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Change management lessons learned for Lean IT implementations

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Abstract:
Lean Management is a standard production mode that has been familiar to production organizations for several decades. To date, however, academic literature has presented surprisingly little information about the application of Lean Management in Information Technology (IT) organizations, or what is called *Lean IT*. Drawing upon an empirical qualitative case study of the IT departments of two multinational companies, in this paper we identify change management lessons learned for Lean IT implementations, as well as seven characteristics of a corresponding change management approach. As an extension of our work, researchers should validate and expand our initial findings, preferably in a quantitative setting.

Keywords:
Lean Management; Lean IT; implementation; case study; lessons learned.

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1. Introduction

As a standard production mode in modern manufacturing [1], Lean Management (LM) has been familiar within production organizations for several decades [2]. Inspired by its success in those organizations, many nonproduction organizations - for example, in healthcare [3, 4], public service [5], and construction [6, 7] - have begun to take a closer look at LM.

Among academics and practitioners, interest in LM also extends to Information Systems (IS), as demonstrated in scholarly work [8–11] and in numerous practical publications by management consultancies [12–14], in cases on LM implementations in IT departments such as BBC Worldwide, Fujitsu Services, Tesco, TransUnion, and Wipro [15–17], and by the existence of large groups in business-oriented social networks (as of February 2017, the group Lean IT Service Management on LinkedIn counts ~3,800 members). Such interest does not come as a surprise, as commonly mentioned objectives of LM implementations - for instance, high quality, low cost, short lead times, safety, and high morale [18] - often pose stumbling blocks for IT executives [19].

Although the objectives of Lean IT implementation seem worthwhile, most LM implementations fail to achieve anticipated results [20, 21]. In two studies on the success factors of implementing Lean IT [22] and the associated roles and phases [23], we found evidence that Lean IT, unlike other change programs, puts great emphasis on the bottom-up side of change - for example, by making sure that employees in a group are responsible for parts of implementation - and top-down leadership support in change management (CM) approaches concurrently.

In response, we investigate the following research question:

What are change management lessons learned for a Lean IT implementation?

In this paper, we apply an exploratory empirical–qualitative approach using case studies as our research method. Herein, we first conceptualize Lean IT and describe the CM framework employed. Second, we describe the cases and outline the applied method, after which we analyze the results in the light of two CM perspectives. We close the paper with a brief conclusion and outlook for further research on the topic.

2. Research background

2.1 Lean IT

Lean IT refers to a holistic management system based on philosophy, principles, and tools. Lean IT aims at systematic management of continuous improvement by reducing waste and variability as well as enhancing value and flexibility in all functions of an IT department [24]. Using that definition, we follow Arlbjörn et al.'s [25] conceptualization of LM for production organizations, in terms of philosophy, principles, and tools, and transfer it to IT departments [cf. 24]. The following sections conceptualize Lean IT according to Arlbjörn et al. [25].

Philosophy: Lean IT aims to reduce waste - that is, "any human activity which absorbs resources but creates no value" [26, p. 15] - and develop customer value. In that sense, *value* is any "capability provided to a customer at the right time at an appropriate price, as defined in each case by the customer" [26, p. 311] and can be easily transferred to the context of IT departments - for instance, by fulfilling service-level agreements about server storage or the reliability of an Enterprise Resource Planning (ERP) system [24]. At the same time, waste can also be transferred to IT departments, however differs from that in production organizations [27]; examples include the overprovision of services, the over-specification of services that thereby go unused, redundant handling of work or data, defects (e.g., bugs), and excessive wait times for approval, information, or resources [28].

Principles: Arlbjörn et al. [25] mention five principles of action, primarily in reference to Womack and Jones [29], that are also relevant to IT departments:

(1) *Specify value from the customer's perspective*. Instead of focusing only on efficient service delivery, IT departments should understand what exactly creates value for internal or external customers and act accordingly.

(2) *Identify all steps necessary to designing, ordering, and producing products across the value stream in order to highlight nonvalue-adding waste.* Identifying waste requires transparency in processes and value streams, which for IT departments is challenging since service delivery is commonly less delineated and standardized than the production of physical goods.

