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LEAN MANAGEMENT IN IMPROVING THE ORGANIZATION – CASE STUDY

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Purpose: The aim of this article is to present the results of research on needs and possibilities of implementing Lean Management concept at the university. Using the literature review and the results of empirical research, author proposes specific solutions (tools).
Design/methodology/approach: The aim of the research was carried out on the basis of latest world literature review and empirical research conducted at a Polish university, the domain of which is practical education. The article is a case study with a proposal for the implementation of LM in a selected university. The research covered selected organizational units of universities.
Findings: Recommendations for the use of selected Lean tools is the need to rationalize the activities undertaken in universities, including continuous improvement and flexibility of processes. There are economically justifiable actions to reduce waste and losses occurring in universities, as well as the integration of diversified and often non-cooperating organizational (functional) units. The proposals presented in this article may become an inspiration for universities that are thinking about implementing previously unused improvement tools.
Research limitations/implications: Empirical research has been limited to one university, and the proposed methods and tools relate to selected functional areas. LM implementation requires prior analysis of the needs and capabilities of each organization.
Practical implications: Due to the functioning of universities in an increasingly difficult to predict environment, they are forced to look for ways not only to survive, but above all to continuously improve the entire organization. The implemented rationalization and development measures should contribute to the improvement of the effectiveness and efficiency of management. Unpredictable changes concern the legal, socio-cultural, economic and economic environment, as well as the COVID-19 epidemic situation. These challenges are met by the concept of LM - as an inspiration and an opportunity to accelerate remedial and pro-development actions.
Originality/value: The article is dedicated to people interested in the theory and practice of the LM concept. The use of the methods and tools proposed by the author in various functional areas of the university may bring about beneficial changes in the form of improvements in activities, time savings, as well as rationalization and greater efficiency of the implemented processes.

Keywords: Lean Management, university, university management, organization improvement, efficiency.

Category of the paper: research paper, case study.

1. Introduction

The special nature of higher education, including the exceptionally complex and increasingly difficult and hard to predict condition in both the micro- and macro-environment, mean university more and more frequently seek ways to increase their effectiveness and education quality (Avella, 2017; Detyna, 2018; Krdžalić et al., 2020; Gento et al., 2021). The quickly growing trend to introduce new educational, organizational and management related solutions started in at the beginning of 2020 when the Covid-19 pandemic started. Practically on a day to day basis, universities were forced to implement modern IT and communication solutions, which allowed to continue didactic, research and organizational activity. Both administrative and academic staff started to use in their work various tools, which very frequently they had not used before. Gaining new knowledge and skills in this respect can still be observed. Academic staff, while performing various roles and pursuing various tasks, are more willing now to use modern IT communication tools than before 2020. Undoubtedly, this new situation, observed in recent years, accelerated the pace at which universities were adapting to the IT communication needs of various stakeholders. This trend should be employed to tailor the university offer to the needs of the modern environment, and also to make informed decisions on remodeling its structure and organizational culture to adapt them to the contemporary needs (including the changing needs of staff).

The fast-paced changes one can observe now encompass the legal, political, economic and also social and cultural environment. Organizations in various sectors and areas, including universities, are confronted with numerous issues resulting from demographic changes, civilizational challenges, including the necessity to adapt their offer the needs of people at various ages, or people with disabilities. The reason why is that the needs of the elderly (e.g., students of third age universities), students with disabilities, other administrative or academic staff are different from the needs of the less digitally educated part of the society. One of the essential challenges faced by contemporary universities has been the arrival of war refugees from Ukraine (since February 24, 2022), including the need to allow Ukrainian students continue their education in Poland. An analysis of contemporary challenges faced by universities leads to a reflection that it is necessary to undertake dynamic actions aiming at making university organization more flexible, opening it to team work, including tightening cooperation with various groups of stakeholders (both internal and external ones), to name just a few. According to numerous authors, such changes form a basis for further organizational

changes in the organization and management of universities, which in effect should contribute to higher efficiency in the activity of such institutions (Bacoup et al., 2016; Wiśniewska & Grudowski, 2016; Ribeiro et al., 2019; Grudowski & Wiśniewska, 2019; Grudowski, 2021; Vasilieva et al., 2021; Adam et al., 2021; Yeh et al., 2021).

