# Managing Paradoxes in Bi-Modal IT Functions: A Multi-Case Study

# Appendix

**Table A.1**
Literature review on bi-modal IT. We followed the recommendations of Vom Brocke et al. (2015) for a sequential review of IS research on bi-modal IT and searched for “bi-modal” OR “bimodal” OR “two-speed” in keywords (or abstracts when possible) within the Senior Scholars’ Basket of Journals[[1]](#footnote-2). As this revealed not a single fitting publication, we searched in the proceedings of major IS conferences (ECIS, ICIS, HICSS) and found four articles (Haffke et al. 2017b; Horlach et al. 2017; Joehnk et al. 2019; Joehnk et al. 2017). Backward and forward searches on these articles revealed more completed and peer-reviewed studies focusing on bi-modal IT, all summarized below.

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| --- | --- | --- | --- | --- |
| Reference | Research question(s) | Study design/ methodology  | Important findings and contributions (in light of this study) | Focus on interactions between IT modes |
| Badr (2018) | What practices would empower IT organizations in IT services companies in order to successfully integrate innovation? | Two case studies with semi-structured interviews and brainstorming sessions | General mechanisms and practices to balance exploration and exploitation capabilities for an ambidextrous IT organization | No |
| Bygstad and Iden (2017) | Which models are available for reasonable governance of lightweight IT? | Four cases with more than 100 interviews | Governance models to manage lightweight and heavyweight IT, bi-modal IT, in general, is one of these governance models | No |
| Fortmann et al. (2019) | How are sales channels managed in a bi-modal IT? | Single case study and semi-structured interviews | IT was re-organized twice: first split into bi-modal IT then re-integrated into one large agile IT – both organizational forms created conflicts | No |
| Haffke et al. (2017a) | Reasons to engage in a bi-modal IT transformation | 19 cases studies semi-structured interviews | Guidelines for practitioners on bi-modal IT and observation of tensions, e.g., resource management and cultural divide | No |
| Haffke et al. (2017b) | What are the drivers and manifestations of bi-modal IT? | 19 case studies with semi-structured interviews | Three different archetypes exist of bi-modal IT leading ultimately to a re-integrated IT | No |
| Horlach et al. (2016) | How is business-IT alignment affected by a bimodal IT organization? | Review of practitioners’ documentation and one scientific article | Overview of bi-modal IT governance modes, processes, and skills and observation that it has an impact on bi-modal IT alignment and bi-modal business-IT alignment | No |
| Horlach et al. (2017)  | How is bimodal IT realized in practice? How is business-IT alignment affected by bimodal IT, and what approaches do companies use to enable alignment within IT and in relation to business in the bimodal IT environment? | Nine semi-structured interviews  | Five different archetypes of bi-modal IT mainly based on IT outsourcing state | No |
| Joehnk et al. (2017)  | What are the design options for agile IT setups? | Taxonomy development process with seven semi-structured expert interviews | Seven characteristics practitioners have to decide on to set-up and agile IT unit (scope, institutionalization, accountability, governance, location, staffing, technical integration) | No |
| Joehnk et al. (2019) | Which structural, procedural, and relational governance mechanisms are employed in bimodal IT organizations, and how do these mechanisms relate to challenges associated with organizational ambidexterity? | Two case studies with semi-structured interviews | Governance tensions in bi-modal IT and general mechanisms to approach the tensions, concluding with five paradoxes in bi-modal IT | Yes, focusing exclusively on organizational-level tensions |
| Remfert and Stockhinger (2018) | How do IT managers understand and evaluate the two-speed IT concept? | Eight semi-structured interviews across eight companies | All case companies used one of the bi-modal IT archetypes of Haffke et al. (2017a), even if not under the specific term. Bi-modal IT has the danger to create a “two-class IT” | No |

**Table A.2**
Literature review on paradox lens in IS. We performed a sequential literature review in the Senior Scholars’ Basket of Journals2, following the recommendations of Vom Brocke et al. (2015) searching for “paradox\* theory” OR “paradox\* lens” in the full text. After reading through, we discarded papers that mentioned paradox theory in passing without employing it in their studies. We arrived at nine papers of which only two focus on the IT function. Therefore, we extended our literature review and searched in the proceedings of major IS conferences (ECIS, ICIS, HICSS) which revealed another two completed studies focused on the IT function and employing a paradox lens.