(3) *Create flow without interruption, detours, backflows, waiting, or scrap.* After identifying nonvalue-adding waste, flow can be achieved by retaining only value-adding and necessary nonvalue-adding process steps and by removing unnecessary nonvalue-adding ones.

(4) *Produce only what the customer pulls*. This principle balances the terms *waste* and *value* because every service delivered that is not directly requested by the customer is considered to be waste - for example, software functionality that is never used [cf. 28] or the provision of high-performance server capacity for computationally low-level tasks.

(5) *Eliminate successive layers of waste as they are uncovered*. As for any organization, continuous improvement is also applicable to IT departments [24].

Tools: To bring the described philosophy and principles to life, LM uses a variety of tools, including 5S, Information Boards, Kanban, Overall Equipment Effectiveness, Pull Production, and Value Stream Mapping [25]. We argue that many tools are transferable to IT departments, yet also that there is no fixed set of tools, since every tool used to execute the described principles and philosophy can be considered to be a Lean IT tool [24].

2.2 CM approaches

To interpret our case study findings in the light of literature, we examined different CM frameworks (e.g., Kotter's 8 steps model [30], Lewin's 3 steps model [31], and Armenakis' and Harris' institutionalizing change model [32]) and identified the work of Pascale and Sternin [33] as most applicable, given their concurrent incorporation of the bottom-up and top-down perspectives of change in their framework. They moreover based their findings on inductive research covering 14 years as well as many corporate and public change programs. Their dual-angle perspective, as well as their broad, in-depth dataset, was decisive for our selection. Pascale and Sternin [33] differentiate two stereotypes of CM approaches: the traditional approach to change and the positive deviance approach (cf. Fig. 1).

On the one hand, the traditional approach is described as a top-down, outside-in, and deficit-based approach that seeks to fix only what is wrong. When a solution is identified, the change program is implemented at all organizational levels. Leadership takes over ownership to implement the change, and resistance typically arises from ideas imposed by outsiders and stakeholders who are usually associated with the problem in focus. The traditional approach is especially appropriate when problem solving relies heavily on cognitive efforts and when behavioral adjustments are not greatly required [33].

On the other, the positive deviance approach is described as a bottom-up, inside-out, and asset-based approach, in which the community takes over ownership while implementing change. To minimize social distance, that circumstance often reduces the acceptance of change, and innovators are identified and leveraged to implement change. The positive deviance approach is especially appropriate when behavioral and attitudinal changes are sought [33].

Traditional approach to change		Positive deviance approach to change
Leadership as path breaker Primary ownership and momentum for change come from above.	1	**Leadership as inquiry** Leader facilitates search; community takes ownership of the quest for change.
Outside in Experts identify and disseminate best practices.	2	**Inside out** Community identifies preexisting solutions and amplifies them.
Deficit based Leaders deconstruct common problems and recommend best-practice solutions. Implication: "Why aren't you as good as your peers?"	3	**Asset based** Community leverages preexisting solutions practiced by those who succeed against the odds.
Logic driven Participants think into a new way of acting.	4	**Learning driven** Participants act into a new way of thinking.
Vulnerable to transplant rejection Resistance arises from ideas imported or imposed by outsiders.	5	**Open to self-replication** Latent wisdom is tapped within a community to circumvent the social system's reaction.
From problem solving to solution identification Best practices are applied to problems defined within the context of existing parameters.	6	**From solution identification to problem solving** Solution space is expanded through the discovery of new parameters.
Focused on protagonists Engages stakeholders who would be conventionally associated with the problem.	7	**Focused on enlarging the network** Identifies stakeholders beyond those directly involved with the problem.