When faced by complex issues and numerous challenges, universities operate in difficult and unpredictable times, including increased risk, and so they use the experience of various businesses (including manufacturing enterprises), their strategies, concepts and tools (Mcguire et al., 2008; Osborne et al., 2012; Krdžalić et al., 2020). One of such concepts is, e.g., Lean Management (LM), which as yet is not so commonly used at universities (it is still wrongly associated with manpower reductions) (Allaoui & Benmoussa, 2020). In this context, it should be emphasised that the implementation of new methods and tools requires a detailed analysis of currently available resources (including knowledge), opportunities (e.g., staff), and real needs (Leana, Buren, 1999; Lam, 2015; Henry, 2016; Detyna & Detyna, 2016; Alefari et al., 2017; Klein et al., 2021). One of key management tools, used in decision making processes, planning, evaluation and forecasting, is knowledge, which should be understood here as information transformed into understanding and ability to act efficiently.

As a result of the situation when universities function in an increasingly unpredictable environment, they have to look not only for ways to survive, but also to constantly improve the whole organization. The implemented rationalization and development solutions should contribute to improved management efficiency and effectiveness. The response to such challenges can be the Lean Management concept, which can be an inspiration and opportunity to undertake numerous repair and pro-development actions. The goal of this paper is to present results of the analysis of needs and possible implementations of LM in a selected university. Based on literature review and empirical research results (a case study), the authoress proposes specific solutions (tools). Their application in various areas of university activity can prove to be beneficial, bring improved activity, contribute to time saving and the rationalization and higher efficiency of processes. The research goal was pursued based on literature studies and empirical research conducted in the years 2020-2022 at a university providing education in practical profiles. The research encompassed the selected organizational units of the university: promotion department, student work experience and careers department, training center and university institutes. The authoress indicates in the article the potential applicability of the LM concept at universities whose objectives include, among others, the efficient management of available resources, without excessive waste. The study recommends selected LM tools for office, project and service processes. The authoress focuses on the application the Lean Management concept in such areas as: marketing, project implementation, organization of trainings and courses, services for students, cooperation with the business and economic environment and lecturers. The presented recommendations are preceded by the presentation of the essence of the implementation and the goal of implementing the LM philosophy at universities, including the Kaizen continuous improvement model which the key strategy here (Imai, 2012).

2. Lean Management and its applicability in higher education

The Lean Management concept, usually refereed to as Lean, is an enterprise management philosophy developed based on the Toyota Production System – TPS principles. One of its founding fathers was Taiichi Ohno, who distinguished seven waste categories: overproduction, waiting, transport (understood as unnecessary transfer), overprocessing, inventory, motion (understood as unnecessary motion of staff, e.g. looking for something), and defects.

In the last 30 years, LM became a universal concept, applied in offices, banks and health service institutions. Such techniques as 5S, standardized work, clarity visual management or value stream mapping are more and more frequently used in, e.g., offices, customer service processes. The so called Lean techniques are becoming more and popular in such areas as project management, marketing, Human Resources management, finance, and customer service (Loher, 2011; Hafidzoh et al., 2016; Detyna, 2018; Adzhienko et al., 2021; Benuyenah, 2021). The key LM requirements encompass mainly leadership and the involvement of all employees, so that every effort made to streamline processes could bring a return on this investment in the form of time savings or reduced stress. Then, according to D. Locher, "the feeling of being in control replaces (…) the so common in many companies learned helplessness, questions about who is guilty – focus on the process" (Locher, 2011).

The correct and efficient implementation of the LM assumptions and goals at a university requires from the management and team members the knowledge and understanding of basic notions and definitions related to this concept – this is of paramount importance in the correct implementation and use of his philosophy, including LM performance monitoring in an academic environment (Mcguire et al., 2008; Yorkstone, 2016; Ribeiro et al., 2019; Gómez-Molina & Moyano-Fuentes, 2021). The terms, the knowledge of which is especially important in the context of the issues in question are as follows:

- Unit – understood as a workplace, usually U- or L-shaped so as to facilitate service provided by one or more employees (e.g., in offices).
- 5S – that is the concept forming the basis of the Kaizen philosophy, LM and Total Quality Management (TQM), whose goal is systematic striving to create and maintain orderly working environment. This can be reduced to: sort (Japanese term: Seiri), straighten (Japanese term: Seiton), shine (Japanese term: Seiso), standardise (Japanese term: Seiketsu), and sustain (Japanese term: Shitsuke).
- 5 Whys principle – the question 'Why?' is asked five times to correctly recognise the real reasons for a given problem. This rule is useful during e.g., teamwork for the purpose of plotting the Ishikawa diagram indicating potential causes of a problem (the fishbone diagram).
- Gemba – in Japanese it means site, which is understood here a workplace where a particular value is created (e.g., value for a student).

