THE LEAN MANAGER AS A MENTOR IN THE PROCESS OF PROBLEM-SOLVING IN THE A3 THINKING APPROACH

Iwona BURKA

Górnośląska Wyższa Szkoła Handlowa (Katowice Business University), Katowice;
iwonaburka@efektywnosc.net.pl, ORCID: 0000-0002-7338-8830

Purpose: The purpose of this study is to gather information on how Polish managers operating in a Lean environment, using mentoring, develop competences related to the application of the A3 Thinking approach among their employees, and how they themselves acquired the competences of mentors, what makes it difficult for them to work with their mentees and what benefits of mentoring they perceive.

Design/methodology/approach: To answer the research questions raised, the author conducted a literature review and a qualitative research – multiple-case studies. As part of the qualitative study, five in-depth interviews were conducted.

Findings: The main contribution of this study is to provide information on mentoring in the problem-solving process in the A3 Thinking approach and the experiences of mentor-managers. However, they can be used as input data for the design of training and mentoring programmes in the process of learning the A3 Thinking approach.

Research limitations/implications: Subjectivity of the analysis, owing to the application of a qualitative approach in the studies. Future research may be connected with creating a mentoring programme in the studied area.

Practical implications: The study results can be used as input data for the design of training programs and mentoring programs in the studied area. They can also act as a guidepost and motivation for Lean managers.

Originality/value: The literature review shows a small number of scientific publications that contain an approach to mentoring in the problem-solving process in the spirit of A3 Thinking. This publication may provide input data for managers wishing to improve the effectiveness of the problem-solving process.

Keywords: mentoring, A3 Thinking, problem-solving, problem owner, developing competences.

Category of the paper: Research paper.

1. Introduction

A problem is an organisational situation which causes specific difficulties or constitutes a smaller or larger divergence from the deliberate, optimised state of a system or subsystem (Perlaki, 1974, p. 21). Problem-solving is one of the most critical aspects of an organisation (Marksberry, Bustle, and Clevinger, 2011). A structured approach to this process is directly related to organisational performance and the ability to repeat successful outcomes (Perloff, and Carlton, 2004). There are many methods and approaches to problem-solving in the literature and practice of management and quality sciences. However, the A3 Report, which was derived from the Toyota Production System (TPS), is gaining more and more popularity. Whereas, A3 Thinking is Toyota's approach to using A3 Reports as a standard form of communication throughout the organisation at all levels (Loyd, Harris, and Blanchard, 2010). The A3 Report itself is used to record the thinking process and it is supposed to be flexible and adapted to the current problem (Anderson, Morgan, and Williams, 2011). The effectiveness of the problem-solving process in the A3 Thinking approach is dependent on many different factors, including: specific competences required from people responsible for solving problems, work environment, resources, standards, but also the way of learning the individual steps of A3 Thinking. Developing competences, which are necessary for effective problem-solving in the A3 Thinking approach, is most often executed with the use of training (external, internal), field studies, courses, and less often individual or group mentoring.

Mentoring means activities carried out by a mentor, an experienced person who wants to share his or her knowledge with someone who has less experience, and through his/her work and action helps the weaker to reveal their potential (Clutterbuck, 2002, p. 36). The sources of mentoring can be found in Greek mythology, in the person of Mentor who was a friend of Odysseus and guardian of his home and also tutor of his son (Marcinek et al., 2010, p. 177). A mentor is an experienced person who gives another person individual, non-linear assistance in transforming knowledge, work, or thinking. (Megginson, and Clutterbuck, 1995, p. 13). The mentor is an expert in a given field, a role model, a master who interacts with his or her mentee to support their development, achieve goals, and improve their competences. The mentor does not provide ready-made solutions, but rather gives some tips. He or she cares for, inspires, and supports the mentee.

Can mentoring be used for developing competences associated with effective problem-solving in the spirit of A3 Thinking? It seems so. In the literature, you can find studies related to mentoring or coaching in the implementation of the Lean approach (Tillmann, Ballard, and Tommelein, 2014; Liker, and Rother, 2011; Bassuk, and Washington, 2013; Tortorella, and Cauchick-Miguel, 2018). However, there is little research on being a mentor in the process of developing competencies that are necessary for effective problem-solving in the A3 Thinking approach (Shook, 2012; Alnajem, 2021).

Taking into account the importance of the effectively implemented problem-solving process (including the A3 Thinking approach) for the organisation and the benefits of mentoring, the author, during meetings with representatives of Polish organisations operating in the Lean environment, searched for information about their use of mentoring in the A3 Thinking approach. Unfortunately, cases of using such an approach were extremely rare and did not involve the creation of internal mentoring programmes, but rather only the goodwill and commitment of managers. However, people using mentoring declared numerous benefits resulting from this approach to developing the competences of employees. This was a contribution to conducting systematic research on the use of mentoring in the process of developing competences necessary for the effective implementation of individual steps of A3 Thinking. The author centred her attention on Polish business organisations operating in the Lean environment. The author's additional motivation was willingness to disseminate knowledge about the possibility of applying mentoring in teaching the A3 Thinking approach.

In her work, the author posed the following research questions:

RQ1. What paths of developing mentoring competences have Polish Lean managers chosen, and which competences of a mentor do they consider to be crucial in their work?

RQ2. How do Polish managers working in the Lean environment implement mentoring in the problem-solving process in the A3 Thinking approach?

RQ3. What difficulties do managers encounter most often when mentoring problem owners and what benefits of mentoring in the analysed area they perceive?

Problem owners should be understood as persons who have been indicated by the organisation management to solve a specific problem and are responsible for solving it.

In order to answer the research questions, the author conducted a literature search and an empirical study, a multiple case study, among Polish managers operating in the Lean environment, conducting five partially structured in-depth interviews with mentor-managers. The study results made it possible to collect information on: the development paths of Polish managers-mentors operating in the Lean environment, conducting mentoring under A3 Thinking; their way of working with their mentees; opinions on mentor competences which they consider relevant for mentoring in A3 Thinking; the difficulties they encounter in this process and the benefits of using mentoring to teach the aforementioned problem-solving approach.

The information obtained can be a guidepost and motivation for Lean managers to deal with the topic of mentoring. They can also be used as input data to the development of a mentoring programme in the A3 Thinking approach teaching process.

2. Mentoring in the problem-solving process using the A3 Thinking method

Problem-solving is a complex activity that requires continuous development of competences while the implementation of A3 Thinking in an organisation is associated with many difficulties, as indicated by the authors of the publication (Saad et al., 2013; Tortorella, Viana, and Fettermann, 2015; Tortorella, Cauchick-Miguel, and Gaiardelli, 2018; Oliveira, and Nodari, 2010; Arantes, and Giacaglia, 2013; Silva Filho, and Calado, 2013; Sobek II, and Jimmerson, 2004; Sobek, and Smalley 2011; Shook, 2012). In order to solve problems effectively, theoretical knowledge should be combined with knowledge about the organisation and responsibilities. To do this, it is not sufficient enough to complete studies, a course or participate in training. Many years of experience are needed, a change in the way of thinking about problems and the ongoing filling of gaps in knowledge that appear in specific situations. In this way, the employee becomes an expert in a given field. Inexperienced employees willingly use expert advice. This helps them speed up the learning process, be more effective and more productive and become full-fledged employees quicker. An expert can become a good teacher if he or she takes the time to do so and develops competences that allow him or her to teach effectively. Unfortunately, in organisations you often work under the pressure of time. Instead of letting employees discover, under the watchful eye of the master, the emerging clues, they are overwhelmed with ready-made solutions. Their role is reduced to mechanically, thoughtlessly filling out the A3 Report. Do such activities allow for effective teaching?