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| --- | --- | --- | --- | --- |
| Reference | Study context | Associated theory or research stream  | Level of analysis | Findings of emotional tensions |
| Dubé and Robey (2009) | Empirical qualitative (exploratory) study based on 42 interviews uncovering five paradoxes in virtual teams and strategies to "survive" them | Virtual Teamwork | Team | Yes  |
| Zheng et al. (2011) | Empirical qualitative study on six improvisation paradoxes that build collective agility | Agility, Organizational Improvisation | Multi-level | Yes  |
| Aubert et al. (2015) | Conceptual paper exploring the cognitive tensions, then paradoxes, approaches, and virtuous cycles in the innovation-outsourcing relationship | IS Outsourcing and Innovation | Intra-organization | No |
| Gregory et al. (2015) | Empirical multi-year qualitative study at one bank using grounded theory to show resolution strategies for ambidexterity paradoxes in six areas in large IT programs (e.g., IT program planning, IT architecture change) | IT Ambidexterity | Organization | No |
| Ciriello et al. (2018) | Empirical qualitative multi-year field study at one firm identifying three paradoxes of PowerPoint use in innovation practices | Digital Innovation | Multi-level | No |
| Yeow et al. (2018) | Empirical qualitative study on the aligning process and emerging tensions in this process | IT-business alignment, Dynamic capabilities | Organization | No |
| Joehnk et al. (2019) | Empirical qualitative study at two organizations identifying transformational and operational governance tensions in bi-modal IT and general mechanisms to approach the tensions, concluding with five paradoxes in bi-modal IT | Governance mechanisms, IT Ambidexterity | Organization | No |
| Montealegre et al. (2019) | Empirical qualitative in-depth case study theorizing a digital infrastructure ambidexterity model that includes higher-order organizational capabilities (i.e., structure and leadership) | Digital Infrastructure, IT Ambidexterity | Multi-level | No |
| Soh et al. (2019) | Empirical qualitative study uncovering paradoxes in the digital transformation, sequences of paradoxes, and combined defensive and receptive responses based on one case study | Digital transformation | Organization | Yes |
| Lindgren et al. (2020) | Empirical qualitative action research study of a twelve-year Swedish IT initiative in road haulage firms | Technology standardization | Multi-level | No |
| Wimelius et al. (2020) | Empirical qualitative longitudinal case study of a 9-year-long digital platform renewal at a Swedish health service provider showing virtuous and vicious cycles in the responses to three paradoxes | Technology renewal | Organization | No |

**Table A.3**
Case research principles by Klein and Myers (1999) applied to this study

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| Case research principle | How it was applied in this study |
| The Fundamental Principle of the Hermeneutic Circle: This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles. | After each interview dyad, we reflected based on the coding of the cases on the tensions we had identified and used them to tune our interview guideline further and ask the next interview partners for the same or similar experiences. During our data analysis, we constantly iterated our coding based on novel published studies on digital transformation; therefore, following the principle of the hermeneutic circle.  |
| The Principle of Contextualization: Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged. | We followed the principle of contextualization by collecting various public and non-public documentation besides our interview transcripts and by starting each interview in a narrative way, asking our interview partners the context that led to their current bi-modal IT. |
| The Principle of Interaction Between the Researchers and the Subjects: Requires critical reflection on how the research materials (or “data”) were socially constructed through the interaction between the researchers and participants. | By interviewing two strategic employees from the two different IT modes, we were able to collect data from complementary and often very different perspectives. Thus, the critical reflection on the data was facilitated. |
| The Principle of Abstraction and Generalization: Requires relating the idiographic details revealed by the data interpretation through the application of Principles 1 and 2 to theoretical, general concepts that describe the nature of human understanding and social action. | Based on our iterative data analysis and also relying on existing studies, we could link our findings to existing theoretical background (from ambidexterity and paradox theory).  |
| The Principle of Dialogical Reasoning: Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings (“the story which the data tell”) with subsequent cycles of revision. | Our findings (e.g., Table 2) have continually evolved via numerous cycles based on the involvement of different researchers critically reviewing the manuscript. Simultaneously these researchers were less biased by existing theory (e.g., paradox theory) of which they were not fully knowledgeable.  |
| The Principle of Multiple Interpretations: Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it | We interviewed different stakeholders across different hierarchy levels of both IT modes with varying degrees of involvement in the build-up and operations of the second IT mode.  |
| The Principle of Suspicion: Requires sensitivity to possible “biases” and systematic “distortions” in the narratives collected from the participants. | Based on the different perspectives of the employees of each IT mode on the other IT mode, we gathered narratives with often opposing biases that then clearly surface and exclude each other. Also, by comparing the narratives with archival data, we crosschecked our interpretations.  |

