

Association for Information Systems  
**AIS Electronic Library (AISeL)**

---

AMCIS 2020 Proceedings

Strategic and Competitive Uses of IT

---

Aug 10th, 12:00 AM

## 'Forewarned is Forearmed': Overcoming Multifaceted Challenges of Digital Innovation Units

Jun-Patrick Raabe  
*University of Hamburg*, [raabe@informatik.uni-hamburg.de](mailto:raabe@informatik.uni-hamburg.de)

Bettina Horlach  
*University of Hamburg*, [horlach@informatik.uni-hamburg.de](mailto:horlach@informatik.uni-hamburg.de)

Ingrid Schirmer  
*University of Hamburg*, [schirmer@informatik.uni-hamburg.de](mailto:schirmer@informatik.uni-hamburg.de)

Paul Drews  
*Leuphana University of Lüneburg*, [paul.drews@leuphana.de](mailto:paul.drews@leuphana.de)

Follow this and additional works at: <https://aisel.aisnet.org/amcis2020>

---

### Recommended Citation

Raabe, Jun-Patrick; Horlach, Bettina; Schirmer, Ingrid; and Drews, Paul, "Forewarned is Forearmed': Overcoming Multifaceted Challenges of Digital Innovation Units" (2020). *AMCIS 2020 Proceedings*. 8. [https://aisel.aisnet.org/amcis2020/strategic\\_uses\\_it/strategic\\_uses\\_it/8](https://aisel.aisnet.org/amcis2020/strategic_uses_it/strategic_uses_it/8)

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2020 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# **‘Forewarned is Forearmed’: Overcoming Multifaceted Challenges of Digital Innovation Units**

*Completed Research*

**Jun-Patrick Raabe**

University of Hamburg  
raabe@informatik.uni-hamburg.de

**Ingrid Schirmer**

University of Hamburg  
schirmer@informatik.uni-hamburg.de

**Bettina Horlach**

University of Hamburg  
horlach@informatik.uni-hamburg.de

**Paul Drews**

Leuphana University of Lüneburg  
paul.drews@leuphana.de

## **Abstract**

Due to rapidly changing customer needs, enterprises seek to innovate continuously. Incumbent firms need to improve their capabilities to develop, evaluate, and implement digital innovations. Recently, many enterprises established digital innovation units (DIUs) for accelerating their digital innovation endeavors. Although numerous units exist in practice, the number of negative press headlines that address failure or dissolution of DIUs is increasing. Based on a literature review and a qualitative cross-industry study with eleven enterprises, we discuss the relation of DIUs to organizational concepts like ambidexterity, bimodal, and trimodal IT. Furthermore, we substantiated seven multifaceted challenges of DIUs, which span across stages of innovation development, organizational units, and hierarchical levels. Based on these findings, we developed three recommendations for responses to these challenges: (1) DIU-Business-IT collaboration across stages, (2) network of executive responsibilities, and (3) general digital awareness of the organization as a whole.

## **Keywords**

Digital Innovation Units, Digital Innovation Labs, Challenges, Failure.

## **Introduction**

The rise of digital technologies imposes new opportunities and challenges for incumbent firms. As ‘digital’ reduces entry barriers for new competitors and leads to a greater variety of offers to choose from, the power shifts towards the customer (Denning 2010). Thus, enterprises feel forced to rapidly and continuously develop particularly digital innovations (DI) for the market(s). For non-digital enterprises, this often implies becoming ambidextrous with simultaneously exploiting the existing day-to-day business and exploring radical or disruptive innovations for new business opportunities with new digital technologies (Dixon 2017; Kathuria and Konsynski 2012; O’Reilly and Tushman 2008).

To respond to this need, enterprises seek new ways of enabling DI. One approach to speed up digital endeavors is to set up a separate ‘fast lane’ for DIs (Fuchs et al. 2019). This ‘fast lane’ can have different forms of specifications, e.g. by being realized as separate (digital) units, and vary whether the innovation activities happen within or outside of the main organization (Fuchs et al. 2019). For instance, company builders, accelerators, or incubators directly offer innovations to market(s), which leads to outside innovation activities (Hausberg and Korreck 2018; Raabe et al. 2020). However, we focus on units with inside innovation activities, which deliver DIs for the main organization. We call them digital innovation units (DIUs). Despite being one specific kind of a ‘fast lane’ implementation, DIUs are not mutually exclusive to other units, as they can co-exist with company builders, incubators and accelerators, or other initiatives (Jöhnk et al. 2020; Raabe et al. 2020).

Although numerous DIUs do exist in practice (Barthel et al. 2020; Raabe et al. 2020), research on DIUs and how they foster DIs for the main organization is still scarce. Yet, research is especially crucial, as negative press headlines on DIU failure or dissolution and challenges with the approach are rising (Depiereux 2017; Kleske et al. 2016; Römer et al. 2017; Unger 2018). Although some issues are stated in the articles, the challenges are neither described nor solutions are given. We seek to fill the gap by analyzing the following research questions: *Why do DIUs not meet their expectations* and *which set of actions can enterprises take to tackle the challenges?*

This paper is structured as follows: In the next section, we describe DIUs and DI management as conceptual foundations. Afterward, we outline our research methodology and present our main results. Finally, we discuss our findings and conclude with future research opportunities.

