles ultimately relate to job performance through a longer chain of mediation, the influence is weaker. Overall, it appears that implementation of lean principles strongly influences job satisfaction, which in turn positively influences innovative work behavior and job performance. Employee engagement also plays a role but seems to have a more modest impact in this model.

4. CONCLUSIONS, RECOMMENDATIONS, LIMITATIONS AND FUTURE RESEARCH

4.1 Conclusions

1. Based on the systematic analysis of lean principles and the consequences of their implementation for employees in organizations, it can be concluded that the concept of Lean is complex and can be comprehended at different levels of abstraction – as a philosophy and mindset, a set of principles, and as diverse practices and tools implemented. Since the main aim of lean practices is to uphold or improve performance levels while decreasing input needs such as time, space, human effort, machinery, materials, and costs, lean is defined as "an integrated socio-technical system, whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability" (as cited in Alefari, 2020, p.222). The 5 main principles behind lean thinking – defining value, mapping the value stream, creating flow, using a pull system, and pursuing perfection – are strongly connected. The outcomes of lean principles implementation can be twofold: while improving various skills, increasing teamwork and responsibilities, encouraging innovation and collaboration, some aspects of lean can cause increased level of stress and time constraints.

2. Based on the investigation of employee engagement conducted to identify relevant framework, it could be concluded that employee engagement is associated with actively involving employees in their work and cultivating a sense of connection between them and the organization they are affiliated with. Employee engagement is an intricate combination of mental, emotional, and physical participation, the three crucial aspects of which represents its dimensions. The first dimension is vigor, or enthusiasm, which pertains to employees who are highly energized, eager to excel at work and exhibit high levels of mental resilience and perseverance when facing challenges. The second dimension of employee engagement is dedication, where employees are fully committed to their work and experience a profound sense of purpose through emotions like inspiration, enthusiasm, and pride. The third dimension, absorption, refers to employees' complete focus and absorption in the tasks at hand.

3. Based on the analysis of the main factors of employees' job satisfaction, it can be concluded that job satisfaction refers to the level of contentment an employee experiences with the rewards and fulfilment they derive from their job, particularly concerning intrinsic motivations. The factors that impact job satisfaction can be divided into environmental and individual aspects. Environmental factors derive from the physical demands of the job or

challenges of communication. Individual factors include mood, emotions, genetics, and personality of employees.

4. Based on the analysis of the criteria and dimensions of employees' individual performance, it could be concluded that individual performance represents behaviors or actions that align with the organization's objectives. The three main concepts of individual performance include defining it on the basis of behavior rather than results, considering only behaviors that are relevant to the organization's objectives, and understanding individual performance as multi-dimensional. The most important dimensions of individual performance are organizational citizenship behavior, counterproductive work behaviors, innovative work behaviour etc.

5. Based on the literature analysis conducted to elicit relations between lean principles, job satisfaction, employee engagement, and individual performance, it can be concluded that though all the variables are interconnected, the types of relationships between all of them remain arguable. The effective application of lean principles within an organization involves leaders providing positive feedback and acknowledging individual employees' efforts and accomplishments, thereby enhancing their self-worth and leading to enhanced job satisfaction. In lean organizations, there is a priority placed on recognizing and rewarding employees for their contributions to process improvement and goal attainment. By consistently offering feedback, commendations, and acknowledgments for employees' dedication and achievements, morale is boosted, motivation is maintained at high levels, and employees feel appreciated. This recognition of employees' significant input can significantly raise engagement levels and foster a favorable work atmosphere. While implementing lean practices necessitates all employees developing new competencies such as teamwork, problem-solving, communication, and decision-making, continuous training and improvement initiatives help employees acquire these skills, ultimately enhancing individual performance and driving better outcomes for the company.

