

THE APPLICATION OF LEAN MANAGEMENT IN THE WORK OF IT TEAMS: A CASE STUDY OF THE SPOTIFY SERVICE AND INTEL COMPANY

ZASTOSOWANIE LEAN MANAGEMENT W PRACY ZESPOŁÓW IT CASE STUDY SERWISU SPOTIFY I FIRMY INTEL

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Abstract: In the face of challenges related to the execution of IT projects, companies are looking for ways to improve the efficiency of their teams' work. This text presents the impact of the Lean methodology on the functioning of project teams, as well as the process of implementing its principles using the examples of the Spotify service and the Intel corporation. A case study method was employed, allowing for the depiction of complex processes in their natural context, along with an analysis of the relevant literature. Particular attention was paid to the implementation of tools and practices such as value stream mapping and Kanban boards. The introduction of Lean Management in the organisations analysed demonstrated that the application of this methodology can support IT teams to eliminate waste, increase work flexibility, and pursue continuous improvement.

Streszczenie: W obliczu wyzwań związanych z realizacją projektów informatycznych przedsiębiorstwa poszukują sposobów na zwiększenie efektywności pracy zespołów. W tekście przedstawiono wpływ metodyki Lean na funkcjonowanie zespołów projektowych oraz proces wdrażania jej założeń na przykładzie serwisu Spotify i firmy Intel. Zastosowano metodę studium przypadku, która pozwala na ukazanie złożonych procesów w ich naturalnym kontekście, a także przeprowadzono analizę literatury przedmiotu. Szczególną uwagę zwrócono na implementację narzędzi i praktyk takich jak mapowanie strumienia wartości oraz tablice Kanban. Wdrożenie Lean Management w analizowanych organizacjach pokazało, że stosowanie tej metodyki może wspierać zespoły IT w eliminowaniu marnotrawstwa, zwiększaniu elastyczności pracy oraz ciągłym doskonaleniu.

Keywords: *Lean Management, Lean, IT project, Kanban, VSM, Spotify, Intel*

Słowa kluczowe: *Lean Management, Lean, projekt informatyczny, Kanban, VSM, Spotify, Intel*

1. Introduction

Contemporary organisations are increasingly confronted with challenges related to the speed of product delivery, product quality, and flexibility, all of which enable dynamic growth through the adaptation of tasks carried out by teams responsible for product creation. An approach that supports these aspects is Lean Management – a concept whose key principles include continuous improvement, the elimination of so-called bottlenecks, and the provision of products of the highest possible value to customers.

The purpose of this article is to analyse the application of Lean Management beyond the traditional industrial production sector, particularly in the IT industry. The main research question focuses on how Lean Management tools and practices, such as value stream mapping and Kanban boards, can be effectively implemented in IT teams to improve their efficiency, work quality and flexibility. The analysis is based on the case study method, which enables a practical illustration

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of these processes. Using examples from Spotify and Intel, the article presents the deployment of Lean Management as a strategy for enhancing the performance of IT teams by pinpointing bottlenecks that adversely affect workflow and contribute to waste. The structure of the article is as follows: the first part presents the essence of Lean Management and its key principles. Next, the possibilities of adapting this approach in project teams operating within the IT sector are discussed. The final part contains an analysis of the cases of Spotify and Intel, illustrating the practical implementation of Lean Management. The conclusion provides the main findings, identifies the limitations of the study, and outlines potential directions for future research on the adaptation of Lean Management within IT environments.

2. Lean Management

The pursuit of ever-improving results by companies, whether in the context of projects or processes, is due to the need for effective management of the teams responsible for their execution. A core goal of organisations is to achieve better outcomes, become more efficient, and produce increasingly high-quality products. Focusing on quality and satisfying customer needs is a standard requirement – every enterprise can identify areas that, if improved, will help deliver higher quality². In line with the Kaizen philosophy, they should strive to become ever better: “Something is always changing; in improving one thing, we notice further elements that can be enhanced. A continuous search for improvements and gradual process refinement step by step”³.