## Related Research

As ‘digital’ becomes a key factor for success, the use of digital technologies challenges enterprises during the whole process of innovating (Nambisan et al. 2017). In general, ‘digital’ refers to all innovations that are enabled by or embodied in IT (Fichman et al. 2014). DIs can be conceptualized as “the creation of (and consequent change in) market offerings, business processes, or models that result from the use of digital technology. [...] [I]n digital innovation, digital technologies [...] form an innate part of the new idea and/or its development, diffusion, or assimilation” (Nambisan et al. 2017). Thus, DIs can be distinguished along three dimensions: DI type, the intended impact, and the unit of adoption. Types of DIs refer to digital product, service, business model, or process innovations (Fichman et al. 2014). The intended impact of DIs can be incremental, radical, or disruptive. While incremental innovations refer to continuously exploiting existing types (Christensen 1997), radical DIs need to be completely different and adaptable to influence future DIs (Dahlin and Behrens 2005). Disruptive DIs are technologically a non-linear break, create new markets, and eventually bring existing ones to a standstill (Christensen 1997). “[D]isruption refers more to a market/business phenomenon rather than a major technical breakthrough” (Edwards-Schachter 2018, p. 72). The unit of adoption refers to by whom the novelty of innovations is measured. Units of adoption can be the business units of the main organization, customers, or competitors (Rogers 2010).

The complex task of managing DIs includes appropriate practices, processes, and principles to orchestrate them effectively (Nambisan et al. 2017). Most important is digital awareness, which “[...] should allow the firm to discern when it is time to be patient with a developing technology, and when it is more important to abandon the technology and search for a better solution” (Dixon 2017). Awareness shall be secured by allocating DIs to the role of Chief Information Officers (CIOs) and Chief Digital Officers (CDOs) (Drechsler et al. 2018; Haffke et al. 2016; Tumbas et al. 2018). Further, stage models exist to advance digital endeavors, e.g. the ‘stage-gate systems’ (Cooper 1990) or the ‘new product process’ (Crawford and Di Benedetto 2011). As these focus on tangible products, Fichman et al. (2014) define a stage model that explicitly addresses DIs. It consists of four stages. After discovering and selecting potential ideas that could lead to a DI, the ideas are implemented and diffused externally to the market or internally into the main organization. Finally, the intended and unintended impacts of DIs are measured based on the predefined unit of adoption. A final practice for success is embedding DIs in a broader management of innovation. To react to rapidly changing customer needs, bimodal IT appeared to be a promising concept to respond to the duopoly of speed (Horlach et al. 2016). The first traditional mode addresses more predictable areas to exploit what is known; the second agile mode focusses on uncertain areas by being exploratory (Horlach et al. 2016), which highlights the parallels to ambidexterity, connecting the traditional mode to exploitation and the agile IT mode to exploration (Jöhnk et al. 2017; Kathuria and Konsynski 2012; Lee et al. 2015).

Initial approaches on how to implement bimodal IT setups exist, e.g. on a project-by-project base or with separate organizational units for DI discovery and delivery (Haffke et al. 2017; Raabe et al. 2020). However, challenges and downsides of bimodal IT are rising (Cohen 2016; Jöhnk et al. 2019), e.g. the problem of a two-class silo system creating conflicts (Boulton 2016; McCarthy et al. 2016). Consequently, some enterprises move beyond and implement multimodal or trimodal concepts (Jöhnk et al. 2019). This may result in a structural division to foster innovations by transitioning between so-called pioneers, settlers and town planners (Wardley 2015): While pioneers create entirely novel and new prototypes or minimum viable products (MVPs), settlers identify common patterns and productize them, so they are documented, manufacturable and stable. Town planners then “build the core, volume operations based, good enough, ultimately (long term) low margin but highly industrialized services & commodity components [...] [by]

[using] the portfolio of the settlers” (Wardley 2015). Besides, they encourage pioneers and settlers to continuously cannibalize the as-is state of the business (Wardley 2015).

The trimodal concept is supposed to narrow the gap between the two bimodal modes, but research on this concept and the realization via ‘fast lane’ units is yet in its infancy. While some place ‘fast lane’ units within the explorative mode of ambidexterity (Fuchs et al. 2019; Jöhnk et al. 2020), other see DIUs as one implementation of an organizationally separated agile division within a bimodal IT context (Haffke et al. 2017; Holotiuk 2020; Raabe et al. 2020). While the main organization usually contains large parts of the exploitative traditional mode, DIUs are fully explorative and agile. However, the embedding of these units into the trimodal concept is not delineated. Although the connection between pioneers as explorative/agile and town planners as exploitative/traditional mode is already described (Wardley 2014), it is unclear if DIUs enable enterprises to realize trimodal IT with its transition mode of settlers as a middle component. This may depend on the characteristics of DIUs and ‘fast lane’ units in general. Based on the research gaps outlined above, we outline DIUs, which primary objective is to develop and diffuse DIs into its main organization, and analyze occurring challenges in-depth.

## Research Methodology

Since little is known about DIUs and their challenges, we conducted a literature review (vom Brocke et al. 2009) and a qualitative cross-industry study via expert interviews to gain rigorous insights on existing DIUs and their challenges. For reviewing the literature, we searched for the combination of ‘Digital Innovation\*’ and ‘Digital Unit\*’, ‘Digital Innovation Unit\*’ or ‘Innovation Lab\*’ in the title, keywords or abstract in the IS databases ACM Digital Library, ProQuest AbiInform, Science Direct, IEEE Xplore, AIS eLibrary, EBSCOhost Business Source Complete, and SpringerLink. As we suspected that little prior scientific literature on DIUs and their challenges exists, we also analyzed the first 50 entries in Google for white papers and relevant websites. Our initial pool contained 739(+50) articles. We excluded articles that had no challenges or concerns mentioned within the title, abstract, or keywords. Our final pool consisted of 27 relevant articles addressing DIUs and their explicit challenges or concerns in the full text.