**A.4**

Details on the cases

**Case 1: High-tech company with ~6bn EUR revenue and 10,000-50,000 employees**

Based on a company-wide digital transformation strategy of smartly enriching the core business (Hess et al. 2016), a new centralized agile IT unit was created in 2016 in a new location, directly reporting to the CEO, acting as supporter to business units in their digital transformation. Case 1 thereby follows divisionally separated bi-modal IT. As of today, nearly 100 experts in digital product development (e.g., UI/UX designer, scrum master, front-end developer, data scientists) develop digital products for end customers together with the business units (e.g., a digital platform for imagery analyses). Business units have to nominate a full-time product owner and sponsor the project. A newly developed product will eventually, once it reaches a particular maturity, be handed over to the traditional centralized IT. This centralized IT primarily manages the corporate application landscape and develops internally used software products with several hundreds of employees.

**Case 2: Pharmaceutical company with ~20bn EUR revenue and more than 50,000 employees**

The centralized IT is deeply involved in day-to-day business activities as it manages regulated activities such as drug safety or global reporting to agencies but also develops and manages software used by physicians. Bi-modal IT efforts started in 2016, and in 2017 an agile unit was established with today more than 50 co-workers. Case 2 presents a sub-divisional bi-modal IT as the new agile IT unit reports to the CIO. Its goal was first to develop innovative digital products with the business units and thereby support them in their digital transformation. So far, digital products are handed over to traditional IT and the business side once a minimum viable product (MVP) is developed and tested. Now, the agile IT unit is transforming into an incubator and company-builder function and has established a second location thereby moving from a supporter to an enabler role and developing new digital business models for the business units on its own initiative, following the overall digital transformation strategy of the company.

**Case 3: Retail company with ~6bn EUR revenue and less than 10,000 employees**

The centralized IT was mainly responsible for supporting internal processes (e.g., logistics). A new agile IT unit was built up around 2012 to develop a webshop. In 2015 the unit had around 50 co-workers already, and responsibilities started to shift as the traditional IT took over responsibility for the continuous technical development of the webshop, whereas the agile IT unit maintains its responsibility for customer analytics, online marketing, assortment. As such, the company started with a divisionally separated bi-modal IT, where both modes acted self-sufficiently and reported to CIO and Chief Customer Officer (CCO), respectively. To increase customer experience and customer engagement, the company’s strategy envisioned more omni-channel capabilities and moved towards a reintegrated bi-modal IT.

**Case 4: Mobility company with ~0.8bn EUR revenue and less than 10,000 employees**

A second, agile IT department was created more than a decade ago to support the digital sales channels of transportation tickets. This department could then respond to the constantly changing requirements in online channels. The traditional IT would focus on supporting back-end systems of traditional offline channels (e.g., sales agents). From an organizational perspective, the company had chosen a divisionally separated bi-modal IT with both modes reporting to CIO and Chief Digital Officer (CDO) respectively. However, due to interdependencies, both modes were involved in most IT projects, and activities of the agile IT mode were handled as a subproject of an overall project. Both IT modes started to re-integrate from 2015 into one larger IT department reporting to one executive to enable omnichannel capabilities (e.g., customer journey through different channels) following an updated customer engagement strategy (Sebastian et al. 2017). At this point, the agile IT mode had about 200 employees, while the traditional IT had over 1,000 employees.

**Case 5: Automotive company with more than 100bn EUR revenue and more than 100,000 employees**

A central IT function already developed customer-facing software (e.g., car entertainment). A new agile IT unit was set up in 2013 at a separate location to create value from existing company data. Its location closer to top universities enables recruiting of lacking data scientists, and the agile IT unit now develops internal analytics-based solutions for all company functions (e.g., parts logistics) with more than 50 employees and more than 100 projects already finished. By that the company follows a strategy of exploiting selected digital opportunities for which the bi-modal IT acts as supporter (Hess et al. 2016). Once a solution is developed, it is handed over to the central IT function for further operations and maintenance. External, customer-facing digital products are planned for the future. Both IT modes report to the CIO, marking a sub-divisionally separated bi-modal IT.

**Case 6: Utilities company with ~20bn EUR revenue and 10,000-50,000 employees**

The case company explicitly decided not to create a company-wide digital transformation strategy. Each business unit is responsible for driving digitalization as needed. Besides the centralized IT function, a new centralized agile IT unit was created in 2015, directly reporting to the CEO. It supports the business units on digitalization initiatives and now employs around 30 people. The main activity is the development of digital products and new digital business models in collaboration with the business units once they request it. Once the development phase is finished, commercial responsibility stays with the business units, and the traditional IT takes over operations and maintenance as a service unit for the business units. Additionally, the agile IT mode develops product ideas based on technical knowledge. Thereby, this case presents an example of divisionally separated bi-modal IT.

