Agile Digital Transformation: A Case Study of Interdependencies

Short Paper

Marius Mikalsen
SINTEF
Strindveien 4, Trondheim, Norway
marius.mikalsen@sintef.no

Nils Brede Moe
SINTEF
Strindveien 4, Trondheim, Norway
nils.b.moe@sintef.no

Viktoria Stray
University of Oslo and SINTEF
Gaustadalléen 23 B, Oslo, Norway
stray@ifi.uio.no

Helga Nyrud
University of Oslo
Gaustadalléen 23 B, Oslo, Norway
helga.nyrud@gmail.com

Abstract

Current digital transformation moves information systems development into larger transformation programs with higher strategic significance and increased complexity in organization. Agile and BizDev are among the practical methods used to practice digital transformation. These methods are characterized by autonomous and diverse teams, and experimental development with the aim of achieving faster time-to-market and customer centric digital offerings. While empirical evidence points to positive effects of such methods in smaller projects, we know less about how key aspects of agile work with increasing interdependencies resulting from larger, more complex organization. Driven by our research question - how are interdependencies addressed in agile digital transformation – we contribute by presenting findings from an empirical case study of a bank practicing agile digital transformation. Applying a theoretical lens of dynamic interactions, our findings sensitize us to the necessity of negotiations, and suggest the need for more research on of the role of divergent evaluative principles in agile digital transformation.

Keywords: Agile digital transformation, Agile, information system development, BizDev, negotiations, evaluative principles, empirical case study

Introduction

Accelerating rates of technological change and continuously shifting customer behavior and markets necessitate information system development (ISD) that is customer centric, iterative, and experimental, with a fast time to market. Organizations apply agile methods to these digital transformations in order to allow themselves to create, react to, embrace, and learn from change while enhancing customer value (Conboy 2009). While agile methods have traditionally been practiced within ISD teams and in smaller and low-risk projects, the current prominence of digital technology as a key enabler for organizational change and growth is moving agile beyond ISD teams and into larger projects and programs (Dikert et al. 2016). By agile digital transformation we understand that agile methods get higher strategic significance and necessitates that these methods be adapted to fit more complex organizational environments (Khan et al. 2016). This complexity comes from increased interfacing between complementary roles on ISD teams, between agile ISD teams, and between agile ISD teams and other organizational units (Dikert et al. 2016). Foundational to agile ISD methods are team autonomy (i.e., self-directedness and self-organization) and diversity (i.e., complementary actors, roles, and competencies) (Lee and Xia 2010).

While agile methods have shown success in smaller projects, less is known about the agile digital transformation of large ISD programs, where increased autonomy and diversity imply a significant increase in the number of interdependencies between actors, tasks, and goals (Jiang et al. 2018).

In this work, we seek insight into how agile digital transformation with autonomous and diverse teams works empirically to address interdependencies. Therefore, our research question is as follows: *how are interdependencies addressed in agile digital transformation?* To investigate this question, we adopt a dynamic perspective of interdependencies (Elbanna 2010), which suggests that the continuous negotiation of boundaries within teams, and between teams and the rest of the organization, contributes to ISD project success. This is in line with insights from studies of complex projects and larger ISD programs, which discuss the need to address interdependencies (Jiang et al. 2018) and potential conflicts (Jiang et al. 2014). Using the dynamic perspective, we examine a digital transformation program in a Norwegian bank that applies agile (Lee and Xia 2010) and BizDev (Fitzgerald and Stol 2017) methods to increase autonomy and diversity in its ISD. Our analysis illustrates negotiation of boundaries, both within teams and between teams and the wider organization. In doing so, we aim to *i)* show how current digital transformation implies more complex agile projects and programs that include the wider organization beyond development, what we call *agile digital transformation, ii)* exemplify the interdependencies that arise in agile digital transformations and the negotiations that follow, and *iii)* discuss the need for further theorizing about how autonomy and diversity are negotiated in agile digital transformation.

The rest of the article is organized as follows. In the next section, we outline our perspective on agile digital transformation and signify the need to focus on negotiations. Section 3 introduces the case, shows how the bank is engaged in agile digital transformation, and outlines our empirical approach to studying negotiations. Section 4 presents the findings, which exemplify interdependencies and forms of negotiation. Finally, Section 5 discusses these findings and suggests avenues for additional research on negotiation in agile digital transformations.