To gain first-hand insights on DIUs challenges in practice, we further interviewed experts from eleven organizations in 2018 and 2019. For insights on a variety of DIUs, we selected organizations from multiple industries. Interview partners were selected based on three criteria. First, the main organization applies a bimodal IT type with a separate organizational division (Haffke et al. 2017) and employs at least 1000 people. We assume that due to higher complexities with legacy IT systems and non-agile processes, these enterprises face different challenges than startups. Second, the main organization is not a digital-native and established for more than 30 years. Since DIUs are closely linked to the digital transformation of enterprises, we assume that older enterprises have historically grown IT systems, where parts of a traditional IT are still present. Finally, the participants need to have in-depth insights into the overall organization, especially regarding the DIU and all its tasks within the DI stages. Thus, we contacted Chief Executive Officers (CEOs), Chief Digital Officers (CDOs), Chief Information Officers (CIOs), DIU Leads, and Innovation Managers (Inno. Mngr.).

	ID	DIU Size <sup>1</sup>	Main Org. Size <sup>2</sup>	Industry	Interviewee Role	Est. / Status of DIU
DIU Employees	ENT1	Large	Upper Large	E-Commerce	DIU Lead	2012 / active
	ENT2	Medium	Lower Large	Real Estate	CDO/DIU Lead	2018 / active
	ENT3	Medium	Upper Large	E-Commerce	DIU Lead	2016 / active
	ENT4	Medium	Upper Large	Banking	Inno. Mngr.	2017 / active
	ENT5	Small	Large	Transport	DIU Lead	2015 / closed in 2019
	ENT6	Medium	Lower Large	Energy	Inno. Mngr.	2017 / active
	ENT7	Small	Upper Large	Healthcare	DIU Lead	2017 / active
	ENT8	Medium	Large	Parcel Delivery	DIU Lead	2016 / closed in 2019
	ENT9	Small	Lower Large	Transport	Inno. Mngr.	2017 / active
	ENT10	/	Upper Large	Aviation	Former CIO	/
	ENT11	/	Lower Large	IT Consulting	CEO	/

<sup>1</sup> DIU size (number of full time equivalent [FTE]): Small = < 6; Medium = 6 – 15; Large > 15

<sup>2</sup> Size: Lower Large = < 5k FTE & revenue < 1B €; Large = 5k–20k FTE & revenue 1–5B €; Upper Large = > 20k FTE & revenue > 5B €

**Table 1. Overview of Analyzed Enterprises**

Nine interviews were conducted with DIU leaders or their innovation managers and two with top managers, who work with them (ENT10 and 11). We used semi-structured interviews which mostly were conducted by phone. In the interview, we asked each participant to describe the DIUs objectives, the general setup and tasks, DI focus, and challenges. Table 1 gives an overview of the participating enterprises. The interviews lasted 45–90 minutes, were audio-recorded and transcribed. For deriving the challenges of DIUs, we conducted a qualitative content analysis. The dimensions of DIs served as deductive codes, whereas we assigned inductive codes for specific identified challenges (Mayring 2015). To attain the final results, we clustered the challenges out of our data, until the final challenges emerged.

## Results

Based on our data, we developed three key findings. First, we outline and embed DIUs into the organizational concepts and identified the dimensions of DIs. Second, we identified seven challenges, which can lead to DIU failure. Third, we derived three actions, which assist overcoming them.

### *Nature and Shape of Digital Innovation Units*

Based on Raabe et al. (2020) we define DIUs as newly founded organizational units dedicated to develop DIs. They consist of interdisciplinary teams of permanent employees, employees from the main organization, and external partners who design and develop DIs for its main organization. As a separate legal entity or department, they work across enterprise boundaries, have high degrees of freedom, are involved in all DI management stages, and serve as enabler for the integration of DIs into the main organization. Some authors (Barthel et al. 2020; Jöhnk et al. 2017; Raabe et al. 2020) suggest ideal types or good practices with very similar characteristics. Referring to DIUs as specialization-based global R&D structures, Chiesa (2000) divides between support and center of excellence structures. While a support structure is responsible for generating innovation stimuli and providing support for the centers of excellence, the latter is responsible for DI development and transfer (Chiesa 2000). This division fits within the DI management stages since support structures have tasks in discovery and center of excellence structures in the remaining stages. Raabe et al. (2020) describe two types of DIUs, which fit these stages. Their ‘Coaching & Screening’ units focus on discovery and ‘Center of Excellence’ units specialize in the other stages (Raabe et al. 2020). As we see the term ‘support structure’ ambiguous, we refer to it as discovery structure. This dichotomy is in line with the empirical data, as we could identify three DIUs mainly as discovery structures (ENT4, 6, 9) and six combined DIUs, that include both structures in separate teams (ENT1–3, 5, 7–9). We identified that DIUs focus on digital product and service innovations since these require the least effort of integration (Memon et al. 2018; Svahn et al. 2017). All interviewed DIUs state, that digital business model and process innovations are not focused (ENT1–9). The intended impact for these DIs is radical (ENT1–9). While incremental innovations are in the responsibility of the main organization, radical innovations should primarily not address completely new customers, as disruptive ones are usually supposed to do, but new target groups inside the industries of the main organization (Sindemann and Buttler 2018). Disruptive DIs have minor attention, as they can hardly be integrated into existing processes of the main organization. All interviewees stated the main organization as the unit of adoption, except DIU of ENT8, which also includes customers of the main organization. In addition to the DI dimensions, Table 2 lists the embedding of DIUs in the previously described organizational concepts.