What can improve the effectiveness of educating employees, especially problem owners? How to make them become masters of the A3 Thinking approach?

2.1. Mentoring

One of the methods of effective competency development which is widely described in the literature is mentoring. Mentoring in the organisation has developed as a response to the need to support employees in their pursuit of development and achievement of the assumed goals (Myjak, 2016, p. 137). It is a relationship of master and apprentice in which the entrant draws from the master's experience, and the master transfers knowledge to the entrant over a longer period of time. This relationship is based on full voluntariness, constant contact, relationship dynamism, and focuses on inspiring. Mentoring has been studied extensively, but as Clutterbuck says, the "father" of modern mentoring, intensively does not mean well. Clutterbuck believes that the problem is the errors in structure and definition (Clutterbuck, 2013). So there are as many definitions of mentoring as there are researchers.

According to the authors, mentoring is: a process in which learning and development are stimulated and supported (Parsloe, and Wray, 2002, p. 81); a method of supporting young people in their development by the care of a more experienced and older person over a younger and less experienced one (Karwala, 2007, p. 27); it is voluntary help which is independent of

the official hierarchy, given by one person to another, owing to which he or she can make progress in their knowledge, work, or way of thinking (Clutterbuck, 2002).

Mentoring can take the form of either an informal relationship or a formal programme (Czekaj, 2007; Wanberg, Welsh, and Hezlett, 2003). Regardless of the degree of formalisation of this relationship, we can talk about patronage and development mentoring. In the patronage model, the mentor is more influential, usually takes a higher position in the hierarchy, actively advocates for the mentee, promotes them, guides them in gaining experience and gathering resources. The development model, on the other hand, is focused on joint development, the mentor helps the student enrich their knowledge and act independently, has more experience in a given area, helps the student to make small discoveries, owing to which the student can direct his/her own development (Megginson at al., 2008, p. 30).

Mentoring, apart from the individual form (student-master; one-on-one), can also take the form of group mentoring. There are also specific advantages and disadvantages of both approaches (Myjak, 2016).

Implementing mentoring in an organisation gives a number of benefits for the organisation, the mentored employees as well as the mentors themselves. According to Sidor-Rządkowska, mentoring is a valuable supplement to the organisation's training policy, it allows for supporting knowledge and diversity of the management processes, supports the idea of life-long learning, influences the development of managerial competences and it is a kind of prevention of the so-called "burnout". It also allows you to build alternative career paths (Sidor-Rządkowska, 2016). In addition, the benefits include accelerated promotion rates, greater job mobility, higher overall salaries and remuneration packages, greater personal and professional satisfaction, increased professional confidence, increased self-esteem, reduced stress related to the implementation of new tasks, reduction of work-family conflicts, or a sense of greater agency in the organisation (Burke, 1984; Chao, Walz, and Gardner, 1992; Dreher, and Ash, 1990; Wright, and Wright, 1987; Johnson, 2003). Mentoring supports management processes by increasing the value of human and social capital, supports an individual in increasing his or her independence, and prepares them to take responsibility for themselves (Krzyminiewska, 2016). The mentors themselves also benefit. Mentoring allows for the constant development of a mentor, gaining greater respect among employees, and increasing job satisfaction. Ayoobzadeh and Boies also indicate that in the case of mentor-managers, if they themselves provide their mentees with a higher level of mentoring, they experience an improvement in the leader's identity and feeling of self-efficacy (2020). Ślęzak-Gładzik (2016), among others, writes about the benefits as well.

The implementation of the mentoring process is associated with many difficulties that mentors face. Research shows mentors' doubts about their initial role and tasks, anxiety connected with uncertainty about their skills, difficulties in understanding what the expectations of the mentees, frustration related to the mentees not showing up to the arranged meetings, limited time to support the mentees, fear that they are doing too little or that they do not have the competences to teach and conduct meetings (Gonçalves, and Bellodi, 2012). The threats

resulting from the implementation of a mentoring programme in an organisation stem from many aspects. On the one hand, the direct superiors of mentored people may feel threatened as regards developing the competences of their subordinates, which, moreover, is related to the opinion that the immediate supervisor should not be a mentor. Other threats include: improper selection of the candidates for mentors, lack of training support, improper selection of mentor-mentee pairs, insufficient, poorly planned or organised information campaign, or maladjustment of the mentoring programme to the organisation's specificity (Sidor-Rządkowska, 2016).

According to Gambade, the mentor's tasks include: providing feedback, sharing knowledge, opinions and feelings, encouraging discovery, defining barriers, indicating methods of action, supporting, encouraging, and observing (2013, pp. 16-17). At this point, it is worth adding active listening and asking the right questions. Rowley believes that a good mentor is committed to the role of mentoring, accepting of the beginner mentee, skilled at providing instructional support, effective in different interpersonal contexts, is a model of continuous learner, who communicates hope and optimism (Rowley, 1999).

What competencies are required of a good mentor? The most frequently mentioned competences include: knowledge and skills in the field of work, knowledge of the principles and techniques of mentoring, attitude towards one's own professional work and towards the mentee, self-awareness (understanding oneself), behavioural awareness (understanding others), sense of proportion/humour, communicativeness, conceptualisation (understood as the ability to analyse and evaluate information, giving information the right structure), uninterrupted self-education, interest in the development of others, managing a mentoring relationship, clarity of the goals, the ability to delegate work to others, maintaining confidentiality, the ability to communicate empathy, respect, compassion to the mentees, observation and feedback skills (Sidor-Rządkowska, 2014; Ślęzak-Gładzik, 2016; Clutterbuck, 2002; Johnson, 2003; Orth, Wilkinson, and Benfari, 1987). The virtues highlighted are integrity (personal honesty to develop trust in a relationship), protectiveness, care, and prudence (Johnson, 2003). The mentor should also present some manifestations of creative thinking to be able to show unconventional paths to the mentee. Pietroń-Pyszczek and Golej (2018) writes about the necessity to develop creative thinking in the mentees under their care, and to have critical and analytical thinking skills (Gantz, 2010; Orth, Wilkinson, and Benfari, 1987).

The essence of mentoring today does not only come down to personal development, but it covers a wider scope, a broader perspective (Flaszewska, Lewicka, 2020). One of the directions of development is to provide support while learning specific methods, tools, or approaches to management, including problem-solving in the A3 Thinking approach.

2.2. A3 problem-solving

A3 Thinking reflects the PDCA (Plan, Do, Check, Act) cycle and it is based on a scientific approach to creating knowledge in an organisation (Marksberry, Bustle, and Clevinger, 2011).