Theory: Agile Digital Transformation and Negotiation

Current digital transformation requires organizations to continuously adjust how they interact with customers, define digital value propositions, use data, and organize operations (Jöhnk et al. 2017). The accelerating rate of technological change and volatile markets leads to a need for faster time-to-market, customer-centric, iterative, and experimental ISD (Bharadwaj et al. 2013; Horlach et al. 2016).

Agility is the continual readiness of an ISD method to create, embrace, and learn from change while contributing to customer value through its collective components and relationships with its environment (Conboy 2009). Team autonomy and diversity is reported to be key to achieving agility (Lee and Xia 2010). Autonomous—that is, self-organized, self-directed, and self-disciplined—teams are necessary for achieving ISD agility (Highsmith 2004; Nerur and Balijepally 2007). *Diversity* is defined as the heterogeneity of actors involved in ISD in terms of characteristics such as education, functional role, and technical abilities (Williams and O'Reilly 1998). For example, including both business representatives and software developers in the agile ISD team increases the diversity. A key principle in Agile ISD is to deliver working software to users at regular short intervals. By frequently gaining feedback from customers, the chance of delivering customer value increases. In practice, this requires a close and continuous linkage between business and software development. The process of continuously assessing and improving this link is described as BizDev (Fitzgerald and Stol 2017).

Current digital transformation requires adopting agile methods in larger projects or programs, which involves increased interfacing with complementary organizational roles, having several teams, more inter-team coordination, and interaction with other organizational units (Dikert et al. 2016). This represents a challenge, as the application of agile practices to large-scale and more transformative projects is known to be problematic and requires adaptation and tailoring to fit more complex environments (Kruchten 2013). We need to grasp how autonomy and diversity, key foundations of agile methods, work in wider, more formal, document- and plan-driven organizational environments. A recent review of large-scale agile transformations demonstrated how dealing with interdependencies—that is, relating multiple teams, working across organizational boundaries, and effectively integrating non-IT functions (such as business development or customer service)—is a key challenge to the successful agile transformation of organizations (Dikert et al. 2016). Interdependencies result from the relationships created by employing

multiple organizational groups in ISD (Jiang et al. 2018) and include the following: *i*) outcome interdependence, which considers goals and rewards, such as how teams are rewarded, *ii*) means interdependence, which addresses the necessary sharing of common resources, such as expertise, and *iii*) boundary interdependence, which represents the personal relationships across groups, such as cross-functional membership. We take our cue about how such interdependencies can be addressed from Elbanna (2010), who demonstrated that interdependencies are not merely an undesirable consequence of increased complexity. Instead, dynamically interacting with other entities in the organization and bypassing boundary structures initially set up by the management contribute to ISD project success. Dynamic interaction involves a continuous negotiation of boundaries "as different organizational actors emerge to renegotiate the previously set boundaries" (Elbanna 2010, p. 25).

To grasp diversity and autonomy in agile digital transformation, there is therefore a need for more empirical insight into how interdependencies are negotiated. Aiming to contribute to such an understanding, we discuss how a further refinement of negotiations should consider how action, particularly innovative action, is not rooted in convergence or agreement on a single principle of justification, but by the divergence of evaluative principles (Stark 2017). Forcing convergence can be detrimental to an organization´s capacity for creating, learning and responding to change. Such capacities are key to agile ISD, and should remain so in agile digital transformation.

Method

Case Context: Drivers of Agile Digital Transformation

Many organizations currently need to respond to digital changes and must compete in an increasingly digital marketplace. Banks are at the forefront of such transformations, dealing with legacy IT systems and heavy legacy processes. Banks are also under significant compliance requirements, which challenges their capacity to experiment freely. Yet "digitalization hits at the core of a bank—i.e., the digitalization of money and all the related functions around money" (Sia et al. 2016). The European payment service directive (PSD2) is requiring banks to open parts of their payment infrastructure to third-party providers, and a more open market increases competition. Furthermore, social computing, big data, the internet of things, and cloud computing enable financial services to move beyond the automation of services and instead provide entirely new products and services, which in turn changes business models (Puschmann 2017). In addition to these technological changes, consumer behavior is changing. Following new regulations for open banking, being an account aggregator and creating a superior user experience has now become crucial.