		DIU		Main Organization
		Stage 1* (discovery)	Stages 2–4* (center of excellence)	
DI Dimensions	Type of Innovation	Digital Products and Services		All
	Intended Impact	Radical		Incremental
	Unit of Adoption	Main Organization		Customer
Organizational Concepts	Ambidexterity	Exploration		Exploitation
	Bimodal Mode	Fully Agile		Traditional and Partly Agile
	Trimodal Mode	Pioneers	Settlers	Town Planners

\* DI Management Stages (Fichman et al. 2014): 1 = discovery; 2 = delivery; 3 = diffusion; 4 = impact

**Table 2. Categorization of DI Dimensions and Organizational Concepts**

Due to the identified division of two DIU structures, DIUs can enable enterprises to realize trimodal IT. Pioneers can be assigned to the discovery structure (stage 1), settlers to the center of excellence structure (stages 2–4), which refer to the transition stage due to its task of enabling the integration into the main organization, and town planners to the main organization.

### ***Identified Challenges in DIU Settings***

We identified seven challenges in total, which could lead to DIU failure. The results in the literature and the empirical data are homogeneous, despite minor differences (see Table 3). We categorized the challenges according to the DI management stages and their affect. In the following, we describe each challenge.

Both in literature and the empirical data, the NIH syndrome (C1) is addressed very often. It is defined as “the rejection of an innovation developed elsewhere during the transfer and introduction of that innovation [...]” (Chiesa 2000). It manifests itself in managerial (non-)actions, including lack of appreciation, lobbying, rejection, delay, or other justifications, which can be linked to ethnocentrism or resistance to change (Fecher et al. 2018). Ethnocentrism in particular is specified as mutual ignorance or as corporate clash of cultures (Islam et al. 2016). We identified three underlying challenges, which enhances the NIH syndrome. As the main organization is partly dissatisfied with the innovations realized (Kerr 2018), wrong potential DIs are selected, which indicates a missing collaboration within discovery stage (C1.1). “This may explain why many firms are disappointed with the returns [...] – if the right conditions aren't set, the output tends to be isolated” (Kerr 2018). Therefore, the selection of DIs based on the main organization is of great importance (Novacek et al. 2017; Velten et al. 2016). “In many companies, corporate IT does not have the reputation of being an innovator. However, it is nonsense to believe that a DIU can be successfully built up in the medium and long term without ‘IT’ [...]” (Velten et al. 2016). We further identified a DIUs attitude of knowing everything better (C1.2) (ENT8). This challenge implies that DIU employees may feel superior. This could be perceived as arrogance and therefore harms the diffusion due to the interactions between DIU and the main organization. ENT1 describes a further challenge that possible ideas do not remain with the owner of ideas and ‘are stolen’ by DIUs (C1.3). This may lead to reluctance finding solutions and therefore influences discovery. Out of empirical and literature findings, we elaborated the challenge of unclear DIU objectives (C2). This challenge affects the DIU and the main organization. DIUs are often founded out of fear not to miss current digital trends and consequently not to lose current competitive advantages. Although the used agile methods are usually defined in detail, a clear definition of objectives, focus topics, or achievements, is missing and the used methods become an end in themselves (Narayanan 2017, ENT11). Due to that, business units and the IT department of the main organization may brand them under the term of ‘innovation theater’ (Turrin 2019), which enhances the NIH syndrome. Since it hinders the collaboration from the beginning, it affects especially the discovery. We identified missing support of the top management as a third challenge (C3), primarily within the empirical data. Low support or commitment may lead to rejected decisions for implementing or integrating DIs (Velten et al. 2016, ENT1–6, ENT8, ENT11). DIU of ENT5 and ENT8 were closed because their leads left the unit. Without the unit leads, top management lost its trust in the DIUs. C3 refers to all DI management stages, as top management could influence and abort all endeavors. Further, we identified the challenge of missing skills (C4) in the literature and empirical data, which affects the whole enterprise. Among technical skills, DIU employees may lack of strong communication and cooperation skills to maintain contact with the employees of the main organization (etventure 2018; Velten et al. 2016). As agile working methods may have been hardly adapted in the main organization, the results of DIUs might not be transferred. For the main organization, the results (MVPs or prototypes) may seem to be in an immature state of development (Fecher et al. 2018; Narayanan 2017). Missing skills affect especially the discovery for DIUs and the diffusion stage for the main organization. The conflict between CDOs and CIOs is another crucial challenge (C5) described by ENT10. Many enterprises have established the role of a CDO in recent years. Although this role should foster digital endeavors, it could lead to problems with the CIO, as their tasks could overlap and fortify conflicts (Pfirsching 2017; Velten et al. 2016). Interviewee from ENT10 (the former CIO) left the enterprise due to their different views on digital leadership. “I personally don't like this CDO role at all [...] especially if it is approached in a way that someone comes in with a traditional hierarchical thinking and then wants to build his empire. [...] That made the traditional business nervous because they felt attacked” (ENT10). This challenge has serious effects on the diffusion stage, as the conflicts between CDO and CIO may hinder suitable DI integration plans. Financial bottlenecks (C6) were often mentioned in literature and the empirical data. As digital endeavors are costly, it should be transparent that digital endeavors are always associated with high costs

to get enough budget, otherwise, DIUs will be prematurely condemned as failed (ENT8). As implementing, diffusing, and evaluating DIs are costly, this problem affects especially DI management stages 2–4. Part-time employees (C7) represent our last identified challenge, which occurred often in the empirical data. Employees should not be distracted by additional tasks, e.g. day-to-day operations, as it could be labeled as a frivolous project without serious intentions for change (Depiereux 2017) and might result in an ‘innovation theater’ (Turrin 2019) as well. This affects all DI management stages.