- Hoshin kanri – in Japanese it means strategy deployment and is understood as determining goals and implementing solutions using a set of selected management methods and tools.
- Just in Time – the concept in which materials and processes are delivered (made or pursued) at the right time and quantity – in accordance with the real needs (e.g., of training participants, students).
- Kaizen philosophy – in Japanese 'kai' means change and 'zen' – good. The term refers to continuous improvement.
- Kanban system – in Japanese 'kan' means see and 'ban' – card, it is a system used to signalize demand (needs) from a later process to an earlier one using cards, badges, baskets, and other visual indicators.
- PDCA – known also from IS standards, it is a cycle of streamlining (improvement) activities, compliant with the W. E. Deming concept, the so called Deming wheel: Plan – Do – Check – Act. It is a universal tool successfully used in various tasks, e.g., project management. Undoubtedly, it forms the basis for both TQM and LM concepts.
- Total Quality Management – the concept of complex (total) quality management, the approach which emphasises the significance of every employee in the process of continuous quality improvement. The element in this concept is the system and process approach, and also the role of customers (external and internal ones) – in the case of universities: students, the representatives of the social and economic environment, administrative, didactic and academic staff.
- Value stream mapping – it presents the concept of the whole process and its steps from the moment a need appears to the final stage when a product is ready. The process shows the flow of materials and information for the purpose of finding wastes and undertaking corrective actions (to repair the problem) – most frequently it is depicted using block diagrams or tables (Wamack & Jomes, 2001; Imai, 2012; Ciarniene & Vienazindiene, 2014; Lam, 2015; Singh, Singh, 2015; Yorkstone, 2016; Detyna & Detyna, 2016; Randhawa, Ahuja, 2017; Gómez-Molina & Moyano-Fuentes, 2021).

The basic steps leading to LM implementation in the academic environment encompass:

- Stabilization – its goal is the creation of predictable and repeatable results. Simultaneously, the reasons for process instability, which during service (educational) processes frequently results from misunderstanding students' needs, should be identified.
- Standardization – the development of practices consistently used by employees. One of the fundamental standardization areas is the work rationalization and streamlining.

- Visualization – it is used to create working conditions in which a workplace speaks to employees. One of the most efficient communication methods is visual communication. This is why, e.g., project timelines, instructions, and priorities are located in visible places.
- Continuous improvement – it means encouraging all staff (e.g., administrative and academic) to improve their work. This philosophy should become part of company organizational culture and it should encompass all process and elements in the university system (Locher, 2011).

The retrospective analysis of the scientific achievement in the LM area allows to highlight 5 basic Lean principles, which are based on the assumption that organizations act as part of processes – Table. 1.

Table 1.
Basic principles and recommendations of Lean Management

Principles	Recommendations
1. Define customers and determine their value	– It is assumed that only a small fraction of all time and effort in any organization increases the final value (according to the Pareto – 80/20 principle). – The value of particular products and/or services should be clearly specified with respect to customers. – It is necessary to identify all actions which do not contribute to the added value of the organization so as to eliminated them step by step. – The identification of customer's value is important for the purpose of answering the following questions: What do customers need? When do they want it and in what way? What combination of functions, opportunities and price will be preferred by the customers?
2. Define and map value streams	– It is recommended to map the organization to create value streams and then during particular actions it is possible to focus on tasks contributing to the added value. – The value stream is a set of processes and actions in parts of an organization which contribute to its success. – On should focus on those processes which deliver value to customers (stakeholders). – The value stream is not limited to the boundaries of a particular organization – one should strive for the integration of suppliers, manufacturers, service providers, partners, allies, etc. – It is recommended for the organization to make efforts to influence partner organizations (co-operators) to also recognise and analyse the value stream (so as to achieve better results in whole value chains). – There are also three main categories of actions: a) the ones that add value, b) the ones that do not add value, but it is not possible to avoid them and c) the ones that do not add value and this is why they should be eliminated.
3. Improve workflow	– Good workflow is the necessary condition of efficient processes, as a result of which products, materials, documents, and people smoothly pass through the subsequent stages of creating values. – The elimination of the reasons for downtime and other workflow defects results in increased value and better satisfaction of the needs of various stakeholder groups. – The rationalisation of the time devoted to particular tasks, projects, etc., (minimalization of time wasting) is also recommended. – The processes which do not contribute to the added value of customers and the other stakeholders should be eliminated.