Fig. 1. Traditional and positive deviance approach to change [33, p. 75]

3. Case study companies and methodology

3.1 Case study companies

In order to investigate the research question at hand, we observed two IT departments of renowned companies – Company A, a financial service provider, and Company B, a business in the car manufacturing industry (cf. Table 1 for a detailed overview) – and investigated their current experiences with implementing Lean IT. Given their size, prominence, and international focus, both companies are suitable for case study research [34]. The cases differ from their context, as Company A had no previous experience with LM, whereas Company B had already successfully implemented LM in its manufacturing functions, yet not in its service functions. However, as both companies shared (to a large extent) a comparable approach with regard to implementation phases and roles (findings described in section 4),

we could use this joint starting point to focus more clearly on the details with regard to the change management approach and to deepen the understanding beyond the general implementation setup.

Table 1. Overview of companies in the case study

Category	*Company A*	*Company B*
Industry	Financial services	Car manufacturing
Employees, revenue, and global reach (unspecific to ensure anonymity)	Employees: >20,000	Employees: >60,000
	Revenue: > USD $25 billion	Revenue: > USD $50 billion
	Active in >120 countries	Active in >150 countries
Unit of analysis	Lean Management implementation in IT department	Lean Management implementation in IT department
Focus of implementation	Application development and maintenance	Application development and maintenance as well as Infrastructure services
Main reason for implementation	To improve efficiency in order to deliver more projects with the same staff	To improve efficiency in order to prepare for digitalization
Planned duration of implementation	~3–4 years	~2.5–3 years
Current status of implementation	Ongoing	Ongoing

3.2 Case study methodology

The applied methodology is an exploratory empirical–qualitative case study that builds on a previous research-in-progress paper [22] and a practitioner-oriented journal article [23]. Compared to the former, our study extends the original dataset by incorporating a second case company observation; compared to the latter, it investigates a different research question.

The applied method is rooted in established case study research [35, 36] and follows an IS case study protocol by Pan and Tan [34] involving eight steps: negotiating access, conceptualizing the phenomenon, collecting and organizing initial data, constructing and extending the theoretical lens, confirming and validating data, devising and applying selective coding, ensuring the alignment of theory and data, and writing the case report. Each step was carried out as follows.

Negotiating access: We used our network of personal and professional contacts to gain access to the Lean IT program managers of the case companies. *Conceptualizing the phenomenon:* Based on two thorough reviews of literature on Lean IT in general and Lean IT implementation success factors in particular, we conceptualized Lean IT from two perspectives. First, we analyzed nontechnical literature from which we could possibly gather background information. Second, we broadly analyzed different theories applicable to the context. Following this analysis, we formulated initial hypotheses for the theoretical background of Lean IT. *Collecting and organizing initial data:* First, we refined the interview questionnaire with three experienced researchers during pilot interviews. To glean an initial understanding and to select appropriate interview partners, we discussed the background and context of the implementation with the companies' Lean IT program managers, with whom we facilitated all activities listed in the following sections. *Constructing and extending the theoretical lens:* Since implementing Lean IT changes how daily work is conducted, it qualifies as a program of change. Given that many LM implementations have failed in the past [20, 21], we adopted the research focus of investigating what CM lessons had been learned. The underlying CM approaches serve as our theoretical lenses, as discussed in the detailed explanation in Section 4. *Confirming and validating data:* Using data

triangulation, we collected data from several sources, including interviews, field observations, and documents of important meetings. In total, we conducted 25 interviews during 5 months - 14 in Company A and 11 in Company B - 20 of which we conducted in person and onsite and the other five over the phone. The interviews were scheduled within a 90 minutes timeframe of which we used half for introduction and conclusion and the other half for conducting the semi-structured content part. We commenced interviews after Company A had been implementing Lean IT for 9 months and Company B for 11 months; the total planned implementation duration was 3–4 years for Company A and 2.5–3 years for Company B. Although implementation was not finished during our study period, both companies had already perceived their implementation efforts positively and were satisfied with the initial results of having Lean IT in certain organizational groups. To answer the research question from different perspectives, we decided to interview employees in different roles (cf. Table 2), the responsibilities of which are detailed in the following section. Seven accompanying field visits and a review of archived documents regarding the most important meetings ensured the triangulation of data. We refined our findings from data collection round to data collection round. *Devising and applying selective coding:* We transcribed and coded all interviews using open and axial coding to determine common themes, identify propositions, and reflect on focus points for the next round of data collection. *Ensuring the alignment of theory and data:* Following each round of data collection, we reflected on the alignment between the research context and the applied theories and made changes accordingly. *Writing the case report:* The final case report is the paper at hand.