Case Background: Agile BizDev Teams

The organization analyzed in this study is a Nordic bank, pension, and insurance organization with more than 2,000 employees, here known as NorBank (a pseudonym). At the beginning of 2014, as we entered the case, their IT development unit was organized in a hierarchical and modular structure. Within this structure, there were units based upon the modules constituting their digital portfolios, such as business relationship management, banking and insurance, and digital and mobile. In this period, NorBank was deploying a new program that was transforming the way the IT development unit delivered digital offerings in the bank. Instead of having technical modules as the central organizing concept, they moved toward a delivery model consisting of five delivery streams (e.g., insurance, banking, pension). The goal of the program was to implement a new delivery model for digital solutions. Effects the program sought included giving development clearer frames regarding resources (i.e., hours), a more unified prioritization of tasks, rapid delivery, stable team participation, a unified development method, and a predictable frequency for prioritized deliverables.

During evaluations one year into the program, it became clear that a key challenge was the separation of business development and IT development, including the organizing principle that business developers prioritize what the IT developers should deliver without involving IT developers. Further, the business side was complex, involving many decision-makers, many stakeholders on the business development side, and, accordingly, many challenges to coordinating prioritization. There were also challenges related to the fact that the development teams consisted exclusively of IT developers and testers; for example, the specifications for digital solutions were being created by business developers who were not on the IT

team. IT development relied on Scrum, an iterative method in which the team began with a planning meeting and subsequently met daily for two to three weeks, presenting what they have delivered at a demo meeting after that time. When IT development started solving tasks that were put into a sprint (iteration), they soon discovered that the tasks were different (e.g., in terms of complexity, size, or number of dependencies on other sub-systems) than what was originally planned for by the business development side. As a consequence, IT development did not deliver what the business side had expected at the end of a sprint, causing business development to begin to lose trust in IT development. Further, because the business developers were often not aligned or not available, IT development seldom got fast feedback when they discovered that a feature or design needed to be changed, causing IT development, in turn, to lose trust in the business side. The result of all these challenges was that the process from identifying a feature to delivering the feature took much longer than necessary.

To solve these challenges, NorBank decided to create agile BizDev teams consisting of business representatives from business development and IT developers, testers, and user experience (UX) designers from IT development to achieve a continuous process of planning and execution. The new teams also recieved increased authority to specify solutions and prioritize development tasks. The teams were given the responsibility to achieve a growth goal/market share on the service for which they were responsible, and they could prioritize their resources accordingly to achieve this goal. We focused our study on these teams and their interactions with the wider organization, as we report in the findings section.

Data Collection and Analysis

As this is an ongoing longitudinal qualitative case study, we are continuously collecting new data. All authors are involved in the data collection, and we are using three main data sources (see Table 1). First, we conducted eleven semi-structured interviews, focusing on how collaboration in ISD occurs in the bank and clarifying interesting aspects we observe in practice. The second data source is observational data, which includes participatory observations of teams in NorBank since June 2014. We observed several meetings and conducted more engaged research by performing retrospectives with the teams, helping them to find practical—yet theoretically informed—solutions to the challenges they faced. Additionally, we have participated in informal talks over lunch and coffee breaks. Documents, such as plans and reports, are our third data source.

Data source	Volume	Description
Interviews	11	We conducted semi-structured interviews with open-ended questions. We interviewed all roles listed in Table 2. The average length of the interview was 45 minutes. All the interviews were audio recorded and transcribed.
Observation of meetings	24	We observed daily stand-up meetings (12), retrospective meetings (2), planning meetings (1), weekly meetings (2), and other meetings (7). We made notes from all the observed meetings.
Documents	15	We collected documents such as plans, strategy reports, progress reports, evaluations, and sketches and designs of systems.