It is a kind of scientific storytelling about a problem, supported by a detective flair, rationality of action, as well as critical, holistic, visual, and creative thinking. The result of the work is entered in the individual fields of the A3 Report. The report is usually completed by the problem owner, i.e. the person responsible for solving it. The work, on the other hand, takes place in teams. The A3 report is a worksheet containing several sections that complement each other when solving a specific problem. It is recommended to include data and information in graphic form. Its layout and the way of completing the sections allows it to be placed among visual management instruments (Simons et al., 2014). An A3 report typically includes the following sections (Sobek II, and Jimmerson, 2004; Shook, 2012; Sobek, and Smalley, 2008; Dennis, 2015; Liker, and Meier, 2011; Koskela et al., 2020): Theme – problem definition; Background – relevant background information that is necessary to understand the scope and severity of the problem; how the problem was detected; what is the business context of the problem; Current Condition – information about the current results of the process; facts collected at source, resulting from observations and measurements, quantified and presented graphically; Target Statement/Future Goal – determining what results are desired and what results are to be achieved; Root Cause Analysis – identifying the causes of the problem, determining what is the essence of the problem, asking more and more questions ("5 Why's"), looking for cause-effect relationships, developing a set of causes; Countermeasures/Target Condition – proposed solutions, methods of counteracting the problem, improvement proposals, graphic presentation of the target state; Implementation Plan - defining the steps to be taken in order to achieve the target state, their order, identification of responsible persons, implementation deadlines, scheduling activities, supervising the status of activities; Follow-up Action – information on how actions will be reviewed in order to make sure that the problem has been eliminated; the last stage is drawing conclusions and knowledge sharing.

In order to efficiently and effectively solve problems applying the A3 Thinking approach, it is necessary to develop specific competences. The authors indicate the following competences necessary for effective problem-solving using the A3 Thinking approach (Shook, 2012; Sobek, and Smalley, 2008): the ability to apply various ways of thinking and reject opinions and use facts; the ability to analyse data, investigate the situation, detective work; ability to define problems; the ability to observe, ask questions, listen and draw conclusions, reflect; ability to think independently, initiative; responsibility; the ability to see opportunities in emerging problems, openness to various possibilities, the ability to generate unconventional solutions; the ability to tell stories; the ability to think contextually, identify and analyse coexisting factors related to something; ability to set standards; the ability to reach consensus and agreement; the ability to admit mistakes and ignorance; the ability to involve other people in activities; the ability to look to the future; teamwork skills; the ability to graphically present data and information.

A mentor in the problem-solving process should be an expert who possesses a high level of the above-mentioned competences in order to be able to teach them. At the same time, he/she should develop the competences necessary for effective mentoring.

3. Methods

Although the A3 Thinking approach to the problem-solving process seems to be intuitive and thoroughly described in the literature, in practice it turns out to cause many difficulties for organisations. These can include: bias in data collection, bias, rigid approach to problems, basic attribution errors and other cognitive errors, making decisions based on opinions rather than evidence, tendency to skip the steps of problem analysis, misidentification of the problem to be solved, inadequate information gathering connected to the situation in which the problem occurs, difficulties in generating innovative ideas (Shook, 2012; Saad et al., 2013; Tortorella, Viana, and Fettermann, 2015; Tortorella, Cauchick-Miguel, and Gaiardelli, 2018; Oliveira, and Nodari, 2010). Introducing mentoring for problem owners can help to overcome them. However, this is not a common practice in Polish enterprises operating in the Lean environment.

The author conducted systematic research on the use of mentoring in the process of developing employees' competences necessary for the effective implementation of individual steps of A3 Thinking.

In order to answer the research questions posed by the author, a literature study and an empirical study were carried out. Since the research questions begin with the question: "how?" and "what?" the author chose qualitative research, multiple case studies with the use of in-depth interviews as the most appropriate research method. Thanks to case analysis, it is possible to confront one's own reasoning with the conduct of real participants of events and processes (Sławińska, and Witczak, 2008, p. 121). The case study is empirical in nature, it is reliable collection and processing of data that can be compared with each other (Yin, 1994, p. 23).

The research method adopted by the author is made up of three stages: stage I – a literature query according to previously established criteria, correlated with research questions and goals (the information obtained was used, inter alia, to construct an interview sheet); stage II – empirical research (multiple case studies with the use of partially structured in-depth interviews to maintain data consistency); stage III is the preparation of results, drawing conclusions, and giving proposals for further research.

The objectives of the empirical study were:

- to indicate which paths for the development of mentoring competences were chosen by Polish Lean managers, and which mentor competences they consider to be crucial in their work,
- to indicate how Polish managers working in the Lean environment implement mentoring in the problem-solving process in the A3 Thinking approach,
- to indicate what difficulties managers, encounter when mentoring problem owners most often and what benefits they perceive from mentoring in the analysed area.

Information connected with in-depth interviews:

- the author conducted 5 in-depth interviews, based on partially structured interview questionnaires, where the respondents were Polish managers working in the Lean environment, in three different industries,
- the interview questionnaire consisted of 80 questions (open and closed-ended ones), divided into five groups of questions,
- the participants of the study were managers (men) with many years of experience in problem-solving using the A3 Thinking method (from 3 to 9 years),
- the call to participate in the study was posted on 30 March, 2021 on LinkedIn, and the study was conducted in April 2021 (telephone interviews and video calls using Internet connection); the interviews lasted from 1.5 hours to 2.5 hours,
- 6 people expressed their willingness to participate in the study, of whom 5 met the initial assumptions (at least two years of experience in problem-solving with the A3 Thinking method and experience in mentoring in the A3 Thinking method).

One of the limitations of the study is the possibility of reporting the willingness to participate in the study only of people for whom sharing knowledge and supporting others in their development is a passion.

4. Results

The study presents the results of research on the use of mentoring in the process of developing the competences of problem owners employed in organisations operating in a Lean environment, in the context of problem-solving in the A3 Thinking approach. Five mentor-managers replied to the interview questionnaire. The study participants were coded with a number from 1 to 5, resulting from the order of the interviews. The interview questionnaire included 80 questions, both open and closed-ended ones, divided into five groups: introduction and general information; mentoring the competence development pathway and mentor's key competences; the way of implementing the mentoring process in the A3 Thinking approach;

difficulties and benefits; additional notes. The respondents defined the mentored person as a protégé, student, mentee, or intern. For the purposes of this study, in order to standardise the terminology, the term "mentee" was adopted. The mentee is a person responsible for problem-solving in the organisation, also known as the problem owner, who is in the process of developing his/her competences in problem-solving. In each of the organisations represented by the study participants, problem owners are appointed, and the mentored mentees are people with higher education, short work experience, working in white-collar positions.

The research participants implement development, informal, spontaneous, direct mentoring (it happens that they use instant messaging or phones in their contacts). Only Mentor No. 5 carries out formal mentoring, based on a mentoring programme introduced in the organisation half a year ago. Mentor No. 5, however, declared that he had already mentored one of the mentees (before the formal programme was introduced). Mentors do not plan and carry out mentoring sessions, but focus on supporting the mentees at the next stages of the problem-solving process, depending on the needs.