Table 2. Overview of roles of interviewees

Interviewee category	*Company A*	*Company B*
Program management	3	3
Group participants	6	3
Core implementation team	5	5
Total interviews	14	11

4. Findings and interpretation

4.1 Findings related to observed implementation approaches

Both case companies used an implementation setup with key roles of employees and implementation phases, which is described in the following section [c.f. 23]. However, this general setup only served as a guideline for each group. In practice, phases were shortened or extended as well as the responsibility of roles adapted to the context of respective group. The most important differences in between the case companies are summarized at the end of this section.

Key roles

(1) Program management was responsible for advocating Lean IT in the IT department and steering its overall implementation. Program management consisted of two primary roles: a program sponsor, who strategically supported implementation by, for example, setting objectives, allocating budgets, and communicating regularly on program progress; and a program manager, who was operatively responsible for implementation by, for instance, guiding the core implementation team, ensuring progress, assuring quality, and determining program design and adaptions.

(2) Participants were responsible for implementing Lean IT within their specific groups. We identified two primary roles: group leaders, who steered implementation in an organizational unit (i.e., group), were seen as management representatives by employees, and were part of the top-down strategy of change; and group experts, who supported group leaders with group-specific knowledge by, for instance, accessing appropriate data sources for analyses or estimating which Lean IT tools would suit the purposes of a group best. Seen as being another team member by groups' employees, group experts were part of the bottom-up strategy of change and acted as agents of change within groups.

(3) The core implementation team was responsible for the operational side of implementation and implemented Lean IT's philosophy, principles, and tools. Its chief role was that of a navigator - that is, a company-internal employee educated in Lean IT. Each core implementation team had numerous navigators, who were directly involved in implementing a specific group and supported group leaders in implementing Lean IT by conducting analyses and quality assurance evaluations, answering questions, and adapting Lean IT tools to best support the groups' internal implementation objectives. In a broader sense, navigators bridged contact among program management, group leaders, and group experts.

Implementation phases

Both companies segmented the implementation of Lean IT into waves, each of which took 3–4 months and contained several organizational groups. Each group belonging to a wave passed four implementation phases: preparation, analysis, design, and execution. A fifth phase - sustainability - began after the end of the wave. Fig. 2 describes the five phases of the Lean IT wave and their durations.

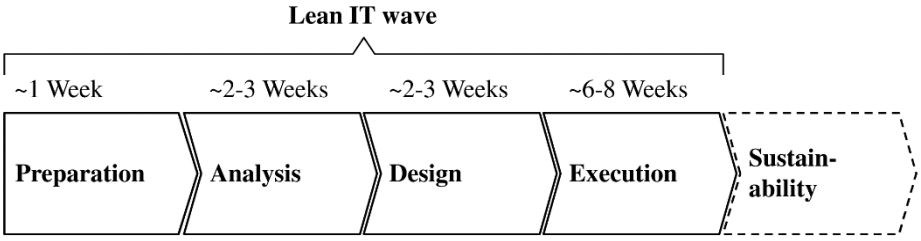

Fig. 2. Implementation phases of a Lean IT wave

(1) *Preparation (~1 week)*: All roles were involved in preparation phase. The program sponsor, program manager, and navigators introduced all group participants to Lean IT and provided an overview of the upcoming implementation phases. During this phase, expectations and responsibilities were communicated, and support was offered. All roles and group participants familiarized themselves with each other and had the opportunity to build initial relationships.

(2) *Analysis (~2–3 weeks)*: During analysis phase, group employees were exposed to Lean IT for the first time. Navigators, group leaders, and group experts analyzed the current state of the group, and through workshops, group employees became actively involved or at least continuously informed about results. Employees could identify problematic areas at any time, through navigators, group leaders, group experts, or an anonymous channel. At the end of analysis phase, a list of the group's problematic areas was created.