Cont. table 1.

4. Address customers and stakeholders' needs	– Understanding the demand is key – so first there is the customer's need followed by the creation of the system and processes which will allow to satisfy this need (with continuous cost-effectiveness practice). – It is necessary to conduct constant monitoring of customers' needs and communication (exchange of information with the surrounding environment). – It is important to adapt the organization offer to customers' needs in term of quantity, time, quality and costs. – Organization activity should be justified – it should result from the real needs of various groups of stakeholders. This should be accompanied by the economic account.
5. Strive for continuous improvement and development	– Continuous improvement should become a standard – striving for better satisfaction of the needs of various groups of stakeholders, streamlining of processes, communication and staff competence development, etc. – Process streamlining requires radical reorganization (rethinking and replanning) of particular stages (because there is a cause and effect relationship between these stages). – The management all staff should be convinced that the improvement efforts will never be completed and the positive effects of LM require common and realistic goals, understanding, perseverance and consistency in undertaking corrective and preventive actions.

Source: Own study based on: Radnor, 2010; Locher, 2011; Singh, Singh, 2015; Stoller, 2015; Yorkstone, 2016; Gómez-Molina & Moyano-Fuentes, 2021.

Aiming at the constant improvement of processes, management service quality, and also the minimalization of waste, the university management should identify potential sources of errors and ineffective actions (the sources of occurring risks). Waste (muda) may occur in all sorts of processes. Table 2 presents the losses which are the most common sources of waste in the academic environment. The losses are divided into four categories:

- work time,
- work system,
- staff,
- processes.

Table 2.
Losses which are the source of waste in the academic environment

Work time	Work system
– too long waiting time for e.g., signatures, new computer software, etc., – too long time spend searching for documents, files, information, etc., – breaks in work time – downtime resulting from interferences in processes and tasks, – too much time spent on preparing a concept or project, e.g., during extended consultations, arrangements and negotiations, – unnecessary movement of people or transfer of documents, – prolonged waiting for necessary documentation, – planning errors with respect to time needed to implement projects and tasks, which increases the risk of failing to implement them or incorrect implementation,	– lack of leadership, – lack of unified strategic, tactical and operating goals, – unrealistic strategic goals, – imprecisely formulated goals, – lack of suitable tools to measure goal attainment degree, – inefficient working environment, including technology, – dominant functional and organizational structure which does not focus on the value chain but on its own functional tasks, – excessively rigid organizational structure – low flexibility, – excessive centralisation of decisions, – excessive formality,

– failing to meet deadlines set earlier for task and projects, etc., which results in downtime and lack of timeliness, – doubling the same activities done by a few people at the same time, – excess information sometimes including incorrect information or messages which exclude one another, – information chaos, – efforts to gain the attention of other workers who are not available, e.g., the management staff, – participation in too long ineffective meetings and trainings, etc., – attempts to arrange excess information, including e-mail, spam, adverts, etc., – explaining misassigned and wrongly formulated tasks, – observing complex and too complicated, unnecessary and overly formal procedures while doing work.	– excessive bureaucracy, – low information quality – information overload – information chaos, – inefficient technology, e.g., information and communication, – lack of efficient motivation systems for staff, – misallocation of resources, – errors in the selection of teams assigned to particular tasks, projects, etc., – organizational chaos, – university offer not adapted to the real needs of students and other groups of stakeholders, – wasting space, – inefficient use of infrastructure, – thoughtless and unjustified purchases (e.g., equipment and software), – lack of good communication between management, staff and organization units at university, – lack of information on needs and opportunities, etc., – no coordination of activities, – doubled competences
Staff	**Processes**
– organization culture not oriented or insufficiently oriented to cooperation, including teamwork, – lack of creativity, – lack of involvement, – lack of know-how, – absenteeism, – underused staff knowledge and skills (their potential), – professional burnout, – lack of motivation to work, – lack of identified staff potential, – lack of real change leaders, – unresolved conflicts, – lack of appropriate communication between management staff, administration and academic staff, – inconsistency in action, the so called flash in the pan, – no willingness to help and support new initiatives, – lack of understanding of organizational goals, – lack of understanding of hierarchical connections, – difficulties in promoting grassroots initiatives, – lack of real dialogue between management and other staff – administrative and academic, – too much work, e.g., per particular employee.	– lack of appropriate process identification, – lack of knowledge on key processes at university, – lack of right and careful planning (stages) within particular processes, – no critical points taken into consideration at the stage when planning processes, which are sources of potential failures in process implementation, – no indication who process owners are – the people responsible for process implementation, – wrong task delegation, – ineffective working procedures, – human errors, – lack of efficient monitoring system, – lack of value stream analysis, – too many processes, – excessive physical effort put into the implementation of various tasks, as a result of e.g., wrongly designed processes, – incorrect and inefficient procedures used to do tasks and pursue processes, – errors in designating tasks and their implementation, – too high inventory level (materials, goods), – lack of clear and understandable procedures related to corrective (repair) and preventive actions, – communication interference, – competence conflicts – fuzzy responsibility.