All organisations represented by managers participating in the survey use the A3 Thinking approach to problem-solving, and the survey participants are experienced Lean managers and have been using the A3 Thinking approach for years. They also declare that they are mentors, although not always for their subordinates. Therefore, they meet the author's initial assumptions and could participate in the study.

Table 1 presents the basic information on the study participants.

Table 1.
Basic information on the study participants

	Mentor No. 1	Mentor No. 2	Mentor No. 3	Mentor No. 4	Mentor No. 5
Age	45 years old	38 years old	49 years old	52 years old	45 years old
Sex	male	male	male	male	male
Industry represented	automotive	food	automotive	automotive	manufacturing, household appliances
Organisation size (number of employees)	from 51 to 250	from 51 to 250	above 251	from 51 to 250	from 51 to 250
Seniority	22 years	13 years	27 years	29 years	21 years
Seniority in Lean	7 years	8 years	10 years	11 years	8 years
How many years has the respondent been using the A3 Thinking approach in the problem-solving process?	5 years	8 years	9 years	6 years	3 years
For how many years has the respondent been using mentoring in the A3 Thinking problem-solving process?	0.5 a year	one year	one year	one year	1.5 years

Cont. table 1.

Mentoring scope	only in the A3 Thinking approach	only in the A3 Thinking approach	not only in the A3 Thinking approach	only in the A3 Thinking approach	only in the A3 Thinking approach
Number of mentees	1	1	4	1	2
Are the mentees functionally dependent on the mentor?	no	yes, immediate superior	yes and no	yes, immediate superior	no
Which party proposed mentoring?	mentor	mentee	mentor	mentor	mentor
How long has the mentor study the A3 Thinking approach?	2 years	2 years	one year (with the support of a mentor)	2 years	one year
Did the mentor have a mentor's support?	no	no	yes	no	no
How long has the process of teaching the mentee the A3 Thinking approach been going?	from half a year to one year	from half a year to one year	from four months to even a year	from half a year to one year	from half a year to one year
Does the respondent create development programmes for the mentees?	no, but I will prepare them	I have a general concept	no	no	yes
Has the respondent created his own programme of developing mentor competences?	no, but I have now understood that it is important	yes, I like to have everything planned	no	no	no, but we have programmes in the organisation

Note. own study.

The following subsections contain brief descriptions of individual cases. The sections correspond to the order of the research questions asked. Descriptions concern the examined scope of mentoring, i.e., support in solving problems in the A3 Thinking approach.

4.1. Mentor No. 1

The path of developing mentoring competences and the mentor's key competences

"Mentoring for me is a process of developing the competences of my mentees". The respondent declares that he developed his mentoring competences on his own. He himself had not had a mentor before, but he came across an interesting article about mentoring and that made him interested in the topic. In the literature, he fumbles around in the dark, rather haphazardly. He did not identify competences that he should develop. He does not rate the available materials very well. He believes that most of them are connected with mentoring personal development. A study on the competences that he should develop among the mentees, along with tips on how to do it best would be valuable to him. He does not feel like a real mentor, but tries to develop continuously. During mentoring, he learns to be patient,

and the mentor's key competences are in his opinion: knowledge about work and the ability to apply it, communicativeness, knowledge of the principles and techniques of mentoring, the ability to listen and show respect. He has never created a development programme for himself, but during an interview he decided to create one. The mentoring goal for him will be to crystallise the development path and develop creative thinking. He is motivated well enough to pursue it.

The way of implementing the mentoring process in the A3 Thinking approach

He believes that it is easier to mentor someone for whom you are not a direct supervisor. He lacks the support of his superiors and the development of mentoring among other managers. Knowledge and experiences could be shared. He practices mentoring irregularly, depending on the mentee's needs. The other managers are a bit sceptical about his actions. The immediate supervisor of the mentee is not satisfied. The respondent does not define the goals, expectations and boundaries, but as he stated, he will probably start to do so, because it is a good idea. Periodically, as part of reflection, he analyses the results of his work with the mentee and tries to improve his technique. His support usually concerns specific problems, but if he finds that one of the competences of the mentee needs to be worked on, he returns to it. He believes that mentoring helps him in being a better manager for his subordinates. Meetings with the mentee take place at *gemba* or the mentor's office. There is no possibility to observe the mentee at work, but he places importance on asking questions and is always eager to listen. He has no problem with establishing relationships, he is open to people.

Difficulties and additional remarks

- lack of support from the company's management (resources, time) and the ward's immediate superior, unfavourable organisational culture,
- he was informed that the management was wondering why he wanted to learn so much about other people's problems, but he was not discouraged yet,
- a lot of incomprehensible literature,
- A3 Thinking notices the most difficulties in implementing the steps at the stage of collecting data and looking for root causes,
- his suggestions regarding the inclusion in the training plan in the context of specific competences of the mentee/ward are not taken into account; believes that emphasis should be placed on developing critical and holistic thinking among problem owners; it is difficult for the mentee to concentrate and listen carefully; during each meeting, discusses with him exercises to improve these competences.

4.2. Mentor No. 2

The path of developing mentoring competences and the mentor's key competences

"Mentoring for me means supporting the development of mentees in the agreed scope". He is self-taught in the field of mentoring. He searches for materials on the Internet and buys

books. He makes development plans. He likes to have everything planned. He evaluates the available literature as average. Usually, he finds something that does not fall within his scope and wastes his time on reading it. He became interested in mentoring when his mentee, a subordinate employee, came to ask for help. They had a good discussion, and they worked together well, they even stayed behind after working hours. In the end that employee told him that he could be a mentor. He likes helping others, he builds relationships easily, so he became interested in it. He believes that the key competences and qualities of a mentor are: willingness to learn, knowledge, providing feedback, listening skills, understanding, good knowledge of the organisation, the ability to create lasting relationships based on respect and trust. His mentoring goal is to deepen his knowledge about effective education techniques. He has no problems with motivation. He is driven by the mentee's enthusiasm.

The way of implementing the mentoring process in the A3 Thinking approach

A formal mentoring programme does not exist in the organisation. Being the immediate supervisor of the mentee does not make his job easier. He fears that other employees may feel treated in an unequal way. He tries to lead his mentee by the hand through all the steps of A3 Thinking and constantly improve his competences at each stage of work. He believes that he feels good enough with A3 Thinking that he can help others. During mentoring, he constantly learns something new. He is often forced to look for hints in the literature. He likes to be in *gemba* the most, and this is where he most often conducts mentoring. He tries to meet his mentee regularly, although they do not plan meetings in advance. He never leaves questions posed unanswered. He does not evaluate progress because he does not define expectations. He declares that he will start doing it.

Difficulties and additional remarks

- lack of support from superiors, including in terms of finding time for mentoring,
- supervisors do not understand the value of mentoring,
- he notices the most difficulties in implementing the steps of A3 Thinking at the stage of searching for root causes,
- the least developed competences of problem owners are: the ability to select, analyse and interpret data, especially relating them to the context, a holistic view of the problem, objectivity, and the ability to reflect.