(3) *Design (~2–3 weeks)*: During design phase, ideas for mitigating the previously identified problematic areas were articulated. To increase acceptance, employees were asked to generate as many ideas for improvement as possible by themselves. Navigators supported this effort and provided an outsider perspective, since they were educated in Lean IT, but did not necessarily know the group's work in detail.

(4) *Execution (~6–8 weeks)*: During execution phase, ideas for improvement were executed and, if necessary, refined. Navigators supported this effort in the case of questions and assured quality. Group leaders acted as role models and adapted the new way of working into their own tasks. They also empowered employees to take responsibility for the execution of ideas for improvement and actively supported them by coaching or helping to remove organizational barriers. Group experts continued to create a positive atmosphere and used their knowledge to support their peers.

(5) *Sustainability*: The focus of this phase was to ensure that the new way of working was implemented sustainably instead of only temporarily. After the Lean IT implementation wave ended, navigators returned to their groups regularly

and answered questions openly or provided support. Regular meetings of group leaders, the program manager, and program sponsor additionally helped to maintain the focus on sustainability.

Differences between case companies

While both companies followed the same general implementation setup, three main differences existed related to the (1) Level of recent reorganization, (2) Integration of external employees, and (3) Involvement of the worker's council.

(1) *Level of recent reorganization:* The level of recent reorganizations was higher in Company A than in Company B. As a main consequence, in affected groups Company A needed less time for the analysis phase and more time for the design phase as not all processes have been in place yet. Consequently, the design phase was rather used as a "greenfield" planning of new processes than for mitigating existing problems. In addition, since the employees partly did not know each other well, the implementation of Lean IT was also seen as a way to get to know each other better.

(2) *Integration of external employees:* Another difference were the contract-types used for vendors. While Company B used more fixed-price contracts, Company A used more time-and-material-based contracts. This resulted in a situation in which company B did not have manifold opportunity to include external employees in their implementation, while this was easier for Company A (however, for financial reasons only long-term external employees were included).

(3) *Involvement of the worker's council:* As in Company B the worker's council had experienced a Lean Management implementation in the past (production department) they already knew some basic concepts of what to expect. In Company A it took considerably more effort to convince the worker's council of the Lean IT implementation activities.

However, while these differences are considerable, they did not affect the change management approach (see next section) significantly.

4.2 Interpretation

In the following section, we reflect on the case study results in light of the two previously introduced CM perspectives in order to identify lessons learned for a Lean IT-specific CM approach, as illustrated in Fig. 3.