Source: Own study.

3. Research methodology

The research goal was pursued based on literature studies and empirical research conducted at a Polish university specialized in practical education. The paper is a case study on the proposed implementation of LM in a few selected university activity areas. The research was conducted in the years 2020-2022, it encompassed a few organizational units: student work experience and careers office, promotion department, training center and university institutes. The analysis encompassed, among others, management functions at the university, the number of employees in each organizational unit, management span, and also the tasks performed by offices (teams) as well as responsibilities at selected positions. The conducted research focused especially on such university activity areas as: marketing, project implementation, organization of trainings and courses, services for students, cooperation with the external social and business environment and also with lecturers.

The research object was a state university offering bachelor and master studies for nearly 25 years (currently educating about 1200 students). The courses offered by the university among others encompass: nursing, dental techniques, dietetics, cosmetology, logistics, management, interior architecture, work safety, administration, English philology, and pedagogy. The organizational structure is composed of, among others, the Rector's Office, General Office, Institutes, Department of Studies and Student Affairs, Student Work Experience and Careers Office, Library and University Publishing House, Training Centre, University Office of Promotion, Plenipotentiary for People with Disabilities, Erasmus Coordinator, Administrative Department, HR Organization and Employees Affairs Department, Bursary office, Third Age University, Academic Sport Association, and Archives.

4. Lean Management tools selected for universities – case study

The basic information on the organizational units encompassed by empirical research is presented in Table 3.

Table 3.
Short characteristics of analyzed organizational units

Analysed functional area	Unit characteristics – activity profile	Functions and positions
Institutes	There are three institutes at the University: Institute of Health, Institute of Life and Technical Sciences and Institute of Social Sciences and Law. The Institutes are responsible for particular courses, management, organization as well as research and educational activity. There are Education Quality Assurance Teams in the Institutes, responsible for particular study courses, and Scientific Councils.	Institute Directors Deputy Directors for particular study courses Office staff
Student Work Experience and Careers Office	The Office is responsible for preparing students to enter the job market – it offers support and advisory services related to work experience. The Office cooperates with enterprises and institutions with regards to scientific activity, education and promotion, it also organises trainings for students and meetings with employers.	Vice-Rector for Development, Coordinator for Work Experience, independent clerk
University Promotion	The unit directly cooperates with the Student Work Experience and Careers Office. It is responsible for marketing activity, including university promotion and advertising.	University promotion specialist
Training Centre	This unit is responsible for postgraduate nursing and midwifery courses, and also courses for other medical professions. It offers a wide range specialist courses, qualifications and short educational events.	Training Centre Manager Training Specialist

Source: Own study.

The author recommended some LM philosophy solutions for four selected functional areas – the character of their activity (needs and possibilities):

- Institutes (jointly employing several dozen employees).
- Student Work Experience and Careers Office (3 employees).
- University Promotion (1 employee cooperating with the Student Work Experience and Careers Office).
- Training Centre (2 employees).

The recommended Lean tools and actions for the selected organizational units are presented in Table 4. They refer to four dimensions: stabilization in offices, process standardization and their visualization and improvement.