Identifying the steps that require corrective measures is necessary to implement improvements within enterprises. The concept of Lean Management was developed in response to these needs. The methodology originated from the Toyota Production System. Its principal assumption is “to produce more and more with ever-decreasing resource consumption”⁴. The essence of Lean Management is to create a work culture in the organisation in such a way that everyone responsible for particular tasks strives to reduce the costs of the endeavour, shorten the time needed to deliver the product, and improve quality. These measures enable enterprises to satisfy customer expectations and adapt to the ongoing changes imposed by the business environment⁵. Lean Management holds that anything that does not contribute value is waste; hence, the focus should be on actions that lead to the elimination of it.

According to Taiichi Ohno, a pioneer of Lean Management, it is possible to identify the basic examples of waste⁶ – *muda* (無駄) in Japanese – occurring in the manufacturing industry:

- Production of goods without a customer order (leading to an increase in finished products)
- Idle waiting of people/machines for delayed deliveries or subsequent process steps
- Unnecessary transportation of materials between functional areas
- Excessively long operating times due to poor product or tool design
- Inventories larger than the absolute minimum required

2 A. J. Blikle, *Doktryna jakości: rzecz o skutecznym zarządzaniu*, Gliwice 2014.

3 K. Kaczor, *Scrum i nie tylko, teoria i praktyka w metodach Agile*, Warszawa 2016, p. 62.

4 J. P. Womack, D. T. Jones, *Lean thinking – szczupłe myślenie*, transl. M. Wąsiel, R. Muszyński, S. Kubik, Wrocław 2008, p. 15.

5 P. Józwiakowski, *Lean management – metoda racjonalnego zarządzania produkcją*, “Zeszyty Naukowe DWSPiT. Studia z Nauk Technicznych” 2015 (4), p. 35.

6 Taiichi Ohno (1912–1990) is the father of the Toyota Production System (TPS) and one of the main architects of the organisational revolution in industry. He created an innovative system based on the principles of just-in-time (JIT), so-called *jidoka* method and new management principles, which are the first historical layers of Lean manufacturing.

- Workers' movements in search of parts, tools, instructions, or assistance
- Defects and errors that require repairs or corrections⁷.

Although Taiichi Ohno's original observations on waste were focused on the industrial sector, they have subsequently been translated into issues related to the management of IT teams.

3. Application of Lean Management in the work of IT teams

IT teams, which strive to perform their tasks efficiently, face daily problems that, to some extent, mirror those found in industry. It is thus unsurprising that ever-changing client requirements and the desire to reduce the related costs make Lean Management methods potentially valuable in this context⁸. As researchers state, "Although the use of Lean practices and principles in IT projects managed by IT managers is currently limited, it is nonetheless needed"⁹. As the literature review indicates, organizations adapt Lean principles within their software development processes to eliminate waste, reinforce learning, make decisions before the latest feasible moment, deliver tasks at the earliest possible moment, delegate authority and give authorisation, ensure the integrity of the software, think holistically about the entire system and solution¹⁰.

IT teams usually work on developing software products of a certain complexity, so identifying types of waste that can affect both team efficiency and product quality can be challenging. Value stream mapping (VSM) has proven helpful in characterising potential waste in the IT sector. VSM can be applied in IT processes in nearly the same way as in manufacturing. "The main difficulty for VSM in IT lies in the need to map processes that often do not result in a tangible product and are not visible. VSM begins, as in manufacturing, by identifying the process that is a potential source of waste. Next, the process must be broken down into tasks, measured by their expected completion time. In the next step, the waiting times (between the completion of consecutive tasks) are determined. It is crucial for the map to start and end with the customer or be as close as possible to the actual customer"¹¹. Another Lean Management principle states that, once the sources of waste are known, one should ensure a smooth workflow free from delays. An example of such a disruption is having to wait for another team member to finish their work or for a task to be approved by a different entity. These occurrences can complicate task management. It is thus necessary to organise work so that bottlenecks do not impede progress on subsequent tasks. When introducing Lean to IT teams, it is also important to consider work overload. Tools designed to report work hours or display the status of ongoing tasks can be helpful. The most common of them, used for visualising workflow in software development, is the Kanban board, considered as an excellent example of applying Lean to IT¹². This tool helps to represent the process by identifying interruptions and bottlenecks and also allows setting a limit on the amount of work in progress¹³. The board should indicate which tasks are most critical in terms of priority and should be updated regularly by the team. Depending on the project, Kanban boards may differ. The figure below presents an example of a Kanban board¹⁴.