**Case 7: Logistics company with ~1.5bn EUR revenue and less than 10,000 employees**

So far, a decentralized IT managed corporate applications (e.g., ERP systems) within the different business units and led the digitalization of existing processes. A new unit was set up in 2016, also reporting to the CIO and separated on its own campus. By that, case 7 presents a sub-divisionally separated bi-modal IT. The digital transformation strategy of the company described the creation of a new digital business model targeting novel customer segments for which the agile IT unit is responsible for. Currently, the new unit maintains responsibility for the core digital product of the new digital business model even after the development phase.

**Case 8: Automotive company with ~15bn EUR revenue and more than 50,000 employees**

A central IT managed corporate applications with little experience in customer-facing products (including UI/UX design). Initially (around 2014), a single project with high involvement of the IT function had the task of tackling the digital transformation of the company. With the development of an overarching digital transformation strategy, which includes bi-modal IT as enabler of new digital business models, responsibilities changed. The digitalization of existing processes (e.g., IT helpdesk automation) and products are led by the traditional IT and business units, respectively. A new agile IT unit was set up at a new location end of 2016, directly reporting to the CEO with the goal of developing new digital products and business models. Before the launch of the first digital product, the agile IT unit became a separate subsidiary company with more than 100 employees and a new brand within the overall corporate group. Thereby this case marks a journey from project-by-project bi-modal IT to extreme divisionally separated bi-modal IT.

**Case 9: Software company with ~20bn EUR revenue and more than 50,000 employees**

IT development as the backbone of the business model was split up. As the company’s digital strategy consisted in exploiting selected digital opportunities (Hess et al. 2016), several new agile IT units were opened around the globe in 2013, each focusing on exploring new solutions based on specific technologies (e.g., blockchain) and reporting to the Group CEO. Hence, case 9 shows a divisionally separated bi-modal IT. Today, these units have in total more than 100 employees compared to thousands within the traditional IT mode. Once a new solution has proven technically and commercially viable with first customers, it flows into the established continuous development roadmap of traditional IT and commercial responsibility is given to the business units. At the same time, the product owner also moves from the agile IT unit to the business unit.

**Table A.5**

Interview guide for semi-structured interviews

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| Guiding question | Objective |
| What is your background (educational & professional)?What is your current role, and for how long do you have this role? | Interviewee demographics and context |
| Please recall and guide us through the digital transformation of the company and especially the IT function. | Case context |
| Could you please elaborate on the main activity of the company’s IT and especially the main activity for your IT mode?What is the desired outcome of the activity?What people and skills are represented in the IT mode? By what means (e.g., tools) are you carrying out the activity?Are there any rules/regulations governing this activity?Who are other actors and skills with which the activity is carried out? Who are the major stakeholders? (Boards etc.)Who is responsible for what when carrying out this activity, and how is the IT organized for that?Is there evidence in the form of task descriptions, documented results, work-products, etc.? | Comprehensive understanding of the bi-modal IT  |
| *Only if mentioned by interview partners:*Can you please elaborate on the conflict you mentioned?What other conflicts do you see when this activity is being carried out?What was done or decided to do in order to resolve this conflict? | Tensions and management approaches |