Identified Challenges of DIUs	Affects <sup>1</sup>	Stage <sup>2</sup>				Literature Findings	Empirical Findings
		1	2	3	4		
<b>C1:</b> Not-Invented-Here Syndrome	DIU			x		Bärtle 2017; Catlin et al. 2017; Chiesa 2000; Ciriello and Richter 2015; Dearlove 2006; Diehl 2017; etventure 2018; Fecher et al. 2018; Islam et al. 2016; Narayanan 2017; Remfert and Stockhinger 2018; Svahn et al. 2017	ENT1–5, 8, 9
<b>C1.1:</b> Missing Collaboration in Discovery Stage	All	x				Kerr 2018; Novacek et al. 2017; Velten et al. 2016	/
<b>C1.2:</b> DIUs Attitude of Knowing Everything Better	BU, IT			x		/	ENT8
<b>C1.3:</b> Feeling of Getting Ideas Stolen	BU, IT	x				/	ENT1
<b>C2:</b> Unclear DIU Objectives	All	x				Catlin et al. 2017; Narayanan 2017; Turrin 2019	ENT11
<b>C3:</b> Missing Support from (Top) Management	DIU	x	x	x	x	Velten et al. 2016	ENT1–6, 8, 11
<b>C4:</b> Missing Skills	All	x		x		etventure 2018; Fecher et al. 2018; Haffke et al. 2017; Hyvönen 2018; Narayanan 2017; Novacek et al. 2017; Svahn et al. 2017; Velten et al. 2016; Wiesboeck 2018	ENT1–5, 8, 10
<b>C5:</b> CDO & CIO Conflicts	DIU			x		Pfirsching 2017; Velten et al. 2016	ENT10
<b>C6:</b> Financial Bottlenecks	DIU		x	x	x	Fecher et al. 2018; Hyvönen 2018; Sindemann and Buttlar 2018; Velten et al. 2016	ENT2, 4, 5, 8
<b>C7:</b> Part-Time Employees	DIU	x	x	x	x	Depiereux 2017	ENT4, 5, 7, 8, 11

<sup>1</sup> Challenge primary affects: BU = Business Units of Main Organization ; IT = IT Department(s) of Main Organization; DIU

<sup>2</sup> DI Management Stages (Fichman et al. 2014): 1 = discovery; 2 = delivery; 3 = diffusion; 4 = impact

**Table 3. Identified Multifaceted Challenges of DIUs**

### ***Three Crucial Actions to Overcome the Multifaceted Challenges***

The previously described DIU challenges are multifaceted and occur on various layers. (1) The challenges arise within one, across several, or even in all DI management stages. Since several DIs may be processed in parallel within DIUs, these DIs may be at different DI management stages and therefore have different needs. As they are not only dealt with in DIUs, they require sophisticated cooperation with business units and IT departments of the main organization, which needs to be understood and handled. (2) Further, the identified challenges are not solely confined to the level and role of executors across tasks in DI management stages; they also require the support of executives across various hierarchy levels, as clearly stated in the interviews. Here, a network of responsibilities and decision rights regarding DIs and the fostering of collaboration across units has to be determined and established. (3) Furthermore, some of the challenges point to an overall mindset and openness towards DIs, which we subsume under a general digital awareness of the organization as a whole. In the following, we identify, propose, and elaborate possible actions according to the identified three layers and their actors.

**DIU-Business-IT Collaboration across Stages.** The individual actors must converge and foster strong collaboration mechanisms between DIUs, business units, and IT within and across stages and all hierarchy levels to overcome all of the mentioned multifaceted challenges. As this collaboration includes the missing collaboration within the discovery stage (C1.1), it also assists to overcome the feeling of getting ideas stolen (C1.3). The continuous integration of business stakeholders leads to the impression that ideas remain with their providers. Collaboration lowers the boundaries between DIUs, business units and IT and involves enabling employees not to work as usual in business units of the main organization, but to identify concrete challenges and to solve those using new IT technologies in interdisciplinary expert teams within DIUs. The

proximity to the business units overcome a DIUs attitude of knowing everything better (C1.3) and further solves the challenge of an NIH syndrome (C1) in general. As the discovery, development, diffusion, and the desired benefit of DIs are in close consultation with the business units for which a DI is developed, it also fosters the definition of clear objectives and therefore addresses the challenge of unclear or even missing DIU objectives (C2). *Executives Actions:* To foster collaboration, executives have the responsibility of fostering job rotation or exchange programs where employees of the main organization can work together with DIU employees. They need to create incentives for employees to share their expertise with DIUs. This exchange should be a common practice as it enables all employees to learn from each other, e.g. new technical skills, agile working methods, or handling prototypes. *Executors Actions:* Executors within the business units and IT of the main organization need to build up the necessary skills (e.g. to work with agile methods, handle MVPs and prototypes). Building up these digital skills requires a strong motivation of the executors to compel themselves continuously to learn (Fecher et al. 2018; Novacek et al. 2017; Svahn et al. 2017). This should assist in overcoming missing skills in the diffusion stage (C4). *DIUs Actions:* DIUs should focus on proactively maintaining and keeping in contact with the business units and IT of the main organization. They should motivate digital endeavors throughout the organization through motivational events, trainings, or publishing digital trends within an in-house newsletter (ENT3, 6). DIU discovery structures could assist in getting in contact with the main organization and center of excellence structures can further assist in the remaining stages.