6. Based on the extensive review of theoretical literature and empirical research on the connections among lean principles, job satisfaction, employee engagement, and individual performance, it is evident that employee engagement and job satisfaction act as mediators in the connections between lean principles and individual performance. Employee engagement serves as a mediator that enhances the positive impacts of lean principles on individual performance. To support the findings and explore the relationships among perceived absorption of lean principles, job satisfaction, employee engagement, and job performance regression analyses were performed. A strong correlation was observed between LP and JS, and LP and EE. For the relationship between LP and IWB, the combined variance explained by LP, JS, and EE was 65.7%, with all paths indicating significant effects and confirming the mediation by JS and EE. The relationship between LP and JP also showed a strong correlation, with LP having a positive effect on JP

independent of the mediators. The total indirect effect of LP on IWB was significant, indicating mediation through JS and EE, while the indirect effect on JP was also significant, confirming the mediation hypotheses. Hypothesis testing results indicated that all proposed relationships were accepted, showing that LP influences JS and EE, which in turn enhance IWB and JP. The findings suggest a partial mediation model where LP affects both IWB and JP directly and indirectly through JS and EE.

4.2 Recommendations for practitioners

Based on the conclusions of the research that improving the implementation of lean principles can positively impact employee satisfaction, engagement, performance, and innovation within organizations, the study provides the following recommendations for the practitioners.

1. The negative impact often arises from errors in the implementation of lean principles, such as communication breakdowns or insufficient employee involvement. Lack of employee understanding regarding the purpose of lean implementation or the expected changes, as well as exclusion from decision-making processes, can impede employee engagement. However, when carefully implemented with consideration for the workforce, lean principles can significantly enhance and boost employee engagement within the organization. Research findings emphasize that successful implementation of lean principles, leading to heightened job satisfaction, greatly depends on employees' positive receptiveness to subsequent changes and the leadership approach embraced by the organization. Therefore, it is essential for organizations adopting lean principles to recognize the potential negative repercussions on job satisfaction resulting from inadequate communication and management missteps.

2. To enhance lean principles implementation companies should invest in comprehensive training programs to deepen employees' understanding and application of lean principles. They should also focus on making these principles part of the organizational culture to ensure a high level of perceived absorption. When properly arranged, teamwork and cooperation between departments can encourage the sharing of lean principles and innovative practices. Working in a team can draw on varied viewpoints and improve innovative work behavior.

3. Furthermore, to boost motivation and increase the striving for continuous improvement it might be beneficial to develop recognition programs that reward employees for engaging with lean practices and for their innovative contributions. In this respect, companies should seek to align performance appraisals with lean practices and innovative contributions. This ensures that employees see a direct link between their engagement with lean principles and their performance evaluations, thus reinforcing positive individual performance.

4. The leaders of the companies implementing lean principles should adopt a participative leadership style that emphasizes coaching and mentoring. Leaders should model lean behaviors and foster an environment where employees feel valued and empowered.

5. Current research demonstrated that employees’ absorption of lean principles directly accounts for almost 57% of job performance and 43% of innovative work behaviour. The indirect effect of lean principles on individual performance equaled 43% and 57% respectively. These

results prove a crucial role of job satisfaction and employee engagement as mediators in this relationship. For that reason, lean organizations should implement periodic surveys to assess both job satisfaction and employee engagement levels. This data can help identify areas for improvement and measures to tackle any problems that may arise. For instance, addressing physical and mental well-being can significantly impact job satisfaction. Implementation of wellness programs can promote work-life balance and reduce burnout, thus indirectly supporting higher employee engagement and performance. Creating a work atmosphere that encourages feedback and innovation would also directly improve job satisfaction and engagement.

6. Organizations adopting lean principles should regularly monitor and assess the effectiveness of any strategies implemented. This will help to adjust the approaches used and to ensure they are meeting the desired outcomes of improving job satisfaction, employee engagement, job performance, and innovative work behavior.

Implementing these practical recommendations can create a positive continuous improvement cycle where enhanced job satisfaction and employee engagement lead to better job performance and innovative work behavior. This, in turn, will benefit the overall organization through more successful lean implementation.