Table 1. Data Sources and Descriptions

An interpretive approach guides our data analysis process, putting the practitioners' understandings of reality at the center of our analysis (Walsham 1995). We subscribe to the principles proposed by Klein and Myers (1999), a key principle of which is the hermeneutic circle. The hermeneutic circle helps to account for the interdependent meaning of the parts (e.g., the participants' understandings) and the whole that they form (e.g., the meanings emerging from the interactions between the parts). We follow this principle in our data analysis and sensemaking strategy by following an inductive–deductive approach. Our initial

analysis of the case material indicated many interdependencies taking many different forms; as such, interdependencies in large-scale ISD projects (Jiang et al. 2018) and dynamic interaction (Elbanna 2010) was identified as a sensible theoretical lens through which to interpret the empirical material (Walsham 1995). Our findings illustrate the interdependencies and negotiations occurring in NorBank, including boundary interdependence (cross-functional memberships in BizDev teams), the negotiation of goals due to outcome interdependence, and the negotiation of resources due to means interdependence. Using the lens of dynamic interaction, our data indicates that negotiating interdependencies is a continuous and ongoing process. Walsham (1995) underlines how interpretive researchers must remain open to new ideas from the field data, and we later discuss how justification in these negotiations is a concern that merits future research.

Findings

Cross-Functional Memberships: Creating BizDev Teams

"Change is needed to better serve our customers. We need to change the way we work to ensure that we can serve our customers with what they want in a timely manner" (NorBank documents).

The merging of business representatives and IT developers at NorBank into teams began in February 2016. These new BizDev teams delivered software into the delivery streams. They were co-located and consisted of the roles described in Table 2, below. One team included 13 members, and the other included 14 members. The intention behind creating more diverse, cross-functional teams was to reduce the boundaries between business developers and IT developers, as outlined in the case background.

Role	Description
Project manager	Responsible for the planning and execution of the projects on which the team's developers are working.
Manager	Unit leader with commercial responsibility for the team. Keeps track of the team's stakeholders, is responsible for the direction of the team, and has human resources (HR) responsibilities.
Business developer	Knows the market and users' needs, and is responsible for proposing products or services as solutions to problems and needs in the market.
Digital responsible	Has expertise in the field of business and knows how to develop a business through digital technology. Has insight into how customers use digital technology and knowledge of different technologies.
Digital designer	Works to design the user interfaces of the products that the business developer and digital responsible propose. Has experience with UX design.
Team lead	Responsible for the other IT developers on the team. Tries to protect developers' time by filtering and routing external requests.
Tech lead	Responsible for having a general knowledge of the technologies used and an in-depth knowledge of their service's application programing interfaces (APIs).
Test lead	Responsible for testing the software that the team develops.
IT developer	Both front-end and back-end developers.

Table 2. An Example BizDev Team in NorBank

The teams exercised autonomy by shaping how they worked, and they chose to work according to the Kanban method, also using some Scrum ceremonies such as the daily stand-up meeting (Stray et al. 2018). While Scrum divides work into a series of fixed-length iterations (called sprints, in which whatever is scheduled for a sprint is the team's top priority), Kanban aims to enable flexible planning, because whatever is on the board is the top priority, and enables teams to focus on continuous delivery with changing priorities. Kanban was considered a better approach because the team had difficulty estimating the total amount of work they were able to complete in a sprint as a result of all the dependencies upon

other stakeholders. Further, because of the continuous dialogue between the business developers and IT developers within the team, priorities changed often. Before introducing the BizDev team, the business developers were responsible for describing the end user behavior for a new feature and would then hand the description over to the IT development team. Now, the BizDev team introduced a technique called user story mapping, which sought to describe the user's journey through the product by building a simple visual model. The team frequently conducted user story mapping sessions, involving all functions of the team.

Negotiating Outcomes Within Teams

Working in co-located BizDev teams facilitated easy access to the different competences and an arena in which the team members could discuss tasks and solutions. Being co-located enabled valuable informal ad hoc conversations, as indicated by a business developer commenting on where most collaboration between business and IT developers took place:

> *I would say that it is mostly informal collaboration. We make decisions along the way, while we work on our tasks, when it is needed. That is our largest arena for collaboration, I believe. If there is something which is under development, and an issue occurs, it happens that we deal with it informally by talking with the developers about solving it differently.* (Interview, Business Developer)

Informal collaboration does not imply agreement, and negotiations did occur within the teams. First, it quickly became evident after the BizDev teams were formed that different roles had different needs in terms of how they perform their tasks. For example, business developers appreciated a very open work area that allowed for discussions and offered temporary seats for guests. IT developers, in contrast, wanted to have designated seats because their desktop computers contained specific hardware and multiple monitors; in addition, they needed a quiet working zone and wanted to protect their time to focus on technical programming tasks.