**Network of Executive Responsibilities.** Especially support from top management is crucial, as ENT5 and ENT8 were closed due to missing support (C3). Therefore, a network of responsibilities and decision rights regarding DIs is of great importance. As first digital initiatives are usually implemented project-based (Haffke et al. 2017) and led top-down by IT executives within IT departments (Novacek et al. 2017), IT executives should co-decide who is suitable for the role of a digital leader. As working together is crucial, these roles should have the same view of digital leadership (ENT10). The digital leader is a key player in digital initiatives, usually responsible for DIUs, and is reliant on full support of all executives. The tasks should be clearly distinguished from those of a CIO with whom close collaboration within and across all DI management stages is crucial (ENT10), as this assists overcoming CDO & CIO conflicts (C5). *Executives Actions:* Executives or (top) management need to provide appropriate conditions and need to understand and communicate the relevance of digital endeavors top-down. They must provide DIUs with financial independence (adequate resources) to avoid lengthy decision-making processes. DIUs should have their budget for the long term, managed by the unit lead (Velten et al. 2016). This refers to overcoming the challenge of financial bottlenecks (C6) and part-time employees (C7). As ensuring high degrees of freedom and fast feedback mechanisms are crucial for DIUs, the location should be detached, but close to the main organization. *DIUs Actions:* DIUs must continuously communicate their value and results transparently throughout the entire enterprise to receive long-term support from top management. Therefore, good communication channels should be established. This supports overcoming missing support of the top management (C3).

**Digital Awareness in General.** Digital awareness (Dixon 2017) should be spread early on. It acts as motivation for all digital endeavors in the entire organization. The necessity of promoting digital endeavors and agile working methods should be presented transparently and the value communicated (Velten et al. 2016), which assists to conceive the objectives of DIUs (C2). The whole organization needs to understand, why digital and agile working methods are so important, as major (digital) changes in organizations are always tough and unpleasant (ENT11). Digital awareness acts as an enabler for collaboration mechanisms, which assists in tackling the NIH syndrome (C1). *Executives Actions:* Executives should enable DIU employees to work in fulltime without having other tasks (C7) to strengthen DIUs serious intentions for change (Depiereux 2017). *DIUs Actions:* DIUs should motivate digital endeavors by e.g. publishing digital trends within an in-house magazine or newsletter (ENT3, 6).

## Discussion

Prior research dealt with the identification of bimodal IT types, agile setups in general, and 'fast lane' units like DIUs. Jöhnk et al. (2019) initially describe general challenges for various types of the bimodal IT concept and therefore derive potential governance mechanisms based on the organizational concept to tackle them. We follow a similar approach but proceed vice versa. We focus on DIUs, which enable enterprises to realize the organizational concepts (ambidexterity, bimodal IT with separate organizational



units, and the trimodal concept). As we outlined DIUs and their preferred DI dimensions, our research contributes to the increasing number of DIUs that have been (successfully) established in recent years. As we identified a DIU dichotomy between a discovery ('Pioneers') and a center of excellence structure ('Settlers') (Chiesa 2000; Drechsler et al. 2018; Keuky and Rilhac 2012; Raabe et al. 2020), it enables enterprises to realize the trimodal concept, which introduces a transition mode that fosters closer collaboration. However, enabling the trimodal concept with a DIU dichotomy is not a guarantee to work. DIUs face challenges in day-to-day operations that have so far only been addressed in press articles and not in the academic discourse. We extend the current body of knowledge and initially demonstrate critical aspects of a setting with DIUs by explicating challenges that could lead to failure. Due to the multifaceted nature of the challenges, they appear in all DI management stages, affect the whole enterprise, and are not solely confined to one hierarchical level. This is why we introduce responsibilities and a set of actions to overcome the challenges. Our practical implications for DIUs, executors, and executives assist among general actions to establish or improve current DIUs in practice. However, as we identified the general need for stronger collaboration based on the data, it should be critically scrutinized whether DIUs, as promoters of radical DIs, create value and have an impact within the whole enterprise. On the one hand, the necessary degrees of freedom must be granted to motivate creative ideas. On the other hand, close holistic collaboration of DIUs and the main organization must be established so that DIUs can pursue their objectives. The need for collaboration is already discussed in prior research, e.g. by Svahn et al. (2017), and not necessarily a new finding, but it seems that DIUs primarily insist on their degrees of freedom and forget about the importance of collaboration. Hence, the right balance between degrees of freedom and collaboration is crucial for DIUs to work.

## Conclusion

We outlined DIUs, identified their multifaceted challenges initially in research, and give a set of actions to tackle them, according to the aphorism 'forewarned is forearmed'. Complying with them can enable a successful setup of DIUs. We provide stimuli especially for digital leaders to benchmark their setting of DIUs and its ability to foster digital endeavors. However, this paper does not come without limitations. Although the results of this paper are based on recent literature and empirical data, we cannot guarantee that we cover all challenges of DIUs. Further research can be built based on our paper. As the dichotomy of DIUs is barely discussed, we recommend extending the study with in-depth case studies to gain a better understanding of DIUs and the trimodal concept. Since we limit ourselves only to DIUs, an analysis of other 'fast lane' units would also be promising. Another avenue for research may be a longitudinal study about DIUs and their transformation within incumbent firms. Although concepts with DIUs have received much criticism, we are optimistic and see them as an enabler to boost digital endeavors.

## REFERENCES

- Barthel, P., Fuchs, C., Birner, B., and Hess, T. 2020. "Embedding Digital Innovations in Organizations: A Typology for Digital Innovation Units," *International Conference on Wirtschaftsinformatik*.
- Bärtle, D. 2017. *The digital unit as a game changer*. <https://www.etventure.com/blog/the-digital-unit-as-a-game-changer/>. Accessed 27 February 2020.
- Boulton, C. 2016. *Why bimodal IT kills your culture and adds complexity*. <https://www.cio.com/article/3057886/why-bimodal-it-kills-your-culture-and-adds-complexity.html>. Accessed 27 February 2020.
- Catlin, T., Lorenz, J.-T., Sternfels, B., and Willmott, P. 2017. *A roadmap for a digital transformation*. <https://www.mckinsey.com/industries/financial-services/our-insights/a-roadmap-for-a-digital-transformation>. Accessed 27 February 2020.
- Chiesa, V. 2000. "Global R&D Project Management and Organization: a Taxonomy," *Journal of Product Innovation Management* (17:5), pp. 341-359.
- Christensen, C. M. 1997. *The innovator's dilemma: When new technologies cause great firms to fail*, Boston: Harvard Business School.
- Ciriello, R., and Richter, A. 2015. "Idea Hubs as Nexus of Collective Creativity in Digital Innovation," *International Conference on Information Systems*.
- Cohen, I. 2016. *The Bimodal IT fallacy - Multimodal business demands multimodal IT*. <https://www.cio.co.uk/opinion/disruptive-cio/bimodal-it-fallacy-multimodal-business-demands-multimodal-it-3641302/>. Accessed 27 February 2020.