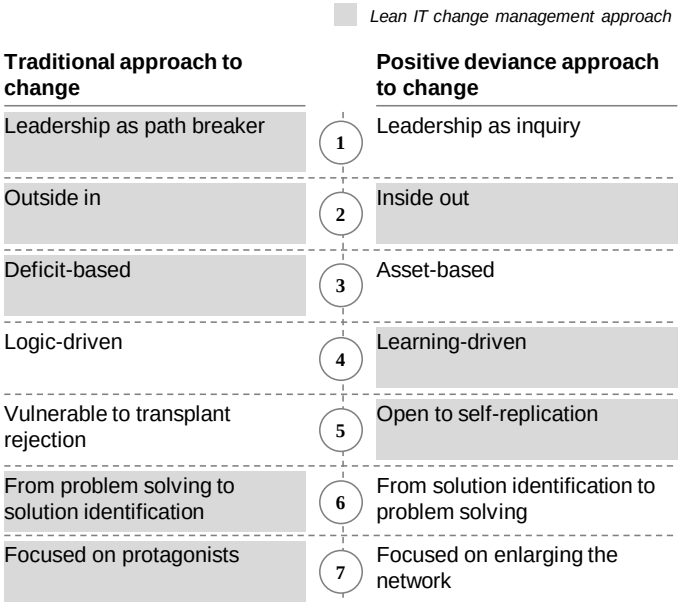

Fig. 3. Lean IT change management approach

Leadership as path breaker vs. leadership as inquiry

The implementation of Lean IT is driven top-down, which means that leadership needs to act as path breaker. The program sponsor, program manager, and group leaders decided on the implementation start date and took responsibility for the success of implementation. However, implementation setup gave employees the freedom of choice (e.g., to identify and prioritize problematic areas, propose improvement ideas, take responsibility for solving a problem, and to budget time in order to drive an improvement project), which also gave them leeway to reflect the bottom-up aspect of change. Nevertheless, while Lean IT aims to achieve behavioral and attitudinal change in the long term, that goal requires a considerable mind-set shift of both leadership and employees. Since we expected this shift to take more time than the timeframe planned for an implementation wave (i.e., 3–4 months), we viewed leadership as playing the chief role in driving change. As a group leader expressed, "As a leader, you need not only to show that you're positive toward it [Lean IT]… You need to show that you think it's fantastic. If you don't show to the group from the very beginning that you'll hold on to the Lean IT implementation no matter what comes…, then the employees will forever look for evidence that it doesn't work." (Company A)

Outside in vs. inside out

Both of these CM characteristics are equally important for implementing Lean IT. On the one hand, Lean IT, in terms of philosophy, principles, and tools, and its effects on the daily work of a group constitute an outside-in intervention. On the other, the group primarily suggested improvement ideas - that is, from the inside out. However, both CM characteristics required strong commitment from the group leaders. Regarding newly implemented Lean IT tools, they acted as role models and continuously engaged the groups, together with the navigators, to adhere to their appropriate application. Regarding improvement efforts, they motivated their subordinates to execute improvement activities and supported them while doing so (e.g., with project management guidance, the removal of organizational barriers, and the provision of time). As one group leader put it, "A board member told me, 'That's a superb result [of the first wave]. You've already defined many measurements that now can be rolled out to all groups [within the IT department].' I replied, 'No! That would be the biggest mistake we could make, since it would be a top-down approach all over again. That won't work… since the employees won't accept it… Let the employees develop their improvement ideas by themselves.'" (Company A)

Deficit-based vs. asset-based

Deficit-based CM characteristics are more appropriate for implementing Lean IT than the asset-based strategy. The analysis phase especially indicated this aspect by showing how group leaders, group experts, and navigators analyzed the current situation of their groups thoroughly. Thereby, the identification of problematic areas usually also involved peer-to-peer comparisons that asked why the group's performance was different from that of other groups or competitors in order to understand the magnitude of the respective problematic area. However, some elements of the asset-based CM characteristic could be observed as well, since Lean IT implementation also focused on the internal sharing of best practices. For example, in the case of high variability in employee performance, standard operating procedures (SOPs) were implemented, and adherence to the SOPs was checked regularly by the group leaders. In the case of deviation, either the SOP was adapted (i.e., positive deviation) or the employee was asked to adapt to the SOP (i.e., negative deviation). Although independently learning from peers is part of asset-based CM, such was not the case in reality because the group leaders actively steered the learning process - for example, when using a systematic skill-building approach. As one navigator attested, "In analysis, the as-is status is made unsparingly transparent, and it is identified where exactly challenges are and where improvement potential exists… In the next step, during design, the measurements that really help need to be reflected in detail in order to create a target status." (Company B)

Logic-driven vs. learning-driven change

Learning-driven change was the predominant CM characteristic used in the cases of Lean IT implementation. Especially during the execution phase, the previously identified ideas for improvement were realized by using a trial-and-error approach. If an idea did not work as expected, then the group changed it and tried again. Moreover, navigators continuously tried to convince the group employees to apply Lean IT tools - at least for a certain timeframe - in order for the group to have the opportunity to experience that the tools could benefit their daily work. As a navigator put it, "It's very important that the group leader really supports it [Lean IT] and consequently says, 'This is what we will try out now'… There were also [implementation] steps when the group leader said, 'We do it like this,' and then we realized, maybe 2 weeks later, that if one went only half of that way it would have been sufficient." (Company B)