4.3 Limitations and future research

This research has several limitations. First, it assesses the effects of lean implementation on employees as a group, suggesting that future studies could also examine these impacts at the individual level. Second, the sample size is limited to 230 employees. A larger number of respondents can be invited for the future studies, which may allow researchers to apply some more advanced statistical techniques. Third, the analysis is based solely on companies from Lithuania and Estonia, and additional research could broaden the scope by investigating the implementation of lean principles in organizations from other countries, enhancing the possibility of more generalized outcomes of the research. The fourth limitation pertains to the measurement approach, as variables were evaluated only after lean principles were implemented. A larger study could benefit from a different measurement strategy, such as assessing variables before and after implementation. Despite these limitations, the research contributes valuable empirical insights to the existing literature on lean practices, job satisfaction, employee engagement, and individual performance and their interrelations.

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SUMMARY IN LITHUANIAN

LEAN PRINCIPŲ POVEIKIS DARBUOTOJŲ ĮSITRAUKIMUI, PASITENKINIMUI DARBU IR INDIVIDUALIAM DARBO VEIKLOS REZULTATUI

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SANTRAUKA

97 puslapiai, 35 diagramos, 7 paveikslėliai, 137 literatūros šaltiniai.

Šio magistro baigiamojo darbo tikslas – teoriškai ir empiriškai nustatyti ir įvertinti *Lean* metodų įtaką darbuotojų įsitraukimui, pasitenkinimui darbu ir individualiam darbo veiklos rezultatui.

Magistro darbą sudaro keturios pagrindinės dalys: literatūros apžvalga, metodika, empiriniai tyrimo rezultatai, išvados, rekomendacijos, apribojimai ir būsimi tyrimai.

Literatūros analizėje susisteminami *Lean* principai (LP) ir jų įgyvendinimo rezultatai darbuotojams, pateikiama atitinkama sistema, skirta pagrįsti darbuotojų įsitraukimo (DĮ) tyrimą, identifikuojami ir analizuojami pagrindiniai darbuotojų pasitenkinimo darbu (PD) veiksniai, pateikiami darbuotojų individualių veiklos rezultatų (IVR) kriterijai, įskaitant darbo rezultatus (DR) ir individualų elgesį darbe (IED), matmenis.

Parengęs literatūros analizę, autorius atliko tyrimą, nagrinėjantį ryšius tarp LP, DĮ, PD ir IVR. Iš viso tyrime dalyvavo 230 darbuotojų. Apklausą išskirtinai atliko tik darbuotojai iš *Lean* metodus taikančių organizacijų. Surinktų duomenų statistinei analizei naudota SPSS programinė įranga. Likert skalių nuoseklumui įvertinti buvo naudojamas Cronbach alfa koeficientas. Kiekvienu atveju koeficientas viršijo 0,7, o tai rodo, kad naudotos skalės buvo patikimos. Ryšio tarp penkių kintamųjų koreliacijai ir stiprumui nustatyti buvo pritaikytas Pearson koeficiento testas.

Empirinis tyrimas parodė stiprų teigiamą ryšį tarp LP ir PD, o tai rodo, kad *Lean* principų įgyvendinimas turi didelę įtaką pasitenkinimui darbu. Buvo nustatytas vidutiniškas teigiamas ryšys tarp LP ir DĮ, taip pat tarp LP ir DR, LP ir IED. LP veikia IED per PD, ir nors poveikis yra palyginti nežymus, bet teigiamas. Rezultatai parodė panašų PD ir DR ryšį. Sąsajos, turinčios DĮ, parodė, kad nors darbuotojų įsitraukimo sąsaja yra teigiama, jo įtaka yra silpnesnė, palyginti su tiesioginiu pasitenkinimo darbu poveikiu. Taip pat paaiškėjo, kad LP įgyvendinimas tyrime dalyvavusiose organizacijose stipriai paveikė PD, o tai savo ruožtu teigiamai paveikė IED ir DR. Darbuotojų įsitraukimas taip pat atliko svarbų vaidmenį, nors ir turėjo silpnesnį poveikį šiame modelyje.