- Cooper, R. G. 1990. "Stage-gate systems: a new tool for managing new products," *Business horizons* (33:3), pp. 44-54.
- Crawford, C. M., and Di Benedetto, C. A. 2011. *New Products Management*, New York: McGraw-Hill.
- Dahlin, K. B., and Behrens, D. M. 2005. "When is an invention really radical?: Defining and measuring technological radicalness," *Research Policy* (34:5), pp. 717-737.
- Dearlove, D. 2006. "Inside The Innovation Lab," *Business Strategy Review* (17:1), pp. 4-8.
- Denning, S. 2010. "Rethinking the Organization: Leadership for Game-Changing Innovation," *Strategy & Leadership* (38:5), pp. 13-19.
- Depiereux, P. 2017. *Von Aufbruchstimmung kann keine Rede sein*. <https://www.welt.de/wirtschaft/bilanz/article164195913/Von-Aufbruchstimmung-kann-keine-Rede-sein.html>. Accessed 27 February 2020.
- Diehl, A. 2017. *Fallstudie: Aufbau und Positionierung eines Digital Hub im Mittelstand*. <https://digitaleneuordnung.de/blog/aufbau-digital-hub>. Accessed 27 February 2020.
- Dixon, J. 2017. "Seizing the Future: Enabling Digital Business Innovation through Digital Awareness," *Administrative Sciences Association of Canada*.
- Drechsler, K. L., Hund, A., and Wagner, H.-T. 2018. "Championing Digital Innovation Success: The Role of CDOs," *Pacific Asia Conference on Information Systems*.
- Edwards-Schachter, M. 2018. "The Nature and Variety of Innovation," *International Journal of Innovation Studies* (2:2), pp. 65-79.
- etventure 2018. *Challenge Your Game: Digital Unit - Den Digitalen Wandel Aktiv Gestalten*. <https://digitalunit.com/>. Accessed 27 February 2020.
- Fecher, F., Winding, J., Hutter, K., and Füller, J. 2018. "Innovation Labs from a Participants' Perspective," *Journal of Business Research* (in press, corrected proof).
- Fichman, R. G., Santos, B. L. D., and Zheng, Z. 2014. "Digital Innovation as a Fundamental and Powerful Concept in the Information Systems Curriculum," *MIS Quarterly* (38:2), pp. 329-343.
- Fuchs, C., Barthel, P., Herberg, I., Berger, M., and Hess, T. 2019. "Characterizing Approaches to Digital Transformation: Development of a Taxonomy of Digital Units," *International Conference on Wirtschaftsinformatik*.
- Haffke, I., Kalgozas, B., and Benlian, A. 2016. "The Role of the CIO and the CDO in an Organization's Digital Transformation," *International Conference on Information Systems*.
- Haffke, I., Kalgozas, B., and Benlian, A. 2017. "Options for Transforming the IT Function Using Bimodal IT," *MIS Quarterly* (16:2), pp. 101-120.
- Hausberg, J. P., and Korreck, S. 2018. "Business Incubators and Accelerators: a Co-Citation Analysis-based, Systematic Literature Review," *The Journal of Technology Transfer* (29:10), 657-682.
- Holotiuik, F. 2020. "The Organizational Design of Digital Innovation Labs: Enabling Ambidexterity to Develop Digital Innovation," *International Conference on Wirtschaftsinformatik*.
- Horlach, B., Drews, P., and Schirmer, I. 2016. "Bimodal IT: Business-IT Alignment in the Age of Digital Transformation," *Multikonferenz Wirtschaftsinformatik*.
- Hyvönen, J. 2018. *Strategic Leading of Digital Transformation in Large Established Companies – a Multiple Case-Study*. Master Thesis, Espoo.
- Islam, N., Trautmann, K., and Buxmann, P. 2016. "Tradition Meets Modernity – Learning from Start-ups as a Chance to Create Digital Innovation in Corporations," *International Conference on Information Systems*.
- Jöhnk, J., Oesterle, S., Winkler, T., Nørbjerg, J., and Urbach, N. 2019. "Juggling the Paradoxes – Governance Mechanisms in Bimodal IT Organizations," *European Conference on Information Systems*.
- Jöhnk, J., Ollig, P., Oesterle, S., and Riedel, L.-N. 2020. "The Complexity of Digital Transformation – Conceptualizing Multiple Concurrent Initiatives," *International Conference on Wirtschaftsinformatik*.
- Jöhnk, J., Röglinger, M., Thimmel, M., and Urbach, N. 2017. "How to implement Agile IT Setups: A Taxonomy of Design Options," *European Conference on Information Systems*.
- Kathuria, A., and Konsynski, B. 2012. "Juggling Paradoxical Strategies: The Emergent Role of IT Capabilities," *International Conference on Information Systems*.
- Kerr, W. R. 2018. "Navigating Talent Hot Spots," *Harvard Business Review* (96:5), pp. 80-86.
- Keuky, R., and Rilhac, E. 2012. *Accelerating Digital Transformation: Understanding and Setting Up a Digital Services Unit*. <https://www.capgemini.com/resources/accelerating-digital-transformation-understanding-and-setting-up-a-digital-services-unit/> Accessed 27 February 2020.