Second, the value of the daily stand-up meeting was questioned. Although the team shared an overarching goal of growth in the products they delivered, different roles had different goals, and several team members indicated that they were not fully aware of what the other team members were working on: "Everyone in the team work with different applications, so there is not much valuable information really. I think there's too little discussions regarding obstacles or opportunities to receive help, it's more like giving a status report" (Interview, IT Developer). Instead of being a forum for working out challenges together, the daily stand-up was considered a status meeting. While the project manager appreciated these moments of insight into the status of the team's tasks, IT developers reported less value from these meetings. One consequence of cross-functional memberships is an increase in goal and task diversity, even though the organization considers them to be one team, the team shares an overarching goal, and they are all completing agile team practices.

Negotiating Means Crossing Team Boundaries

In addition to negotiating outcomes internally in teams, interdependencies also existed across teams. Although team autonomy was a clearly stated goal, each team's tasks and prioritizations had to be negotiated with the other parts of the NorBank organization.

A project manager explained to us that it is important for the team to ground their development work within the program management using "target specifications," which include the specification of tasks and results, who should work on the task, how much it is going to cost, and what technology is required from their platform:

> *We are working on a target specification, describing where we want to go with our customer solutions. We have a dedicated architect and a dedicated UX designer... we used to be a reception for requests from the business department, while now we get to create our own target specification. Although the overall prioritizations are done up there, we at least have a target specification.* (Interview, Project Manager)

The need to receive commitment from stakeholders for team activities is also indicated in the following excerpt from an experience report that was part of the evaluation of the program: "Frames, financial and resources: 1) Get this nailed and locked as quickly as you can. 2) Get clear commitment concerning

resources from relevant stakeholders. 3) There is a tendency that this will surface repeatedly in different settings" (NorBank documents).

Negotiations also occurred with other departments. The business developers on the team had regular meetings with the sales department, marketing department, and product department. In general, all these departments were interested in the solutions that the teams created because the departments were affected, either directly or indirectly, by changes to the company's product portfolio. The meetings with the sales department were held for a mutual exchange of information. The sales department had to understand changes to their products, not only because the solutions were created for their customers but also because the sales department, including customer service, would use the solutions themselves. Moreover, the sales department informed the business developers of what they typically were talking to the customers about in order to provide them with insight into customer issues and needs. Similarly, the marketing department had to be aware of the new solutions developed by the team in order to launch and promote them to customers. The project manager expressed this importance, stating that the marketing department is their most important stakeholder:

> *There is a lot of contact with the marketing department, because they are the ones launching the systems that we create. The might have very strong opinions on what the solutions should look like. Therefore, we try to have very regularly scheduled meetings with them in order to understand each other and build trust. There is a lot of coordination with them.* (Interview, Business Developer)

Discussion and Directions for Future Work

Digitalization is currently a key driver of organizational transformation. Agile methods (Lee and Xia 2010) and BizDev teams (Fitzgerald and Stol 2017) are among the practical methods used for managing digital transformation. While empirical evidence points to the positive effects of such methods in small projects (Lee and Xia, 2010), we know less about how autonomy and diversity in teams work as the methods are scaled up to meet the wider organization (Dikert et al. 2016). Driven by our research question about how interdependencies are addressed in agile digital transformation, we have presented findings from an ongoing case study of a Nordic bank currently in the midst of agile digital transformation. Applying a theoretical lens of dynamic interactions (Elbanna 2010), the findings exemplify the kind of negotiations that follow from increased interdependencies (Jiang et al. 2018) and suggest the need for research that focuses on the role of diverse evaluation criteria within these negotiations.