Table 4.
Recommended Lean Management tools and actions for selected functional areas of the university

Student Work Experience and Careers Office		University Promotion	
Stabilisation in offices	– Processes should be defined, including decision making processes taking place in the DPSK unit which should be identified. – The identification of needs is necessary for both students and employers to streamline the activity of the unit. – Systematic identification of new opportunities will benefit the University – e.g., the development of a new, updated offer of services. – Activisation and motivation initiatives for the staff are recommended. – DPSK should maintain close relations with stakeholders and develop stable cooperation with them for the purpose of identifying their needs and gaining information, opinions and new ideas, etc. – The Department should strive to streamline processes so as to save time necessary to undertake the most important activities for the university.	**Stabilisation in offices**	– Processes conducted in the Promotion Department must be defined. – The improvement process should be started with the identification of issues occurring in the Department and their causes. – The processes conducted by University Promotion should be interrelated with the processes conducted by the Student Work Experience and Careers Office due to close, formal relations. – The processes conducted in the department should be interrelated with the key processes conducted at the University, including the Institutes and other organizational units. – Verification of procedures and practices in terms of their efficiency and effectiveness. – Support for operating activity (conducted in the Institutes and other organizational units at the University) by using marketing skills, etc. – Process optimisation to gain time needed to improve work at this position and develop the university in general.
Process standardisation	– It is necessary to answer the question: how to conduct processes?, what stages should be introduced?, what procedures should be implemented? – Processes conducted in the Department should be divided into subsequent steps, thus creating procedures compliant with both legal regulations and the needs of students and the other stakeholders, however, without over-formalisation of these processes. – If possible, the used procedures should be simplified. – The department staff should be offered an explanation why particular processes have to be conducted according to the specified steps. – Standardised work is also recommended, which means that the Department staff will act in the same way and use the same methods.	**Process standardisation**	– Whenever possible, processes should be simplified and optimised to e.g., shorten them. – It is worth reviewing the activities and processes implemented so far in terms of their usability and efficiency. – Cooperation rules with other organizational units at the University must be established. – On a day to day basis, important (priority) issues should be separated from the less important ones, and the former should be the focus of attention. – The used communication methods with internal and external stakeholders should be verified. – Ne standards simplifying the department operation should be introduced, this will increase its efficiency and effectiveness.

Cont. table 4.

Process visualisation	– Following the flow and queues (e.g., documents) at various stages of processes, using computer systems or simple visualisation tools. – Use of standardised worksheets containing to do lists of activities, time and/or completion time , the number of tasks, task completion time. – Whiteboards, magnetic boards or corkboards can also be helpful in organising office work. – It is also recommended to use value stream maps, which present the whole process and emphasize the role of DPSK (including the role of particular employees) in a process, particular tasks and projects, etc. – The use of boards presenting project/task schedule can also prove to be beneficial. – The use of a complex visual system to present project management. – It is also worth using such tools as: work results board, task implementation visualisation, project status using colours, problem table with and escalation procedure, etc.	**Process visualisation**	– Using visualisation methods and tools, one should control whether the University Promotion Unit meets the University needs and conducts its activity according to the adopted standards. – Process visualisation in the Department should comprise monitoring queues (e.g., the information to be posted on the University website, in social media, etc.). – Work schedules should visualised. – Information on the visual management board should inspire employees to constantly improve. – On the visual management board there should be, e.g.: each process plan with particular activities, completion time, key measurements (criteria, goals, completion, comments), information about continuous improvement (what, who, when, comments), weekly and monthly task schedules (depending on goals and adopted priorities). – Flow diagrams can also be helpful (block diagrams), work results boards, visualisation boards for particular tasks, etc.
Process improvement	– Processes and procedures should be improved at every stage. – It is worth developing a list of measurements and indicators which can be systematically monitored. – It is recommended to identify the causes of problems (their roots) – techniques to be applied 5xWhy? – It is necessary to eliminate waste at every stage of processes, which may allow to regain some time and energy to do subsequent tasks. – Information and proposed corrective measures should be regularly collected from employees and other stakeholder groups. – It is recommended to organise the so called Kaizen workshops for the staff to learn to solve particular problem.	**Process improvement**	– The improvement of the processes conducted at the University Promotion Unit may encourage the staff to be more involved in continuous improvement and thus serve the University with one's IT and communication knowledge and skills (in connection with promotional activity). – Employees' skills should be cleverly used by all University organizational units. – It is recommended to closely cooperate with particular functional areas of the University, and also with various teams. – Another way of improving office processes can be equal workloads every month, which means that it is necessary to plan appropriately, especially in the periods of more intensive promotional activity (e.g., during recruitment).

Cont. table 4.