7 T. Ohno, *Toyota Production System: Beyond Large-Scale Production*, New York 1988, p. 37.

8 J. Łojewski, *Lean IT w praktyce – krótki przewodnik co to jest Lean*, <https://itwiz.pl/lean-praktyce-krotki-przewodnik/> (on-line 24.04.2025).

9 G. Kundu, B. Manohar, *How do the practitioners perceive relevancy of lean practices in IT support services?*, "TQM Journal" 2015 (5), pp. 648–668.

10 M. Poppendieck, T. Poppendieck, *Lean Software Development: An Agile Toolkit*, Boston 2003. M. Poppendieck, T. Poppendieck, *Implementing Lean Software Development: From Concept to Cash*, Upper Saddle River 2006.

11 B. Gładysz, *Zastosowanie wybranych technik Lean Management w projektach*, "Przegląd Organizacji" 2019 (1), s. 54.

12 *Ibidem*, p. 57.

13 K. Kaczor, *op. cit.*, p. 64.

14 *Jira Kanban Board*, <https://kanbanboard.co.uk/jira-kanban-board> (on-line 08.05.2025).



Fig. 1. Sample Kanban board

Another example of the use of Lean in IT is the pursuit of continuous improvement through ITIL. “ITIL is a reference model, a set of detailed practices used in IT service management, comprising five areas: (1) strategy, (2) design, (3) transition, (4) operation, and (5) continuous service improvement”¹⁵. By employing ITIL, organisations can benefit from better financial results and ongoing process enhancements. Table below, proposed by Bartłomiej Gładysz and based on the concepts of Zoltán Vajna, provides an overview of Lean tools in IT that originate from industry¹⁶.

Tab. 1. Lean in IT versus Lean in production

Action	Production	IT	Benefits in IT
Value stream analysis	Value analysis VoC (Voice of Customer) VSM (Value Stream Mapping)		Less complex systems Lower costs Task division Waste elimination
Elimination of waste	5S JiT (Just in Time) Kanban One-piece flow SMED (Single Minute Exchange of Die)	5S in the office Agile methodologies Outsourcing “Roadrunner”, handing over tasks immediately upon completion)	Better alignment with needs Improved planning and delivery Greater flexibility
Elimination of variability	Heijunka	CFD (Cumulative Flow Diagrams) Agile methodologies Kanban in IT	More efficient use of resources Higher quality

¹⁵ *What Are ITIL Best Practices*, <https://www.itsm-docs.com/blogs/itil-faq/what-are-itil-best-practices> (on-line 08.05.2025).

¹⁶ B. Gładysz, *op. cit.*, p. 57.

Action	Production	IT	Benefits in IT
Pull system	Kanban	Iterative software development Kanban in IT Customer-tailored software	Lower working capital freeze and reduced work in progress Greater customer involvement Increased revenue
Focus on quality	Six Sigma Andon (visual control) CtQ (Critical to Quality) Poka-yoke (error-proofing) SPC (Statistical Process Control)	CtQ (Critical to Quality) SOA, modular software Monitoring systems Automated tests Automated data validation	Faster system delivery Higher software quality
Continuous improvement	Kaizen	CMMI ITIL	Cost savings Process improvements Increased knowledge

As the literature review shows, IT companies have long been adapting Lean practices from manufacturing systems to improve their processes and overall efficiency. This may suggest certain similarities in the challenges faced by organisations in different sectors and the shared roots of these problems. Since IT enterprises, like those in manufacturing, are characterised by high variability and susceptibility to external factors, the implementation of Lean Management practices can be an effective way to improve their operations. The following section of the article discusses examples of implementation of Lean methods in practice.