**Table A.6**

Exemplary quotes for first-order tension codes

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| Second-order tension | First-order tension | Exemplary quotes |
| Scarcity of IT talent | Skilled developers within the existing organization are well-known and requested by all kinds of projects and thus blocked | *“There is no doubt that there are good colleagues who can do this. But they are because they are good, rarely available. And then you are faced with a problem."**“We have great difficulty in finding the appropriate and available internal people”**“The corporate IT has given us very few people. The challenge is simply to keep the capacity situation under control.”**“We have 250-300 software developers in corporate IT, and then you just take 50 out, and they do the new stuff. This does not work. I make a very large part of our income from care contracts or licenses. I have to provide the customer with added value on a regular basis, and I cannot tell the customer that they have to pay fees every year, but for the next five years, you do not get any benefit from that.”**“Of course, we have some IT talents within the organization. But these people are al-ready overburdened. Or promoted.”* |
| Too many requests from business side towards agile IT mode lead to capacity issues | *“As we have too many requests, the challenge is simply to do the right things. Identifying the things in the portfolio that bring the greatest added value for the company.”**“Now, the demand is clearly above the existing capacities. Where do you put your people with the skill?”**“The challenge is simply to have a good grip on the capacity situation.”* |
| Additional operations workload for the traditional IT mode | MVPs by agile IT mode lead to additional work for traditional IT mode during development and in operations phases | *“But there is also a lot of old things that are necessary to make something like this [agile IT] possible. But no one is willing to make concessions: more topics are added, but jobs are cut.”**“Traditional IT gets something thrown over the fence, has to integrate it.”**“Then we're back to the capacity issue, that just because there's the agile IT unit, they have to kind of increase central IT as well. Just to absorb what's coming across.”**“They have their own IT infrastructure and architecture and that makes each handover even more complex as deployment processes are different.”**“Our model is that the IT unit takes over the service later for operations.”**“Our colleagues in corporate IT take over service functions. They have to be trained for that, have to be on-site during the development time.”**“Our IT application landscape and architecture are already very fragmented. When the agile IT unit constantly feeds in new platforms, it gets even less standardized.”* |
| IT architecture unfit for rapid development and testing | With large agile IT unit and a lot of new digital products scaling, traditional IT architecture cannot follow and hinders new development (e.g., only two releases per year)  | *“We notice that due to the strong interdependencies in the legacy architecture, it is currently very difficult for us to cut reasonably scaled release trains. Everything is so interconnected, but we should not have more than 100-150 people in such a release train.”**“At the same time, the mindset and mentality of this agile unit was "oh we should" and "here now quickly" and that of the traditional unit was "oh why don't they integrate with the 3 releases we have."**“Quite challenging, not at all easy. Because the classic projects on the back end also ran very traditionally in the past - waterfall - and were also handled very classically. Then also with different lead times, a release twice a year, whereas at that time online/mobile already had 6-8 releases and were therefore also timed differently and were set up differently.”**“So, our classic IT process made 2 to a maximum of 4 releases a year, while with online/mobile we already had the requirement to be able to react more strongly and more quickly.”**“The expectations are relatively simple. I have just written roughly in the book; we want to be 5 times faster than before.”* |
| IT architecture needs for rapid testing of new solutions with customers vs. IT architecture needs for high stability (backend systems) | *“As long as I am in a research and development phase, it does not make sense to use corporate IT infrastructure, because it is like an engine room, far away from the customer. We have there an ambidexterity, a large area of tension. We still need to operate some topics in a highly stable and very cost-efficient manner. However, this world does not fit to “Let me try this” or “I need to change something quickly”.”**“As far as the topic of central IT is concerned, they like to live in their structures, demand boards, etc. It is clear that there is a certain potential for friction.”* |
| Missing end-to-end understanding of the new digital product by the agile IT mode | Agile IT mode has fast product development as goal, traditional IT has a high-quality aspiration and has higher leverage in order to stop agile IT projects and products |  *“We [traditional IT mode] have then already completely shot down some products.”**“From time to time we [agile IT mode] tried a bit naively to push some interesting concepts. Some were not shot down and made it”* *“At every handover, we [traditional IT mode] are like “Let’s see what’s in the grab bag.”*  |
| Agile IT mode does not take into account the full lifecycle of its services/products before handing them over, and therefore the number of non-standardized products increase leading to even less standardized application landscape | *“They do not consider lifecycle e2e. Not only a proof-of-concept, but also product! That was a big hurdle and it rumbled a lot: what came out of the lab was not ready for product. You don't just have to check whether it's market-ready, but also product-ready.”**“In the development phase, you have to think about topics like IT security of the tools employed in order to handover and deploy the product. They have to learn this.”**“In the development phase, other things must also be considered (e.g., security, right tools) in order to be able to hand them over at all. “* |