Training Centre		Institutes	
Stabilisation in offices	– The Department should strive for process optimisation so as to gain time so as to save time necessary to undertake key activities for the centre and the University. – It is recommended to conduct a detailed analysis of services provided by the Centre, including the offer and satisfaction level of training participants (including training quality). – The Department should recognise the needs of potential training participants with respect to their organization and programmes, etc. – It is recommended to verify (evaluate) the conducted processes, e.g., trainings.	**Stabilisation in offices**	– The improvement process should start with the identification of problems occurring in offices and their reasons. – It is recommended to recognise the needs of both students and employees (administrative and academic ones working in a given Institute). – It is recommended to carefully analyse complaints and the results of quality of service evaluations related to office workers as part of the adopted University Internal Quality Assurance System. – It is worth searching for such improvements which will be noticed by students and staff and will be a response to their needs. – The students service system should be corrected in a flexible way and also updated to meet the needs and new challenges.
Process standardisation	– The goal of process standardisation should be the optimisation of the whole value stream. – The key element in the standardisation process is the evaluation of the Department work by training participants (including the training offer, professionalism of trainers, etc.) – the results should be documented and periodically analysed. – The results of the assessment of the Department work should be analysed in terms of their efficiency and also the quality of service, which should translate into the development of the whole University (including its promotion). – Another precious solution can be following the how much time employees spend on particular tasks, this can help to streamline these processes.	**Process standardisation**	– When students are satisfied with administrative service, the implementation of Lean should start with the standardisation of existing processes. – In the case od dissatisfied students, the sources of their dissatisfaction should be identified as well as the errors committed by the staff and corrective measures should be introduced. – The student service system and all processes conducted as its part should be identified. – A detailed map can be made for each process and thanks to this it will be possible to identify opportunities to improve it, including streamlining. – The best practices should be formulated and documented. – When developing the standards it should be taken into account that student satisfaction is of paramount importance.
Process visualisation procesów	– It is recommended to develop a board visualising all activities performed by the Centre staff, there should also be the information whether the tasks are performed in accordance with the adopted schedule. – It is worth visualising continuous improvement projects, e.g., training plans. – The visual management board can also present, e.g., the key measures (criteria, goals, deadlines, comments), and also process schedules for each process (tasks, who, when, etc.).	**Process visualisation**	– Most of the work done in Institutes has an electronic form. – A challenge for the department can the visualisation of information. – It is recommended to visualise the stage of particular tasks, whether they are done according to the plan (standard). – Standardised work instructions, referring to selected processes, could also be helpful. – Process visualisation using and IT system could also be useful, e.g. referring to research projects implementation, particular investments, grant settlement of received funding, etc.

Cont. table 4.

Process improvement	– The identification of training participants' needs is essential (e.g., new skills, additional knowledge), another important element is the continuous improvement of employee potential (their professional competences). – It is recommended to develop a special matrix with the identified needs of training participants (referring to programmes and used didactic methods, etc.) and to what extent these needs are satisfied (level of satisfaction with the current Centre work). – The Centre staff should participate in systematic meetings of e.g., Kaizen teams within their units and also in interdisciplinary teams, e.g. in a given Institute. – Benchmarking can also prove useful, it is visiting other Universities (their training centres) and introducing god, tested practices.	**Process improvement**	– The optimisation of processes will allow to regain precious time which can be used to improve processes with the employees of other organizational units. – Cooperation with units whose work has influence on the quality of tasks conducted in the in the Institute. – The employees should participate in regular Kaizen team meetings. – It is recommended to improve the result measurement system, including the quality of prepared reports and studies, and also their usability. – If the University goal is continuous improvement, then it is necessary to develop such measurement and assessment (efficiency) criteria that will support it, to achieve this the work of all Institute employees is the key.

Source: Own study.

According to the authoress, the adoption of the LM philosophy, including the Kaizen principles, in a relatively short time and without large investments, could improve time efficiency, while time is often wasted during projects and office work. Aspiring to increase university efficiency, including the quality of management and education, it is worth focusing not only on investments in new IT solutions or infrastructure, but also undertake systematic actions aiming at the identification of and elimination of unnecessary muda. The questions that should be asked include:

- How much time do I need during a day/week/month to organize excess information?
- How much time do I need during a day/week/month to gain all the information I need to do my duties/tasks?

The results of this simple analysis may be the beginning of the implementation of selected LM tools at a given position, or in a given organizational unit.