Išvadų, rekomendacijų, apribojimų ir būsimų tyrimų skyriuje apibendrinamos pagrindinės literatūros apžvalgos idėjos ir atlikto tyrimo išvados. Autorius mano, kad nepaisant apribojimų, tyrimas ir jo rezultatai gali suteikti specialistams ir būsimiems tyrėjams naudingų įžvalgų apie *Lean* principų įgyvendinimo organizacijoje procesą.

SUMMARY IN ENGLISH

THE IMPACT OF LEAN PRINCIPLES ON EMPLOYEE ENGAGEMENT, JOB SATISFACTION AND INDIVIDUAL PERFORMANCE

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SUMMARY

97 pages, 35 tables, 7 figures, 137 references.

The aim of this master thesis is to theoretically and empirically identify and assess the impact of lean on employee engagement, job satisfaction, and individual performance.

The Master thesis consists of four main parts: literature review, methodology, empirical study results, conclusion, recommendations, limitations and future research.

Literature analysis systematizes lean principles (LP) and the consequences of their implementation for employees, presents a relevant framework to enhance the investigation of employee engagement (EE), identifies and analyzes the main factors of employees' job satisfaction (JS), and provides criteria and dimensions of employees' individual performance (IP) including job performance (JP) and individual work behaviour (IWB).

Following the literature analysis, the author carried out research into the relationships between LP, EE, JS and IP. Overall, 230 employees participated in the research. The survey specifically targeted only employees of lean organizations as its primary criterion. SPSS software was used for the statistical analysis of the collected data. Cronbach's Alpha coefficient was utilized to assess the consistency of the Likert scales. In every instance, the coefficient exceeded 0.7, which demonstrates that the scales employed were reliable. To determine the correlation and strength of the relationship between the five variables, Pearson coefficient test was applied.

The empirical research showed a strong positive relation between LP and JS which suggests that the implementation of lean principles has a significant impact on job satisfaction. There was a moderate positive relationship between LP and EE, as well as between LP and JP, LP and IWB. LP affects IWB through JS, with a relatively small but positive effect. The results proved similar mediation effect from JS to JP. The series of mediations involving EE indicated that while employee engagement was positively related, its influence was weaker compared to the direct effects of job satisfaction. Overall, it appeared that implementation of LP in the organizations having participated in the study strongly influenced JS, which in turn positively influenced IWB and JP. Employee engagement also played a role but seemed to have a more modest impact in this model.

The conclusions, recommendations, limitations and future research chapter summarizes the key ideas from the literature review and the findings of the research conducted. The author believes that despite the limitations the study and its results can provide practitioners and future researchers with useful insights of the lean principles implementation process.