Vulnerable to transplant rejection vs. open to self-replication

Lean IT uses a CM approach open to self-replication. As soon as the initial employees were convinced that Lean IT could actually benefit their daily work, they acted as multipliers of change and created a pull in IT departments in a way that other groups and employees also became interested in implementing Lean IT. The program sponsor and program manager supported this pull by organizing talks and roadshows and inviting interested group leaders and employees to experience the results and testimonials of Lean IT via those change multipliers. As a program manager put it, "At some stage during the last steering committee meeting, an employee made an introductory statement regarding Lean IT and why he believes in it and why it's a good program. From that moment on, our board [members other than the program sponsor] was hooked." (Company A)

Although one of the companies was already using Lean Management in manufacturing, self-replication occurred only within the IT department. Since experience with Lean IT principles in other parts of the business did not create the described pull mechanism, we suggest that self-replication probably works only within the same community of practice.

From problem solving to solution identification vs. from solution identification to problem solving

Lean IT proposes a CM approach from problem solving to solution identification. The order of the implementation phases demonstrated this dynamic since the analysis phase (i.e., the identification of problematic areas) was followed by the design phase (i.e., the identification of ideas for improvement). In general, Lean IT focuses on the optimization of several smaller problems instead of on finding innovative solutions for greater problems. However, that dynamic does not mean that Lean IT necessarily hinders innovation in general. For example, both companies implemented Lean IT because they wanted to deliver more projects with an innovative focus (i.e., digitization) for the business. In both cases, Lean IT aimed to support innovation by freeing up resources by increasing efficiency and using those resources deliberately for an innovative cause. As a department leader reported, "What I personally liked a lot… was the breadth applied during analysis… since it shed light on many facets… That's indeed a holistic reflection of what we have here in our environment, and it was useful in order to set the direction of impact for later [subsequent phases of the wave]." (Company B)

Focused on protagonists vs. focused on enlarging the network

Since the implementation of Lean IT began at the group level of IT departments, the initial focus was self-optimization within the respective groups. Therefore, improvement ideas primarily involved known protagonists. However, we argue that after the initial period of self-optimization, overarching problems might call for broader solutions with new protagonists, which can include other groups (e.g., in interdependencies within daily work), customers, or suppliers. As one program manager stated, "Lean IT is a about capacity building… Inspire the employees to self-organize efficiently without changing the overarching process… Organize yourself [the employees] around it: that is the main difference… If employees understand this and self-optimize sustainably, then we [the organization] have won." (Company A)

5. Conclusion and outlook

Based on the observation of both companies, we proposed and discussed CM lessons learned to facilitate Lean IT implementations. In that sense, we have outlined seven characteristics of a respective CM approach (Fig. 3).

Our paper contributes to the IS body of knowledge in several ways. From an academic perspective, to the best of our knowledge, we have conducted the first empirical investigation of a CM approach for Lean IT implementations. Our synthesis of lessons learned in the applied CM framework can support the construction and extension of theoretical perspectives for future investigations. For practitioners, we have offered applicable and comprehensible information that can serve as a starting point for future Lean IT implementations. Moreover, since the CM approach reflects the observation of two case companies, the information provided can also help practitioners to reflect on their ongoing Lean IT implementations and to optimize the implementation setup or CM approach in their own organizations.

The main limitation of our paper is its restriction to two case companies. Although we consider the research approach and results to be robust, a broadening of the investigation to include additional cases would help to strengthen the validity and generalizability of the results. Having used two contrasting cases with respect to experience in Lean Production did not demonstrate any significant differences. Thus, further differentiation regarding prior Lean experiences in other domains will probably not yield any valuable replication logic. However, looking at different industries, especially those where the IT department's role differs fundamentally, might prove useful nevertheless.

Future research could extend the investigations in our paper in two ways. First, we did not explicitly address or define the aspect of success in terms of a successful Lean IT implementation, primarily because implementation was ongoing as we conducted our study. As such, we relied on statements of interviewees that confirmed that the implementation had so far been perceived as having succeeded. Future research could aim to conceptualize perceived success regarding Lean IT implementations more clearly and quantify the results of respective CM approaches. Second, we expect that the application of a different research methodology might provide additional insights. In that sense, future research could investigate the research questions at hand in a quantitative research setting.

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