The universities which decide to implement LM must remember, however, that the key principles of this concept are: customer orientation, leadership, employee involvement, process approach, system approach, designing improvements and taking preventive measures, taking decisions based on evidence, and also partnership development. The application of these principles in practice may contribute to obtaining the added value which will be measurable both in terms of the organizational, educational, scientific, financial, and social context. The potential LM benefits for universities, according to the authoress, are mainly:

- reducing waste in various activity areas, including time wasting,
- better work organization, including orderly workplaces,
- improvement of internal and external communication,
- better opinions of students and the other stakeholders about the university and quality of education,

- better addressing the needs of stakeholders (both internal and external ones),
- better understanding of how the university operates by all staff – its structure, connections, organizational ties, necessity to cooperate – to achieve the synergy effect,
- increased awareness of the management and staff of their role in the organization (responsibility for themselves and their team),
- higher motivation and increased university staff involvement,
- smaller number of students' complaints,
- improved efficiency in meetings,
- simplification of complex procedures used to conduct projects and tasks, etc.,
- reduction of excessive, inefficient bureaucracy,
- university image improvement, strengthening its market position.

5. Discussion and conclusions

The literature does not provide a ready success recipe in which the Lean Management concept was used in the academic environment. Such success is usually influenced by a number of mutually correlated factors, including a detailed analysis preceding the implementation of new solutions, verifying their legitimacy and evaluating success probability (Halling, 2013; Jedynak, 2015; Yorkstone, 2016; Krdžalić et al., 2020; Klein et al., 2021). In this context, it is worth emphasizing that striving for perfection in an organization should not be a single action, it should be a continuous process.

The article presents a proposal to use Lean tools in selected university organizational units. However, these tools can be also used in other areas (educational, scientific and organizational activity, etc.), certainly after the necessary modifications related to the needs. Undoubtedly, one of the key conditions in LM and Kaizen implementation at university will be the involvement of university management, management staff and all employees in connection with the continuous improvement process. Based on the analysis of the primary sources, it is possible to give examples how to influence the awareness and motivation of staff. According to the authoress, the following could prove efficient in the academic environment:

- rational persuasion – logical arguments and facts to convince employees,
- inspiring appeals – referring to the values, ideal and emotions of an employee,
- consultations – employee inclusion (involving them) in the planning process, change introduction, asking their opinions and suggestions when priorities and new actions are established,

- praise – emphasizing the role and importance of an employee at university, their good work, signaling their significance in the change implementation process (e.g., new didactic methods, ways of communicating),
- coalition tactics – searching for help and support of other people and working together on change implementation,
- sanctioning strategy – referring to the agreement on the new solutions with university policy (its mission and strategy), principles, traditions, etc.,
- trainings – they can be used to explain the reasons for implementing new solutions, their goals and potential benefits (including how the changes will influence employee development),
- support – help and cooperation with employees offered resources necessary to implement changes (equipment, information, HR, financial, etc.).

Simultaneously, there are some limitations to the efficient implementation and functioning of the LM concept in the academic environment. The authoress would emphasize among others:

- incorrect recognitions of needs and own possibilities,
- inappropriate planning,
- lack of management involvement (leadership deficit),
- employee resistance,
- lack of suitable trainings,
- no adaptability to contemporary challenges and needs in the university organizational structure (creating structures without prior analysis of key processes),
- difficulties in changing the organizational culture (including the mentality of management staff and employees),
- insufficient resources (knowledge, human resources, equipment, financial, etc.),
- lack of strong motivation and understanding of the essences of and significance of LM in the continuous improvement process,
- too wide definition of processes (frequently taking process for tasks and activity areas and the other way around), e.g., university management, human resources management,
- lack of time to conduct systematic improvement activities,
- lack of cooperation in teams (e.g., between organizational units).

To sum up, the model of organization support and reform, in accordance with the Lean principles, should take into account the coordination of operation between four key areas or stages (the so called Model 4P). The model encompasses: involvement of people, improvement of physical working conditions, process improvement and verification of adopted policy. The essence of the described philosophy is based on continuous improvement, including the elimination of waste. Such an approach requires the involvement of not only university management and more generally management, but also all employees – all process owners. The practical application of the 4P model at universities may increase their opportunities and

make them visible to students and the other stakeholder groups in terms of activity efficiency, including education quality or research projects. This effect is frequently possible without the necessity to implement expensive investments. However, the necessary element is sometimes hard to achieve as these are mature employees, who will be willing to participate in continuous development and also motivated in teamwork.

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