4.3. Mentor No. 3

The path of developing mentoring competences and the mentor's key competences

"Mentoring for me is developing the skills of my mentees". He himself experienced mentoring many years ago. As he claims, it was not named that way back then. He maintains close contact with his mentor to this day. It was his mentor who made him start helping others. He tries to continuously develop. He participated in a mentoring training once and the employer covered the costs of this training. He believes it was a good investment. However, he obtains

most of his knowledge himself. He believes that there is too much literature and sometimes he does not know what to choose. Sometimes, he made wrong choices. He feels like a real mentor. He believes that he is predisposed to it, he understands people, he can read their emotions. In his opinion, the most important competences of a mentor are: of course, knowledge of a given topic, communication skills, sense of humour, interest in the development of other people and oneself, empathy, understanding, and patience. His goal is to learn foreign languages. Maybe he could become a mentor without borders.

The way of implementing the mentoring process in the A3 Thinking approach

There is no formal mentoring programme in the organisation. He does not force anyone to cooperate, but the employees come to him themselves. Maybe that is why he says that he likes to joke. Since the employees started to turn to him for support, he had begun to help others develop in a more organised way. His wife is not happy because he sometimes answers phone calls from his mentees at home, also about personal matters. He considered setting boundaries, expectations. He is pleased that, according to the employees, their motivation to work has increased since his mentoring started. However, he believes that if he does not "feel chemistry with someone", he does not declare that he will help that person in the long run. He treats them a little like his own children. As he says: "they feel taken care of". Maybe also because they see his commitment, passion, and it drives them. It happens that they themselves ask what they can help him with, because they see that he is unable to do everything in a timely manner. He is an advocate of creating a mentoring standard for the A3 Thinking approach. The immediate superiors of his mentees do not mind the mentoring activities at all. And when he is the manager, mentoring has had a positive impact on his relationship with the employee. He said: "One of my charges got a better job offer and left the company, but he still talks to me and he still, gives him advice". He believes that the mentee has already outgrown him. He believes that mentoring is more effective than mass training, but it is more time-consuming.

Difficulties and additional remarks

- he compensates the lack of possible bonuses for activities with the joy of continuous development,
- no time; it is an additional, time-consuming activity,
- no training in mentoring in the present organisation,
- he notices the most difficulties in implementing the steps of A3 Thinking at the stage of collecting data and generating ideas for improvement, as he claims, unconventional,
- the mentees are the worst at being objective, with long-term planning and generally dealing with more data and information; they focus too much on statistical date and have a hard time interpreting them, it would also be useful to develop their creativity.

4.4.   Mentor No. 4

The path of developing mentoring competences and the mentor's key competences

"Mentoring for me means supporting my mentees in gaining new knowledge and skills". The respondent's adventure with mentoring began with the words of an employee: "Boss, you can explain it in a nice way." He learns to be a good master for others himself. He lacks support and thinks good, concise material is difficult to come by. He wishes he had had a mentor earlier. Since he "plays" in mentoring, he has jumped out of the routine associated with his professional work. He points to the following key competences of a mentor: mastery in the base field, the ability to cooperate and understand others, knowledge of mentoring and effective teaching of others, the joy of constantly learning something new, and communicativeness. The mentoring goal is to be the best teacher possible.

The way of implementing the mentoring process in the A3 Thinking approach

The organisation lacks a formal mentoring programme. He regrets that he has little time and mentoring is quite irregular. However, he tries to devote every free moment to his mentee. They meet in his office or in the hall. Being a direct supervisor does not bother him. He even thinks that he is a better boss because of that. He is already watching over another mentee. Mentoring improved communication with the employee and developed a common style of communication. The respondent does not create programmes, does not set limits, and does not define goals. He claims that he prefers to act spontaneously, it gives him joy, fun, and satisfaction. The mentee calls him "my guide". The mentee appreciates an individual approach, and you can see that he is trying harder, as if he wanted to prove something. The mentor does relieve him, he only guides him. He also does not analyse the results of mentoring. He claims to feel if there is progress.

Difficulties and additional remarks

- lack of management's interest in extending the scope of mentoring and possibly remunerating for additional work,
- little time and no support (e.g., reimbursement of the cost of books or training),
- he notices the most difficulties in implementing the steps of A3 Thinking at the stage of data collecting and searching for root causes,
- the mentees are the worst at interpreting data in relation to a given situation, at being objective; they fall into the trap of looking for data confirming their assumptions.

4.5. Mentor No. 5

The path of developing mentoring competences and the mentor's key competences

"Mentoring for me means participation and support in developing the required competences in my mentees". First, he developed his passion himself, because helping others is his passion. A year ago, his organisation conducted a series of mentoring training sessions. He evaluates them very well and much better than the available literature. During the first month of reading on the Internet, he was unable to define what mentoring was. While searching for materials, he came across several interesting publication titles, but they were unavailable to him. He has not purchased access to the publication databases. He said it would be good if the scientific studies were available to the general public. He is waiting for someone to publish something simple and clear in the message, as was discussed during the training. He points to the following key competences of a mentor: knowledge, the ability to cooperate and communicativeness. His mentoring goal is to think outside the box and teach the same to his mentees.

The way of implementing the mentoring process in the A3 Thinking approach

There is a formal mentoring programme in the organisation, but its activities are only just getting started. The respondent determines the expectations, boundaries, cooperation rules, since the system is formalised. He has not yet managed to assess in accordance with the system's assumptions. He meets his mentees quite regularly, mainly in the hall or in the conference room. He teaches his mentees how to be detectives and have fun at the same time. His favourite question during meetings is: "What if?" He tries to follow the A3 Thinking process step by step with his mentees. When necessary, they stop and come back. They often work in a team. They have endless discussions and the mentor loves to ask questions. However, this results in a backlog in the mentor's base work. So far, his proposals for training for mentees developing specific competences have not been accepted. He does not understand the whole system a bit.

Difficulties and additional remarks

- despite the mentoring programme, there are no financial benefits so far,
- the programme is quite formal and the expectations assessment system seems to discourage mentoring, there is a lot of bureaucracy,
- he devotes a lot of his private time,
- he notices the most difficulties in implementing the steps of A3 Thinking at the stage of data collecting and looking for root causes; claims that coming up with interesting and wise solutions flounders as well,
- the mentees are worst at dealing with statistics, but also with creative thinking, two different poles of thinking.

Table 2 lists the benefits of mentoring most frequently indicated by the respondents, broken down into benefits for the mentor, mentee, and organization.

Table 2.

Selected benefits of using mentoring in the A3 Thinking approach indicated by the respondents

For the mentor	For the mentee	For the organisation
- fun, pleasure - better mood - greater job satisfaction - change of mindset - more respect from colleagues - distinction (if someone chooses us to be mentors) - continuous development and they modify their approaches to the matter - consolidation of knowledge - structuring knowledge - in order to learn something, it must first be organised - developing knowledge about learning processes - participation in the idea of lifelong learning - continuous development of competences, often resulting from unconventional questions of the mentees	- more efficient problem-solving - increase in motivation to work - greater self-confidence when working on solving a problem in a given team, - greater commitment and willingness to speak in the forum - developing the way of thinking about problems characteristic of the A3 Thinking approach - developing knowledge about problems and ways of solving them - developing knowledge about the processes implemented in the organisation - a broader view of problems and processes - seeing interactions in processes and the impact of the problem-solving process on the company's development - developing a detective talent or a talent for finding out-of-the-box solutions - opportunity to be promoted - better relationships	- efficient problem-solving process - shorter time for people responsible for solving problems to gain experience - easier and wisely aided adaptation of new employees responsible for solving problems - improving communication in the organisation in the problem-solving process - the employee feels more connected with the organisation, which affects employee rotation - revealing tacit knowledge in the use of A3 Thinking, resulting from experience (support for knowledge management processes) - increases loyalty to the organisation and job satisfaction - better relations among employees - supporting the employee training policy

Note. own study.