4. Case study: Spotify and Intel

The first organization analysed is Spotify, a Swedish company that offers digital platform providing music, podcast, and video streaming from around the globe. The second organisation under discussion is Intel, an American multinational corporation and technology enterprise that designs, manufactures, and sells computer hardware components. Both companies have long used Lean Management to improve work organisation. Spotify adopted the Lean Management approach to increase flexibility in its product development process. The company's primary objective was to rapidly introduce new solutions that would give its products an innovative edge to customers. "The company uses Lean thinking to eliminate unnecessary steps in its workflows, allowing cross-functional teams to focus on delivering value rapidly. Spotify's Lean-agile integration enhances its ability to respond swiftly to market demands, leading to better user satisfaction and engagement (Kniberg & Ivarsson, 2012). This approach ensures that teams are continuously improving processes, maintaining flexibility, and staying aligned with customer needs"¹⁷. In addition, Spotify introduced the Kanban method, which streamlines its software development process. By employing Kanban boards, teams can easily visualise their work, track progress, and detect potential workflow disruptions. Implementing Kanban boards has enabled Spotify to respond more quickly to customer feedback and

¹⁷ J. Chukwunweike, O. E. Aro, *Implementing agile management practices in the era of digital transformation*, "World Journal of Advanced Research and Reviews" 2024 (1), pp. 2234.

consequently introduce new features faster than its competitors¹⁸. The table below presents the primary improvements in these areas related to Lean¹⁹.

Tab. 2 Spotify – Lean Key Performance Indicators

Area	Description	Reference to Lean
Organisational structure	Around 70–80 self-organizing, interdisciplinary squads functioning as “mini-startups” with end-to-end responsibility.	Small, autonomous teams with clear goals and responsibilities foster efficiency and rapid value delivery, eliminating the need for a large hierarchy
Culture and people	Emphasis on adaptability during hiring, strong relationships in teams, knowledge sharing in chapters and guilds	Engaged and skilled employees in a flexible structure encourage continuous improvement and innovation
Continuous development	Regular retrospectives at multiple levels, coaches identifying bottlenecks, TPD Operations team eliminating waste	An iterative approach to problem identification, resolution, and waste elimination
Innovation and market responsiveness	The “Discover Weekly” feature reached one billion streams in 10 weeks with high user engagement	Autonomous teams can rapidly experiment and implement innovations in response to user needs, basing on continuous feedback and frequent iterations

Table 2 shows that from the very beginning, Spotify built its organisation on Lean and Agile principles, as evidenced by its structure of small, autonomous teams, culture of continuous improvement, and strong focus on people. This approach allowed Spotify to grow rapidly, remain innovative, and respond effectively to market demands, exemplified by the tremendous success of its “Discover Weekly” feature.

Like Spotify, Intel also applies Lean Management, which in Intel’s case has primarily been translated into optimising production processes by increasing operational flexibility and improving efficiency. The company’s main goal was to implement improvements in production-line management and reduce the turnaround time on customer orders. Its continuous drive to improve processes and increase flexibility in managing organizational tasks has helped Intel solidify its leadership position in the semiconductor market²⁰. Intel likewise adopted Kanban to visualize and manage processes. By depicting each production stage and controlling work-in-progress (WIP) limits²¹, Intel improved its order delivery process while ensuring the quality of its products²². The table below illustrates the most significant improvements achieved through Lean²³.

¹⁸ *Ibidem*.