| For the same reason, products may lack security requirements not needed during the development phase but for a productive environment | *“And that was a tough discussion, I was completely at odds with the architect, too. But that is just a few rules, that is where it just stops. As long as the boys stay on their home turf, they can really play games, that is, VR glasses and programming things that do not fit into the architecture here. But I have to make certain restrictions because I will not install something in our clients’ production line that could lead to problems there.”* |
| Tensions between the agile IT mode and corporate IT policies and guidelines | Tension with IT security: agile IT coworkers ask for administrator permissions across the firm network to get access to data for advanced analytics | *“Yes, the [agile IT mode] needs IT freedom, but there was a lot of friction at the beginning. Wishes do not always correspond to reality. The requirement was that we go to a provider somewhere, buy a big-data server, and put all our data into it. That was the requirement. IT was “Forget it”. This is far too sensitive a body of knowledge to run it somewhere unsecured on rented hardware.”* *“Colleagues say they want access to all data, few restrictions, and full admin rights. With such a requirement, they fly out of the window when it comes to IT security.”* |
| Tension with purchasing of IT services: flexibility and short-notice commissioning requested by agile IT mode is against existing guidelines | *“The point was simple: It took seven days until an IP of Amazon Webservices was unlocked for us so that the developers could get back on it. Apart from the fact that we had no choice in what development computers we use, we only got two days’ time of admin access after a ticket and several calls. I can say for myself I can’t work like this. This is a maximum obstacle and nothing goes forward.”**“Take purchasing as an example: We have very stringent and formal purchasing processes, such as the tendering of services. When [the agile IT mode] says: "We are agile working, we work in sprints" but now realizes that in four weeks, they need a certain service provider and that it will be employed for the next three months. That is when the old and the new world come together in terms of processes and organization. That is when it becomes clear how serious a company means it with two IT modes within a company.”* |
| Cooperation between agile IT mode and start-ups is difficult in regards to corporate policies and supplier certifications | *“Should we work with startups and integrate their digital products if they don't have the huge backing or can vouch for liability risks? That’s a topic for which we have to develop new governance.”* |
| Tensions (with worker's council) about new way of working and its consequences on working time: higher volatility of hours per day instead of fixed 8h/day | *“So, for example, employee leasing in the agile context is a big topic. This is being hotly debated right now because our current guidelines simply don’t work.”**“In a start-up environment, colleagues want to work until 10:00 in the evening. Our working time models do not allow for such a situation.”* |
| Traditional IT mode envious of the agile IT mode about working with new technologies | Envy that agile IT unit is not bound to corporate IT policies | *“We do not use corporate IT, but we really have our own computer with admin access, we get to develop completely online. Many in our company envy us.”**“I think it also became a cultural problem later on, because of course you always have the people who are in the new, sexy topics, who are allowed to act differently and for whom different rules apply than for the people who do classic IT.”* |
| Envy that new unit can work with new technologies instead of traditional IT department, where co-workers might have knowledge (gained outside of the company) about these technologies (e.g., cloud-development) | *“The people who are there don't get the time to try these things out, someone else gets it, which of course also leads to the frustration issue. Because every time the feeling arises, I have now successfully developed for ten or fifteen years for the company and I am not allowed to play with these beautiful toys, especially young people, also want to do cloud development. You have to manage these things.”**“This new mode makes an enormous envy factor in the organization. An IT that has been doing this for 20-30 years knows what innovations there are and would like to do more than it can and is slowed down by savings in the department. When a new area is created that is allowed to do the cool shit, it makes a massive envy factor.”* *“Of course, there are other people who also want to push innovative and digital topics and look at us with a mixture of envy and resentment.”* |
| Envy can lead to frustration and to co-workers within traditional IT feeling less valued | *“Then came the envy from employees and the management levels and performance suffered as a result and I still discuss this topic with my management today.”* *“There is friction and that is a challenge. The challenge is to manage this in such a way that it doesn't lead to frustration for people, but rather enriches them.”**“In the end, that was also difficult in terms of interaction. Also, in terms of the appreciation that people felt. Because they always felt like they were the ones who were sitting on systems, procedures and processes that were being phased out.”*  |
| New agile IT mode is seen as a competitor | Agile IT mode is seen as the future, traditional IT as the past by some employees | *“Some people feel like: I am still the old one here and they are the new one there.”**“They felt that they are working on systems that were no longer being approached in the way they are today. This may lead to a huge issue.”* |