- Kleske, J., Krüger, S., Straub, J., and Schwarzmann, I. 2016. *Warum die Tempel der Digitalisierung oft scheitern*. <https://www.ifok.de/wp-content/uploads/2016/10/Whitepaper-Innovation-Labs.pdf>. Accessed 27 February 2020.
- Lee, O.-K., Sambamurthy, V., Lim, K. H., and Wei, K. K. 2015. "How Does IT Ambidexterity Impact Organizational Agility?" *Information Systems Research* (26:2), pp. 398-417.
- Mayring, P. 2015. *Qualitative Inhaltsanalyse: Grundlagen und Techniken*, Weinheim: Beltz.
- McCarthy, J., Leaver, S., Schadler, T., Giron, F., Matzke, P., Mines, C., Washburn, D., Easton, L., and Birrell, R. 2016. "The False Promise Of Bimodal IT," Forrester Research.
- Memon, A. B., Meyer, K., Thieme, M., and Meyer, L.-P. 2018. "Inter-InnoLab Collaboration: An Investigation of the Diversity and Interconnection among Innovation Laboratories," *Journal of Engineering and Technology Management* (47), pp. 1-21.
- Nambisan, S., Lyytinen, K., Majchrzak, A., and Song, M. 2017. "Digital Innovation Management: Reinventing Innovation Management Research in a Digital World," *Management Information Systems Quarterly* (41:1), pp. 223-238.
- Narayanan, V. K. 2017. "Idea labs: Instituting an Innovation Discovery Process Capable of Sustaining the Business," *Strategy & Leadership* (45:1), pp. 27-36.
- Novacek, G., Agarwal, R., Hoo, S., Maaseide, S., Rehberg, B., and Stutts, L. 2017. *Organizing for a Digital Future*. <https://www.bcg.com/de-de/publications/2017/technology-organizing-for-digital-future.aspx>. Accessed 27 February 2020.
- O'Reilly, C. A., and Tushman, M. L. 2008. "Ambidexterity as a Dynamic Capability: Resolving the Innovator's Dilemma," *Research in Organizational Behavior* (28), pp. 185-206.
- Pfirsching, V. 2017. *CDO versus CIO – a non-zero-sum game: How a fruitful tension can be created from the imminent conflict between CDO and CIO*. [http://www.adlittle.com/sites/default/files/viewpoints/201706\\_cdo\\_cio\\_a\\_non\\_zero\\_sum\\_game\\_o.pdf](http://www.adlittle.com/sites/default/files/viewpoints/201706_cdo_cio_a_non_zero_sum_game_o.pdf). Accessed 27 February 2020.
- Raabe, J.-P., Horlach, B., Drews, P., and Schirmer, I. 2020. "Digital Innovation Units: Exploring Types, Linking Mechanisms and Evolution Strategies in Bimodal IT Setups," *International Conference on Wirtschaftsinformatik*.
- Remfert, C., and Stockhinger, J. 2018. "Evaluating the Two-Speed IT Concept for Digitalization," in *HCI in Business, Government, and Organizations*, F. F.-H. Nah and B. S. Xiao (eds.), Cham: Springer International Publishing, pp. 162-174.
- Rogers, E. M. 2010. *Diffusion of Innovations*, New York: Free Press.
- Römer, M., Röglinger, M., Linhart, A., Schmidl, J., Utz, L., and Venus, M. 2017. "Designing IT Setups in the Digital Age: Digitalization is at the top of every CEO agenda, yet only a future-proof IT setup enables companies to move to the forefront of the digital (r)evolution," *A.T. Kearney and Project Group Business & Information Systems Engineering of Fraunhofer FIT*.
- Sindemann, T., and Buttler, H. v. 2018. *Konzerne auf den Spuren von Startups 2018: (Corporations on the Track of Start-ups 2018)*, Hamburg: Infront Consulting & Management.
- Svahn, F., Mathiassen, L., and Lindgren, R. 2017. "Embracing Digital Innovation in Incumbent Firms: How Volvo Cars Managed Competing Concerns," *MIS Quarterly* (41:1), pp. 239-253.
- Tumbas, S., Berente, N., and vom Brocke, J. 2018. "Digital Innovation and Institutional Entrepreneurship: Chief Digital Officer Perspectives of their Emerging Role," *Journal of Information Technology* (33:3), pp. 188-202.
- Turrin, R. 2019. *Innovation Lab Excellence: Digital Transformation From Within*, Gold River: Authority Publishing.
- Unger, M. 2018. *Digital-Labs: Dead on Arrival oder Success Story*. <https://www.capital.de/wirtschaftspolitik/dead-on-arrival-oder-success-story>. Accessed 27 February 2020.
- Velten, C., Michel, J., and Özdem, A. 2016. *Digital Labs – How to Build, How to Run*, Kassel: crisp research.
- vom Brocke, J., Simons, A., Niehaves, B., Niehaves, B., Reimer, K., Plattfaut, R., and Cleven, A. 2009. "Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature Search Process," *European Conference on Information Systems*.
- Wardley, S. 2014. *Bimodal IT - the new old hotness*. <https://blog.gardeviance.org/2014/11/bimodal-it-is-long-hand-for-snafu.html>. Accessed 27 February 2020.
- Wardley, S. 2015. *On Pioneers, Settlers, Town Planners and Theft*. <https://blog.gardeviance.org/2015/03/on-pioneers-settlers-town-planners-and.html>. Accessed 27 February 2020.
- Wiesboeck, F. 2018. "Thinking Outside of the IT Capability Box," *Americas Conference on Information Systems*.