APPENDIX

Variable	Skewness	Kurtosis	Mean	Std. Deviation
LP - 1. In my area of operations, I know the utility of my activities for external customers	-1.016	2.048	4.10	.738
LP - 2. In my area of operations, I am continuously concerned about the utility of my activities for external customers	-.769	.258	4.08	.824
LP - 3. In my area of operations, I know how 4 external customers are with the products/services I am involved with	-.892	.845	3.93	.831
LP - 4. In my area of operations, I know which products/services my activities are contributing to	-.778	1.593	4.13	.670
LP - 5. I broadly know the activities which are necessary to finish these products/services for external customers	-.921	1.982	3.93	.741
LP - 6. I am continuously coordinating the work on these products/services with every relevant employee involved (also outside my area of operations)	-.646	-.146	3.80	.882
LP - 7. There are key performance indicators for my activities which reflect the satisfaction of external customers	-1.143	2.130	4.00	.812
LP - 8. In my area of operations, together with colleagues, mainly working on activities for one group of products	-1.020	.392	3.81	.987
LP - 9. The reduction of cycle time (not working time) of customer orders, together with my colleagues being involved, is an important goal of my daily work	-.837	.878	3.95	.772
LP - 10. I collect similar orders for my activities to do batch processing	-.785	.109	3.70	.955
LP - 11. My workstation is designed by default to ensure that I can perform my activities without delays (e.g. without search times)	-.271	1.793	4.08	.543
LP - 12. There are rules for reaction times in case of internal requests	-.588	1.697	4.19	.609
LP - 13. There is a continuous coordination with every relevant employee (also outside my area of operations) with regard to the products I am involved with to avoid a backlog of work	-.679	2.669	4.11	.585
LP - 14. There are representation rules for the most important activities in my area of operations	-.554	2.306	4.10	.576
LP - 15. There are clear decision-making competencies of my leader or other colleagues in case of uncertainties in the execution of my activities	-.593	2.416	4.05	.618
LP - 16. I work only on demand by internal/external customers	-.682	-.142	3.73	1.014
LP - 17. In my area of operations, the capacity planning is based on the demand of internal/external customers	-1.098	1.390	3.88	.832
LP - 18. I always check my work results in detail	-.379	-.061	4.28	.621
LP - 19. My work results will not be double checked – except for legal requirements – by colleagues or leaders	-.529	-.389	3.48	.988
LP - 20. There are labelings for my work (e.g. plausibility checks in software programs, clear color markings, etc.) which help me to avoid typical mistakes	-.961	3.875	4.02	.605
LP - 21. Information for the execution of my work (e.g. work instructions) is visualized at my workstation	-.944	2.129	4.05	.713
LP - 22. If I detect possibilities for improvements, I implement these or inform the responsible employee	-.699	.917	3.94	.719
LP - 23. I use documented customer complaints to improve our operations in my area	-.372	-.945	3.49	1.162
LP - 24. In my area of operations, I continuously check implemented improvements to our operations	-.771	.757	3.86	.799
LP - 25. Information regarding the goal achievement in my area of operations is visible for every employee in this area	-1.068	3.733	3.92	.601
LP - 26. My direct leader is a role model regarding changes which affect my area of operations	-.601	.165	3.79	.795

LP - 27. I am a long way (spatial-related) from my leader	1.182	1.470	2.33	.889
LP - 28. In my area of operations, there are regular discussions during the year between leaders and employees with the goal of personal development	-1.121	2.487	3.90	.695
LP - 29. I know the connection between the goals of my area of operations and the company goals	-.593	3.856	4.23	.564
LP - 30. The control of activities in my area of operations is based on key performance indicators	-.605	3.663	4.10	.532
LP - 31. I bear the responsibility for the result of my daily work	-.797	1.311	4.31	.646
LP - 32. I have the possibility to implement new ideas to improve the activities in my area of operations during my working time	-.566	.175	3.70	.816
LP - 33. I discuss the results of our current activities continuously with the team	-.485	.691	4.04	.670
LP - 34. I discuss the goals of upcoming activities continuously with the team	-.683	.069	3.97	.881
LP - 35. I continuously think about how the existing activities can be improved in my area of operations	-.691	.546	3.84	.760
LP - 36. In my area of operations, it is of the upmost importance that the person identified as the causer of the problem bears the consequences	-.548	1.758	3.95	.578
LP - 37. There are regular meetings to discuss the avoidance of typical problems in my area of operations	-.723	1.425	4.03	.673
LP - 38. In my area of operations, actions to avoid mistakes are identified with the persons involved	-.530	1.694	3.90	.636

Variable	Skewness	Kurtosis	Mean	Std. Deviation
IWB - 39. I search out new ideas, techniques, processes and technologies	-.385	.366	3.26	.783
IWB - 40. I generate creative ideas	-.581	.681	3.32	.847
IWB - 41. I promote and champion ideas to others	-.370	.054	3.30	.980
IWB - 42. I investigate and secure funds needed to implement new ideas	-.353	-.220	3.09	1.030
IWB - 43. I develop adequate plans and schedules for the implementation of new ideas	-.633	.100	3.33	1.005
IWB - 44. I am innovative	-.744	.651	3.35	.897