| Agile IT mode is seen as a competitor to traditional IT as both are service units to BU by some employees | *“What happened: You got two mice in the track, then you let them both run, and each one of them has a certain good track. There is not always a winner, but both races lead to cheese. Now one is afraid that she is going to lose some of her cheese.”**“There is a certain competitive situation between the agile IT unit and central IT since both are in principle service centers for the business areas. Of course central IT could say that “innovative IT is also my turf”, but this is not so decided on the board level. If you ask the business organizations, then the situation looks different again, because, in the end, they do not care where they got their services from.”**“Actually, both want to have application developers, and now they would rather go to the new one than to the central IT department.”* |
| Silo thinking between IT modes and not enough communication leads to slower development, especially when the IT modes are physically separated and report to different heads (e.g., CIO and CDO) | *“One [mode] would not ask and the other would not want to answer either.”**“When the departments were formalized, with the departments came the departmental identity, and later silo thinking, which then sets in in such units.”* |
| Risk of responsibility overlaps with different IT units (e.g., new business models vs. digitization of core business) | *“We have other places within the company where similar issues are dealt with. We are clearly focused on company’s core business digitalization but it is not always possible to draw a clear line.”* |
| Distrust, ill will, resentment, or “politics” | Disbelief by many employees of traditional IT that other ways of working (e.g., Scrum) also lead to functioning digital products | *“Nevertheless, of course, the classic managers somehow said, "That cannot be. How can it work that they come here laughing all the time with a kicker, and then somehow something comes out that works.”**„Of course, there are people who look at it with ill-will. In every organization, there is politics, that is just the way it is. All in all, a good image, in some places ill-will.”* |
| Skepticism regarding potential of new digital products developed by agile IT mode vs. potential of digitizing traditional business and therefore agile IT topics get lower priority within traditional IT | *“What we often got as an answer back then, "our core business is selling vehicles and not those digital gadgets.”**“The problem is then: In the management of the classical function, which is still partially reserved, according to the motto, “Can we rely on our traditional business instead of somehow trying out digital products here and spending a lot of time on it? In the end, nothing will come out of it.”* |
| Lack of recognition of the agile IT mode by the remaining company at the beginning  | *“There is resentment and that is actually important to understand why it is not accepted. Did I not understand the mission, did I not understand the Helping Hands, do I have completely different concerns? Someone afraid for his or her role, position? That's Maslow's pyramid up and down.”**“Some said at the beginning: these odd sandbox players. Running around, sitting on colorful cushions with MacBooks, and just having fun.”**“There is a lot of hype on this unit, and with all the internal marketing for it, many get even more skeptical. We should not forget to invest in the development of existing IT co-workers and IT services.”* |
| Helpful knowledge for building up the agile IT mode is not shared and has to be re-created (e.g., on topics like architecture management, SLAs) | *“There was also no exchange or limited exchange during the build-up of the agile IT unit and then all learnings were made again.”* |
| MVP developed by agile IT mode is not considered valuable by the business unit leading to frustration on both sides | *“We built prototypes and prototypes and MVPs, but then nothing happened. And we had to stop that. We did a lot of things and everything nice and well and also fun. But all were frustrated in the end of course because it didn’t fit to the BUs and it wasn't getting to the market.”**“We built the MVP back then and were ready to throw the prototype back to the departments and say "Here's our idea. We've tried this, there seems to be a market. Make something out of it." We teased that a little bit, talked to a department where we thought at the time it would be a pretty good fit. They had hardcore not-invented-by-me; "this can't work and that's where we've thought about it before and it's not going to work now".* |
| Unfit mindset of new hires | Mindset of new hires might not fit: agile IT mode is not a start-up and serves corporate goals even if this slows down progress | *“I do not need an elite force that thinks they are better than others. We are very good but complementary. There are other very good at our company. Some have not understood that.”**“This new organization is now hiring many young, talented, and committed people. Of course, they have a drive. They come in and want to step on the gas. Now someone comes in, sometimes a little naive, and explains how everything should go better, and we have already tried that, and it does not work that way. Then a frustration arises because suddenly, these new ones are hyped as salvation bringer. And another one says, "I told this already ten years ago, nobody wanted to hear it because I did not tell it right". The same can happen on the other side; the young people run into these walls. Sometimes they just do not understand that it is not as easy as they say.”**“You have to be careful that those who come with change don't get frustrated and pull the ripcord at some point and say we don't want that.”“They [newly hired IT talent] forget that life is not full of bliss and that this is not a playground but a full-grown company. Their performance is very well tracked, and they are measured by their results.”* |