NorBank adopts both agile and BizDev methods in their transformation program. The key rationale for so doing is to achieve greater autonomy and diversity in the organization of their ISD (Lee and Xia 2010). Autonomy involved increasing levels of self-organizing teams, including specifying and prioritizing development tasks, and self-directedness (Nerur and Balijepally 2007). Diversity, in NorBank's case, required the creation of BizDev teams working closely with other teams and units within the organization. The combination of autonomy and diversity is considered necessary for achieving sufficient flexibility and greater speed in the face of accelerating rates of technological, regulatory, end-user, and market changes. However, by increasing autonomy and diversity in teams, NorBank now faces a new set of challenges concerning the interdependencies that have been created.

While co-locating different roles in teams helped in achieving more informal collaboration, negotiations persisted within the team. In terms of collaboration within the team, business developers considered it meaningful to have a continuous dialogue within, while IT developers reported the need for protected time in which to focus on complex technical tasks without interruptions. Further, despite working in one team, different roles still worked on unique tasks, different products, and striving toward different goals. As a consequence, some of the agile practices did not work. The daily Scrum meetings, intended as a forum for group problem solving, instead became a forum for collecting status reports.

Such findings indicate how diversity in the BizDev teams spurred negotiations about team goals and outcomes, which add support to IS research on ISD projects that indicates disagreement within teams about project goals (Andres ad Zmud 2001) and about the content of tasks (Liang et al. 2012). This raises the question on whether or not highly diverse and cross-functional teams still can be considered teams according to the definition: "a small number of people with complementary skills who are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually

accountable" (Katzenback and Smith 1993). When we asked NorBank BizDev team members whether the team had a shared goal, most team members answered in the affirmative, but few could clearly articulate the goal. Still, the team members knew who was on the team, and they held themselves mutually accountable for the team´s performance. One possible interpretation of these findings is that diverse and cross-functional BizDev teams constitute a negotiation space (Elbanna 2010), where heterogeneous team members define one another in their interaction, over time reaching a better understanding for which tasks and goals are inside and which fall outside the team boundaries.

Autonomy on the team level, although stated as a specific goal of the program, was not a granted as soon as the BizDev teams were created. Rather, the BizDev teams at NorBank needed to negotiate means with other teams, organizational units such as sales and marketing, and key management stakeholders. We found that the "target specification" was used to rally support for a team's activity towards the program management. Setting up clear financial and resource specifications was a key concern, as this would be questioned and evaluated. Regular meetings with both the sales and marketing departments were necessary to ensure that the digital offerings made sense in terms of both users' needs and company revenue. In larger ISD programs several teams will compete for management support (Elbanna 2013). Teams can gain support through active mobilization and alignment efforts, e.g. using material artefacts such as the "target specification", communication tools, and demonstrating produced digital offerings.

Knowledge about how larger and more complex agile programs can manage interdependencies to improve coordination and promote team diversity and autonomy is currently "very limited" (Jiang et al. 2014). The forms of negotiation within and between teams, and between teams and the wider organization that our findings illustrate, therefore, point toward some relevant avenues for future research into the mechanisms that facilitate and constrain negotiations in agile digital transformation. Elbanna (2010) argues that a key aspect of negotiation is to recruit different actors who can contribute to ISD project success. Future research can detail the empirical workings of such recruitment, be that on teams, between teams, or between teams and other units in the organization. Teams recruiting allies and mobilizing support can be considered as critical situations in the development process. Situations are considered critical when the outcome of a situation is not possible to determine in advance, such as; Who in customer relations should I pay attention to? Will the management board approve our specification? Will my team members agree on my suggested new feature? Will the demonstration convince sales? Stark (2017) argues that in critical situations, action is not necessarily facilitated by convergence or agreement on a single principle of justification, but rather by a divergence of evaluative principles: "Disagreement about what´s valuable can make for new value propositions" (ibid., p. 388). As we have shown, autonomy and diversity in more complex ISD programs will increase interdependencies on means, goals and boundaries. ISD organizations will therefore necessarily have, and potentially may benefit from, the friction between evaluative principles. Interesting research themes emerge concerning when, where and by whom evaluations are done? What are the restrictions to divergent evaluative principles? Can these evaluations be managed? What are the ISD contexts under which the friction of different evaluative principles can become constructive? Answering such questions should add relevant insight into how interdependencies are addressed and can help explain how autonomy and diversity in agile digital transformation is practically feasible.

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