The mentors also emphasised that before starting helping others, it is good to first get to know yourself, your strengths and weaknesses, and the methods of work. They also claim that mentoring in the A3 Thinking approach is based on believing by yourself that problems create opportunities, are an opportunity for development and improvement. Otherwise, the mentor will be unreliable.

5. Discussion

"No problems, that's a problem" (Shook, 2012, p. 2). Problems have always been and will always be. An appropriate approach to solving them is therefore crucial in the process organisation improvement. A mentor-manager, trying to teach his mentees to effectively solve problems in the A3 Thinking approach, should try to understand the process of achieving results used by the mentee, the problem owner. This will allow him/ her to manage the learning process. One of Toyota's principles is that the right process, a process that is well designed and controlled, leads to good results. (Liker, 2005). Mentoring is a long-lasting process. Therefore,

it requires good preparation and planning. In addition to knowledge about processes, work, and responsibility that is gained through experience while working in a given organisation, a manager-mentor must also, as Shook emphasises, "learn to learn" (2012, p. 4). He or she has to lay out the entire A3 path, be able to read the A3 Report, but also find out if the process owner himself understands what he has described. Therefore, it is important to ask questions skilfully, actively listen, be able to think logically, but also to go beyond the patterns of reasoning, thinking outside the box and thinking visually.

Each of the managers surveyed defines mentoring in a similar way as a process, the path of developing human competences and supporting him/her during this journey. Comparing this with the definitions from the literature, one can conclude that each study participant understands what mentoring is and what is the essence of this approach to sharing knowledge and developing skills. The paths of developing the mentoring competences of the research participants were similar. They are self-taught. They search for knowledge and develop skills themselves. They are distinguished by their passion, enthusiasm, commitment, and willingness to help others. Certainly, these features are conducive to building good relationships with the mentees. Motivations to start searching for knowledge about mentoring are the impulse caused by the appreciation of their "natural" way of working with people or an interesting article. In the case of Mentor No. 3, it was his own mentor who influenced his willingness to help others. The survey participants regret that in their organisations mentoring is not an element of organisational culture, is not taken more seriously, and mentoring is not used. In the organisation represented by Mentor No. 5, a formal mentoring program was introduced half a year ago. Mentor No. 5 does not assess it very well, considering that it has introduced too much bureaucracy. On the other hand, the training conducted before the introduction of the programme is assessed very well by him.

The mentors rate the materials available on the Internet rather poorly. They notice the terminological chaos and find it difficult for them to navigate in the knowledge maze, much of which, as they emphasise, is worthless. They had no one to advise them on what to read. All of the respondents agree as to the fact that a good mentor should know well the scope of the work he is teaching. The aims in the context of mentoring, however, vary. These are: crystallising the path of development, expanding knowledge about effective learning techniques, learning foreign languages, or developing creative, out-of-the-box thinking skills. How many mentors, so many different individual goals. Contrastingly, they showed greater compliance with the key competences of the mentor-manager, pointing primarily to the knowledge of work and responsibility as well as: communication skills, knowledge of the principles and techniques of mentoring, the ability to listen, provide feedback, understanding, the ability to create lasting relationships based on respect and trust, sense of humour, interest in the development of other people and oneself, empathy, patience, the ability to cooperate and understand others, knowledge of effective learning of others, the joy of learning something else.

The research participants follow the mentoring process in a similar way. In four out of five cases, it is developmental, informal, and spontaneous mentoring. Only Mentor No. 5 conducts formal mentoring, based on a mentoring programme that has been in place for six months. Previously, however, his form of work was exactly the same as in the case of the other mentors. The mentors rather do not plan, define goals, and implement mentoring sessions, but focus on supporting their mentees at the next stages of the problem-solving process, depending on the needs. They act rather irregularly, intuitively, and do not assess progress. However, they found that it would be good to think about defining expectations and boundaries, or assessing progress. Mentor 2 has an overview of what he would like to achieve with the mentee, while Mentor 5 is obliged to formalise the work. The mentors first of all try to actively listen, observe, ask questions and work in the *gemba*. They encourage reflection, direct, teach a holistic view of the problem, try to develop detective skills in their mentees, especially valuable at the stage of evaluating the current situation and looking for problem sources. They also pay attention to developing critical thinking skills, as the problem, in their opinion, is the lack of objectivity and patterns of reasoning. They develop creative thinking in their mentees, which is important at the stage of generating solutions, as well as visual and holistic thinking, applicable throughout the problem-solving process. They try to teach long-term planning, analysing, interpreting data and relating them to the context, active listening and methods of focusing better. The respondents believe that the mentor should also "feel the chemistry" with the mentee.

The mentors also agree on the difficulties that have an impact on the quality of their mentoring work. These mainly include the following: lack of time, no bonuses for additional work, lack of interest in mentoring among top management, failure to provide training in mentoring and learning materials by the organisation, lack of support from the direct superiors of mentored persons. The most difficult problems for their mentees in the process of problem-solving in the A3 Thinking approach are the stages of data collection, searching for root causes and generating solutions.

The benefits of implementing the mentoring process indicated by the respondents can be divided into benefits for the mentors, mentees, and organisation. Table 2 shows selected benefits of mentoring in the A3 Thinking approach indicated by the respondents.

Mentor-managers believe that mentoring makes them better managers. They believe that every manager should teach how to be a mentor. Mentoring a direct subordinate is something valuable, it improves communication and relationships, however it can lead to a situation where other subordinate employees may feel they are treated unequally.

To sum up, the task of the mentor-managers is to develop employees. Quoting the sentence from the TWI (Training Within Industry) card: "If the employee has not learned, it means that the instructor has not taught them" (Graupp, and Wrona, 2010, p. 13). The mentor-manager must therefore continuously develop his or her own competences.

6. Summary

The practice of management is associated with continuous problem solving. Therefore, the quality of the improvement activities in the organisation depends on the quality of the problem- solving process. Regardless of which path or method of problem-solving a given organisation chooses, its effectiveness will depend on the knowledge and skills of people who implement it. The A3 Thinking approach focuses on changing the way of thinking about problems and acting according to strictly defined steps. However, the effective implementation of each of the steps requires the development of specific competences, and the A3 Thinking approach itself is also a set of knowledge about problem-solving. Therefore, emphasis should be placed on effective processes of developing competences among problem owners, i.e., people responsible for solving them. What can improve the effectiveness of educating employees, especially problem owners? How to make them become masters of the A3 Thinking approach? In the literature of management and quality sciences, the use of mentoring is suggested more and more often and boldly.