**Table A.7**

Exemplary quotes for paradox management practice codes

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| --- | --- |
| Paradox management practice codes | Exemplary quotes |
| For agile IT mode: New hires and temporarily external IT service provider | *“We call it BOT: build, operate, transfer. We looked for an external service provider who would build up the topic purely externally. He drives, operates, and builds it. Especially now for new business models. When I see that the market accepts it, the business case starts to bear fruit; then, I successively put internal employees.”**“At that time, there were internal employees, I would say three or four, with an incredible amount of external support. That means that in the nine months, we have really brought meat to these skeletons of ideas through external support.”* |
| New hires for new mode as some skills not available in-house | *“Data science and UX were definitely skills we did not have in-house and for which we needed new hires.”**“ And If the internal was not good enough, I hired externally. All still quite surprising with fair salaries. But important is that I was allowed to hire them.”* |
| Gradually increasing involvement of traditional IT from the beginning of the funnel | *“At the beginning of every new project, we start by bringing the [traditional] IT colleagues on board. Slowly introduce the IT team to what they are going to be doing after the development phase. That means that a certain IT project manager will be added to the team. The developers will be added to the team perhaps two months before the end of the project and will learn bit by bit.”* *“Our collaboration improves thanks to physical proximity. It allows us to better learn from each other.”**“We are in the middle of a transition as to what such a collaboration model looks like. But one of the models is that the unit that takes over the service participates more in our agile IT. Unfortunately, it is not yet possible for the colleagues to send members on a full-time basis, so they are not permanently at our place, but similar to the specialist department, they simply come to the site on a project basis.”* |
| Corporate IT co-worker working in the lab as "liaison officer" to create better alignment even if it reduces degrees of freedom | *“All in all I think that the link to traditional IT is less our problem. Because we also have a management team that knows the IT department very well, two come from there. One of our managers also has an additional role as chief architect in traditional IT. Also, our big sponsor is former CIO and now CFO.”**“From December on we [=”traditional IT” mode] will have one of our own IT employees in there as “liaison officer.”* |
| New IT architecture for both in the future | *“Goal is to have a common consolidated architecture. Our initial technology stack now becomes the overall IT tech stack.”**“We are still in the process of introducing this technology. So we have our own game platforms and sandboxes. And now you have to bridge the gap to production, and of course you can only do that if you work on the target platforms where the rest of your colleagues are. So then the goal is to have a common consolidated architecture.”* |
| Agile IT mode administers own and separate office hardware thanks to permit of executive board | *“And so back then, we got the exception permission that we have our own networks in which we work and that the developers simply do not have to take a Windows machine.”* *“As the only department in the entire conglomerate they got the permission to set up another separate company network, which they then also manage themselves.”* |
| Agile IT with own commissioning processes thanks to permit of executive board | *“So we went to the chief procurement officer, and he gave us special dispensations.”* |
| Permit of the executive board to quickly partner with non-certified start-ups | *“We escalated and our CEO, and he said: “Okay, do not let that stop you.”*  |
| Transparency and clear communication about roles |  *“We also say quite openly that in three to five years [our agile mode] will hopefully no longer exist. Because then the whole company will be working like this. Including IT. That often takes away the fear if the appearance of two classes of IT was created before.”**“It was a difficult discussion up to this day, but it has now been resolved. For me, corporate IT is an extremely important function. But that does not mean that it should compete with me. That was not clear until now. They have to provide infrastructure. They have implemented an Enterprise Service Bus (ESB). This thing is the best thing they have done for the business for decades. Without this ESB, I would be lost. That is the gold nugget to scale.”* |
| First results communicated broadly lead to more recognition/respect (e.g., first sales closure) | *“It’s improving now, the more products we hand over. Because more and more areas in traditional IT are learning: "they're doing MVP style and then they're handing it over to us." It’s a very collaborative approach. After all, the traditional IT also understands that they are getting new opportunities to expand their capabilities. Now it’s really getting better with real examples.”**“But the point is that we always have extreme transparency through and through. I also believe that the extremely good quality of service that we have developed means that we were not vulnerable.”**“Stupid sayings because of Weber grill existed, you have to breathe that away. When we already wrote a first invoice after one year, those were milestones and results that people think are good.”* |
| Tours of working space for other departments and workshops on new ways of working | *“We often have open house days, and there is always a full house.”**“In the meantime, there were more than 200 people in the agile IT workplace for workshops or appointments (leadership circle), which you also just do there.”* |
| First, mediation between new hires and tenured employees on ways of working, then layoff | *“These new hires inspire me and I curse them. That is it of course again and again a pain point for me and them, because they want things and need things and mean to be right. Which I question, but that's helped a lot of times after we discussed it. Both sides of the card. I think it's important.”*  |
| Co-workers with wrong mindset are laid off | *“I fired four people, and three of them because mindset was wrong. And that is also a success factor in removing rotten apples immediately.”**“Firing is sometimes more difficult at our company. But this clear consistent management is important. Also, the guys often realize themselves that they do not fit in.”**“More specifically, you have some people who want to continue playing so to speak but at a certain size you have to do business. Some then quite frankly say “I misunderstood this” and leave.”**“The people who want to work here like to work independently et cetera. But then suddenly people can no longer work so freely with all the legacy systems and processes. That has repelled some and then you should not hold them back either.”*  |
| Adaptation of working practices and behavior of individuals within agile IT mode after resistance from traditional IT | *“I have often seen myself in an intermediary position, explaining to the team, "Guys, it is all good what you have done here. You have to understand, on the other hand, we have a measurement system that is used by 30,000 customers, which is relevant to quality in production. And we will not do continuous delivery of software development when we have a regulated area here. Medical technology, aerospace technology, this is where both worlds meet. You have to give both processes a transition.”* |

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1. See <https://aisnet.org/page/SeniorScholarBasket> for the full list of journals [↑](#footnote-ref-2)