¹⁹ Author’s own compilation based on K. Lindwall, *How music streaming giant Spotify stays successful*, <https://www.planet-lean.com/articles/spotify-agile-leadership-lean>, and M. Cagan, J. Sundén, *The Product Model at Spotify*, <https://www.svpq.com/product-model-at-spotify/> (on-line 24.04.2025).

²⁰ See J. Flinchbaugh, B. Carlino, *The Hitchhiker’s Guide to Lean: Lessons from the Road*, Society of Manufacturing Engineers, Dearborn 2005.

²¹ WIP – a restriction on the amount of work that can be carried out at one time. Problems can be identified in the of tasks in terms of bottlenecks that hinder further stages of work.

²² J. Chukwunweike, O. E. Aro, *op. cit.*

²³ Author’s own compilation based on: *Inside Intel’s Lean Manufacturing: How the Semiconductor Giant Stays Ahead of the Competition*, <https://www.orcalean.com/article/inside-intel-s-lean-manufacturing-how-the-semiconductor-gi->

Tab. 3 Intel – Lean Key Performance Indicators

Area	Description	Reference to Lean
Production efficiency	62% decrease in production cycle time, 33% reduction in inventories (raw materials, work in progress, and finished goods)	Eliminating waste and optimising production processes directly contributed to reducing production time and lowering the capital tied up in inventory.
Supply chain responsiveness	Increase in confirming order changes within one business day, from 21% to over 70%, and reduction of order fulfilment lead time (OFLT) to one day	Initiatives such as “Just Say Yes”, focused on rapid response to customer needs and the removal of bureaucratic barriers in order processing, thereby boosting supply chain responsiveness.
Quality and reliability	Achieving 96% perfect orders; 30% reduction in unplanned lithography tool downtime, enabled by predictive maintenance	Ongoing process refinement and a proactive approach to machine maintenance improved operational quality and reliability. The use of AI further supports these initiatives.
Process optimisation	25% reduction in wafer transport time through AMHS optimisation, 95% elimination of manual data entry in the planning process	Visualising workflow and automating processes contributed to better operational efficiency and reduced the risk of errors from manual work

The table illustrates how Intel’s implementation of Lean Manufacturing has led to significant improvements in production efficiency, supply chain responsiveness, quality, and process optimisation. By focusing on waste elimination, rapid response to customer demands, and continuous improvement, Intel has solidified its status as a leader in the semiconductor market.

5. Conclusions

Lean Management is a method focused on eliminating waste, delivering high-quality products, and increasing organisational flexibility. Although its principles originate in the manufacturing sector, they are now applied across various industries, including IT. A review of the literature indicates that many types of waste found in manufacturing have parallels in the IT sector. As a result, numerous Lean tools have been adapted to the specific demands of IT teams. One of the key tools for Lean Management used in IT is the Kanban board, which helps teams to visualise work, set limits and identify potential issues in task execution. The Lean Management approach also appears in other popular IT management models. An example is ITIL (Information Technology Infrastructure Library), which emphasises the continuous improvement of processes – a principle that aligns with Kaizen philosophy, promoting the ongoing pursuit of process enhancement and elimination of inefficiency. An analysis of the Spotify and Intel case studies suggests that Lean Management provides tools enabling non-industrial companies to manage resources and projects more effectively. However, it is important to note certain limitations of this review

of the literature. The analysis did not encompass all research on the implementation of Lean Management in the IT sector. Moreover, the case studies of Spotify and Intel address specific principles and tools, which may limit the generalisability of the results to other organisations. In addition, the effectiveness of the implementation of Lean Management can be influenced by individual factors, such as leadership commitment to change or employee resistance to the new approach, further complicating any broad conclusions. However, the use of Lean Management elements by companies with a well-established position in the IT sector suggests that the tenets of this methodology allow companies to enhance their ability to implement changes, rapidly react to emerging challenges, and adapt to dynamic market conditions – factors crucial for success in the modern world.

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