The author, as part of a qualitative research, multiple case study, preceded by a literature query, conducted in-depth interviews with five Polish mentor-managers operating in a Lean environment to obtain answers to the research questions posed. This made it possible to achieve the objectives of the study, including obtaining answers to questions about: paths of developing mentoring competences of Polish Lean managers and mentor competences indicated by them as key; ways of implementing the mentoring process in the A3 Thinking approach; difficulties in mentoring problem owners and the benefits of mentoring in the area studied. The obtained data and information are described in detail in sections 4 and 5 of this study.

This study provides information on mentoring in the problem-solving process in the A3 Thinking approach and the experiences of Polish mentor-managers. Due to its nature, the results of the study cannot be used as a basis for generalisation. However, they can be used as input data for designing problem solving/Lean Management training programme and for creating mentoring programmes in the process of learning the A3 Thinking approach. They can also be a signpost and motivation for Lean managers to deal with the subject of mentoring. This will educate and develop effective problem owners.

References

1. Alnajem, M. (2021), Learning by doing: an undergraduate lean A3 project in a Kuwaiti bank". *The TQM Journal, 33(1)*, pp. 71-94. doi: 10.1108/TQM-01-2020-0010.
2. Anderson, J.S., Morgan, J.N., and Williams, S.K. (2011). Using Toyota's A3 Thinking for Analyzing MBA Business Cases. *Decision Sciences Journal of Innovative Education, 9(2)*, pp. 275-285. doi: 10.1111/j.1540-4609.2011.00308.x.
3. Arantes, A., and Giacaglia, G. (2013). *Melhoria de resultados de confiabilidade dos equipamentos, pela aplicação do Hoshin Kanri, associado ao Relatório A3*. IX Congresso Nacional de Excelência em Gestão, Rio de Janeiro: Universidade Federal Fluminense, pp. 1-22. Retrieved from https://www.inovarse.org/artigos-por-edicoes/IX-CNEG-2013/T13_0628_3463.pdf, 8 Jan. 2021.
4. Ayoobzadeh, M., and Boies, K. (2020). From mentors to leaders: leader development outcomes for mentors. *Journal of Managerial Psychology, 35(6)*, pp. 497-511. doi: 10.1108/JMP-10-2019-0591.
5. Bassuk, J.A., and Washington, I.M. (2013). The A3 problem solving report: a 10-step scientific method to execute performance improvements in an academic research vivarium. *PLOS ONE, 8(10)*, p. e76833. doi: 10.1371/journal.pone.0076833.
6. Burke, R.J. (1984). Mentors in Organizations. *Group & Organization Management, 9(3)*. pp. 353–372. doi:10.1177/105960118400900304.
7. Chao, G.T., Walz, P.M., and Gardner, P.D. (1992). Formal and informal mentorships: A comparison on mentoring functions and contrast with nonmentored counterparts. *Personnel Psychology, 45(3)*, pp. 619-636. doi: 10.1111/j.1744-6570.1992.tb00863.x.
8. Clutterbuck, D. (2002). *Każdy potrzebuje mentora. Jak kierować talentami*. Warszawa: Petit.
9. Clutterbuck. D. (2013). *The problems with research in mentoring.* Retrieved from https://coachingandmentoringinternational.org/wp-content/uploads/CMI-Article-The-problems-with-research-in-mentoring.pdf, 7 Apr. 2021.
10. Czekaj, J. (2007), *Metody organizacji i zarządzania*. Kraków: Wydawnictwo Akademii Ekonomicznej.
11. Dennis, P. (2015). *Lean Production Simplified: A Plain-Language Guide to The World's Most Powerful Production System. 3rd ed.* New York: Productivity Press. doi: 10.1201/b18961.
12. Dreher, G.F., and Ash, R.A. (1990). A comparative study of mentoring among men and women in managerial, professional, and technical positions. *Journal of Applied Psychology, 75(5)*, pp. 539-546. doi: 10.1037/0021-9010.75.5.539.
13. Flaszewska, S., and Lewicka, D. (2020). Mentoring w procesie dzielenia się wiedzą w przedsiębiorstwie. In: Cewińska, J., Krejner-Nowecka, A., and Winch, S. (Eds.),

Zarządzanie kapitałem ludzkim – wyzwania (pp. 151-159). Warszawa: Szkoła Główna Handlowa.

14. Gambade, G. (2013). Mentoring – tajniki skutecznej realizacji. *Personel plus, 9,* pp. 16-17.
15. Gantz, N. (2010). *101 Global Leadership Lessons for Nurses.* Canada: Renee Wilmeth.
16. Gonçalves Mde C., and Bellodi P.L. (2012). Mentors also need support: a study on their difficulties and resources in medical schools. *Sao Paulo Medical Journal*, *130(4),* pp. 252-258. doi:10.1590/s1516-31802012000400009.
17. Graupp, P., and Wrona, R.J. (2010). *Podręcznik TWI. Doskonalenie niezbędnych umiejętności przełożonych*. Wrocław: Wydawnictwo Lean Enterprise Institute Polska.
18. Johnson, W.B. (2003). A Framework for Conceptualizing Competence to Mentor. *Ethics & Behavior, 13(2)*, pp. 127-151, doi: 10.1207/S15327019EB1302_02.
19. Karwala, S. (2007). *Model mentoringu we współczesnej szkole wyższej*. Retrieved from http://www.repozytorium.wsb-nlu.edu.pl/handle/11199/8339, 4 Apr. 2021.
20. Koskela, L., Broft, R.D., Pikas, E., and Tezel, A. (2020). *Comparing the Methods of A3 and Canvas*. In: Tommelein, I.D. and Daniel, E. (eds.). Proc. 28th Annual Conference of the International Group for Lean Construction (IGLC28) [online]. Berkeley: IGLC28, pp. 13-24. Retrieved from https://iglc.net/Papers/Details/1838, 11 Jan. 2021. doi.org/10.24928/2020/0136.
21. Krzyminiewska, G. (2016). Mentoring w podmiotach ekonomii społecznej. *Studia i Prace WNEIZ US, 44(3)*, pp. 23-31, doi: 10.18276/sip.2016.44/3-0.
22. Liker, J.K. (2005). *Droga Toyoty. 14 zasad zarządzania wiodącej firmy produkcyjnej świata*. Warszawa: MT Biznes.
23. Liker, J.K., and Meier, D.P. (2011). *Droga Toyoty. Fieldbook*. Warszawa: MT Biznes.
24. Liker, J.K., and Rother, M. (2011). *Why lean programs fail*. Lean Enterprise Institute. Retrieved from https://www.lean.org/Search/Documents/352.pdf, 25 Jan. 2021.
25. Loyd, N., Harris, G.A., and Blanchard L. (2010). *Integration of A3 Thinking as an Academic Communication Standard*. In: A. Johnson and J. Miller (eds.). Proc. the 2010 Industrial Engineering Research Conference. The University of Alabama, pp. 1-6. Retrieved from: https://uahcmer.com/wp-content/uploads/2010/11/FINAL-Integration-of-A3-Thinking-as-an-Academic-Communication-Standard.pdf, 10 Jan. 2021.
26. Marcinek, J. et al. (2010). *Ilustrowana Encyklopedia Powszechna. Tom III*. Kraków: Wydawnictwo Zielona Sowa.
27. Marksberry, P., Bustle, J., and Clevinger, J. (2011). Problem solving for managers: a mathematical investigation of Toyota's 8-step process. *Journal of Manufacturing Technology Management, 22(7)*, pp. 837-852. doi: 10.1108/17410381111160924.
28. Megginson, D., and Clutterbuck, D. (1995). *Mentoring in Action*, London: Kogan Page.
29. Megginson, D., Clutterbuck, D., Garvey, D., Stokes, P., and Garret-Harris, R. (2008) *Mentoring w działaniu. Przewodnik praktyczny*, Poznań: Rebis.