Variable	Skewness	Kurtosis	Mean	Std. Deviation
JP - 45. Tasks are performed attentively and correctly	.859	-.885	4.28	.459
JP - 46. Tasks are completed as per the specifications and standards	-.358	1.264	4.37	.542
JP - 47. Materials and tools meet the set criteria and standards	-.847	3.946	4.31	.588
JP - 48. Quality inspection is conducted prior to the delivery of goods or services	-1.015	3.703	4.27	.630
JP - 49. Products or services meet the expectations of customers	-1.122	3.890	4.24	.669
JP - 50. The units of output are in sync with the number of employees	-.549	.442	4.07	.711
JP - 51. The units of output meet organizational expectations	-.735	.371	4.08	.791
JP - 52. The units of output under my responsibility correspond to my skills and ability	-.250	1.481	4.24	.546
JP - 53. The quantity assignment is always fulfilled	-.543	.222	4.00	.756
JP - 54. Tasks are normally completed on schedule	-.829	1.581	4.01	.730
JP - 55. Tasks are carried out within a reasonable amount of time	-.558	.528	4.07	.705
JP - 56. The delivery of goods or services is conducted in a timely fashion	-.493	.317	4.04	.714
JP - 57. I achieve time-related organizational goals	-.820	1.656	4.11	.715

Variable	Skewness	Kurtosis	Mean	Std. Deviation
EE - 58. At my work, I feel bursting with energy	-.194	-.028	3.61	.981
EE - 59. At my job, I feel strong and vigorous	-.041	.026	3.47	1.096
EE - 60. I am enthusiastic about my job	-.261	.402	3.32	1.114
EE - 61. My job inspires me	.122	-.144	3.53	1.199
EE - 62. When I get up in the morning, I feel like going to work	-.197	.689	3.11	1.160
EE - 63. I feel happy when I am working intensely	-.264	.366	4.03	1.040
EE - 64. I am proud on the work that I do	-.107	-1.066	4.57	1.070
EE - 65. I am immersed in my work	-.435	-.785	4.80	1.085
EE - 66. I get carried away when I'm working	-.772	-.181	4.80	1.197

Variable	Skewness	Kurtosis	Mean	Std. Deviation
JS - 67. Being able to keep busy all the time	-.534	.994	3.53	.796
JS - 68. The chance to work alone on the job	.103	-.569	3.78	.703
JS - 69. The chance to do different things from time to time	-.116	-.789	4.10	.674
JS - 70. The chance to be "somebody" in the community	-.480	.935	4.19	.623
JS - 71. The way my boss handles his/her workers	-.948	1.848	3.74	.705
JS - 72. The competence of my supervisor in making decisions	-.746	1.372	3.87	.716
JS - 73. Being able to do things that don't go against my conscience	-.380	1.157	4.03	.598
JS - 74. The way my job provides for steady employment	-.044	-.395	3.95	.656
JS - 75. The chance to do things for other people	-.397	1.201	4.08	.601
JS - 76. The chance to tell people what to do	-.532	.054	3.50	.875
JS - 77. The chance to do something that makes use of my abilities	-.691	3.563	4.02	.576
JS - 78. The way organization policies are put into practice	-.568	.405	3.58	.852
JS - 79. My pay and the amount of work I do	-.061	.012	2.90	.885
JS - 80. The chances for advancement on this job	-.539	.343	3.53	.769
JS - 81. The freedom to use my own judgment	-.390	.566	3.64	.756
JS - 82. The chance to try my own methods of doing the job	-.419	.063	3.75	.752
JS - 83. The working conditions	-.065	-.396	3.77	.738
JS - 84. The way my co-workers get along with each other	-.421	-.233	4.13	.714
JS - 85. The praise I get for doing my job	-.164	.043	3.29	.752
JS - 86. The feeling of accomplishment I get from the job	-.234	.177	3.62	.799