30. Myjak, T. (2016) Developing the Potential of Employees Through Mentoring in Organizations Based on Knowledge. *Roczniki Ekonomii i Zarządzania/Towarzystwo Naukowe Katolickiego Uniwersytetu Lubelskiego Jana Pawła II, 8(2),* pp. 137-149. doi: 10.18290/reiz.2016.8(44).2-8.

31. Oliveira, N., and Nodari, C. (2010). *Metodologia do Relatório A3 para solução de problemas*. Universidade Federal do Rio Grande do Sul, Porto Alegre. Retrieved from https://www.lume.ufrgs.br/handle/10183/32228, 8 Feb. 2021.

32. Orth, Ch.D. Wilkinson, H.E., and Benfari, R.C. (1987). The manager's role as coach and mentor. *Organizational Dynamics, 15(4),* pp. 66-74. doi:10.1016/0090-2616(87)90045-3.

33. Parsloe, E., Wray, M. (2002). *Trener i mentor. Udział coaching i mentoring w doskonaleniu procesu uczenia się*. Kraków: Oficyna Wydawnicza.

34. Perlaki, I. (1974). Metody i etapy rozwiązywania problemów w praktyce zarządzania. *Organizacja i Kierownictwo, 12,* p. 21.

35. Perloff, J., and Carlton, D. (2004). *Modern Industrial Organization*. Englewood Cliffs: Prentice-Hall.

36. Pietroń-Pyszczek, A., and Golej, R. (2018). Mentoring z perspektywy rozwoju kompetencji twórczych. *Studia i Prace WNEiZ US, 51(2),* pp. 77-86. doi: 10.18276/sip.2018.51/2-07.

37. Rowley, J.B. (1999). The Good Mentor. *Educational Leadership, 56(8),* pp. 20-22.

38. Saad, N., Al-Ashaab, A., Maksimovic, M., Zhu, L., Shehab, E., Ewers, O., and Kassam, A. (2013). A3 thinking approach to support knowledge-driven design. *The International Journal of Advanced Manufacturing Technology. 68(5-8),* pp. 1371-1386. doi: 10.1007/s00170-013-4928-7.

39. Shook, J. (2012). *Zarządzać znaczy uczyć. Rozwiązywanie problemów i rozwój pracowników z wykorzystaniem metody A3*. 2nd ed. Wroclaw: Wydawnictwo Lean Enterprise Institute Polska.

40. Sidor-Rządkowska, M. (2014). *Mentoring. Teoria, praktyka, studia przypadków*. Kraków: Wolters Kluwer.

41. Sidor-Rządkowska, M. (2016). Wdrażanie programu mentoringu w przedsiębiorstwie – korzyści i zagrożenia. *Kwartalnik Nauk o Przedsiębiorstwie, 40(3),* pp. 62-71.

42. Silva Filho, O., and Calado, R. (2013). Learning supply chain management by PBL with A3 report support. In: *6th IFAC Conference on Management and Control of Production and Logistics*, Fortaleza: IFAC Proceedings Volumes, 46(24), pp. 471-477. doi:10.3182/20130911-3-br-3021.00115.

43. Simons, F.E., Aij, K.H., Widdershoven, G.A.M., and Visse M. (2014). Patient safety in the operating theatre: How A3 thinking can help reduce door movement. *International Journal for Quality in Health Care, 26(4),* pp. 366-371. doi:10.1093/intqhc/mzu033.

44. Sławińska, M., and Witczak, H. (2008). *Methodological basis of doctoral theses in economic sciences*. Warsaw: PWE.

45. Sobek, D.K., and Smalley, A. (2008). *Understanding A3 Thinking: A Critical Component of Toyota's PDCA Management System*. New York: CRC Press. doi: 10.4324/9781439814055.

46. Sobek, D.K., and Smalley, A. (2011). *Common Mistakes in A3 Report Writing*. [Blog] A3 Thinking. Retrieved from http://a3thinking.com/blog/?p=153, 12 Dec. 2020.

47. Sobek, D.K. II, and Jimmerson, C. (2004). *A3 reports: tool for process improvement.* Proceedings of the Industrial Engineering Research Conference. Houston, pp. 1-6. Retrieved from https://www.lean.org/Search/Documents/133.pdf, 10 Feb. 2021.

48. Ślęzak-Gładzik, I. (2016). Mentoring jako metoda wspierająca rozwój potencjału pracowników. *Coaching Review, 1(8),* pp. 177-194. doi: 10.7206/cr.2081-7029.41.

49. Tillmann, P., Ballard, G., and Tommelein, I. (2014). *A Mentoring Approach to Implement Lean Construction*. Proc. 22nd Ann. Conf. International Group for Lean Construction, Oslo, Norway, 25-27 June, pp. 1283-1293. Retrieved from https://iglcstorage.blob.core.windows.net/papers/attachment-43bb28a1-8ec4-466a-987c-eab2db17abb3.pdf, 10 Jan. 2021.

50. Tortorella, G., and Cauchick-Miguel, P.A. (2018), Teaching lean manufacturing at a postgraduate level: Integrating traditional teaching methods and problem-based learning approach, *International Journal of Lean Six Sigma, Vol. 9 No. 3,* pp. 301-323. doi: 10.1108/IJLSS-08-2017-0101.

51. Tortorella, G., Cauchick-Miguel, P.A., and Gaiardelli, P. (2018). Hoshin Kanri and A3: a proposal for integrating variability into the policy deployment proces. *The TQM Journal, 31(2),* pp. 118-135. doi:10.1108/TQM-06-2018-0076.

52. Tortorella, G., Viana, S., and Fettermann, D. (2015). Learning cycles and focus groups: A complementary approach to the A3 thinking methodology. *The Learning Organization, 22(4),* pp. 229-240. doi:10.1108/TLO-02-2015-0008.

53. Wanberg, C.R., Welsh, E.T., and Hezlett, S.A. (2003). Mentoring research: a review and dynamic process model. *Research in Personnel and Human Resources Management, 22,* pp. 39-124. doi:10.1016/s0742-7301(03)22002-8.

54. Wright, C.A., and Wright, S.D. (1987). The role of mentors in the career development of young professionals. *Family Relations: An Interdisciplinary Journal of Applied Family Studies, 36(2),* pp. 204-208. doi: org/10.2307/583955.

55. Yin, R.K. (1994), *Case Study Research. Design and Methods.* Newbury Park: Sage Publication.