Digital Innovation Units: Exploring Types, Linking Mechanisms and Evolution Strategies in Bimodal IT Setups

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Abstract. Due to rapidly changing customer needs, enterprises seek to innovate continuously. This includes the capability of discovering and developing digital innovations. As a nascent phenomenon, companies increasingly use digital innovation units (DIU) as fast and flexible accelerators. Although DIUs are established in practice, research on them and their role in bimodal IT setups is still sparse. Based on a qualitative cross-industry study in nine organizations, we identified two types of DIUs: Coaching & Screening (C&S) units and Center of Excellence (CoE) units. Furthermore, we describe two linking mechanisms between the DIUs and the main organization for ensuring impact and continuous innovation. Finally, we present four DIU evolution strategies, which can be employed by companies seeking to establish a DIU. Our study contributes to research on bimodal IT by developing a foundational understanding of how digital innovation activities are organized in DIUs to create impact on the main organization.

Keywords: Digital Innovation Units, Digital Innovation Labs, Bimodal IT, Digital Innovation Management.

1 Introduction

Digital technologies have become increasingly crucial for enterprises, as they have highly salient characteristics with important implications for innovations [1]. After transforming physical processes, content or objects into digital entities ('digitalization'), these entities are highly malleable and provide large new areas of potential functionality [2]. Further, the range of what is technically and economically feasible to accomplish with IT is rapidly extending. This fosters the role of IT as a strong enabler for innovation [1]. Beyond the increasing potential of IT, digital innovations are also heavily influenced by network effects as they become more valuable for an individual adopter as the number of adopters in a network grows [1]. This effect allows enterprises with huge networks to decrease costs or increase functionalities of IT innovations and thus increases the potential value creation in a

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growing adopter network [3]. We refer to this type of innovation which is enabled by digital technologies (and their highly salient characteristics) as a digital innovation (DI) [4]. Digital technologies are often also employed for supporting the "*process of innovating*" [5].

Despite their high importance for enterprises, the rise of DI deeply challenges corporate reality. Especially the reduced entry barriers for new competitors, the resulting volatility of markets based on a potential multitude of new offers at any time and the increasing number of opportunities available to customers [6] call for enterprises' ability to respond to those threats in the business environment in a timely manner. Thus, companies need to be able to improve their capabilities and resources by exploring and exploiting new (digital) business opportunities to stay one-step ahead of their competitors and to fulfill and surpass (changing) customer needs [6]. While this may involve the development of improved or new offerings in current markets for securing the current position, DIs may also result in stepping into new markets based on changing customer needs [6]. Many organizations try to balance the exploration of new and exploitation of existing resources and practices with an ambidextrous organizational approach [7].

First approaches for fostering DIs arose in recent times. For instance, bimodal IT was proposed as an organizational concept to transform enterprises (especially IT functions) into an ambidextrous setup with two different modes [8]. While the first mode ("slow IT") focuses on exploiting what is known, the second mode ("fast IT") is optimized for areas of uncertainty by exploring and experimenting to solve new problems [8–10]. As the fast IT mode is often seen as the key provider of DIs [9], a structural separation in organizational divisions is favored in many organizations [8, 11, 12]. The basic idea of such a digital division is to create a fast lane for digitalization topics alongside the traditional IT development and business organization [13]. For instance, Volvo Cars decided to create a digital division ('app development group') focusing on the implementation of an integrated (digital) infotainment platform [14]. This was seen as a completely new and radical approach for fostering DIs [14]. As DIs can span various contexts (from disruptive for entering new markets to incremental for existing products), different focuses may exist within digital divisions. We refer to one kind as digital innovation units (DIUs), which focus on developing new products or services for existing markets [15]. As those involve permanent staff as well as temporal internal staff from the main organization and external people, they work across enterprise boundaries and are intended to serve as an enabler for the integration of DIs into the main organization [15, 16]. Thus, they ought to co-exist with other digital divisions and other bimodal IT modes, e.g. on a project-by-project basis [8]. However, knowledge about their internal organization and their interaction with the main organization is yet scarce.

Due to the nascent state of prior theory on DIUs and sparse research and practical findings [4, 17, 18], we aim to outline their nature based on experiences of experts from established DIUs in practice. With an exploratory study comprising nine existing DIUs, we focus on analyzing the DIU setup and their link to the main organization for developing DIs. Therefore, we strive to answer the following research questions:

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RQ1: How are DIUs set up?
RQ2: How are DIUs linked with the main organization?

The remainder of the paper is structured as follows. In section 2, we briefly describe DIs, DIUs and bimodal IT. Afterwards, we outline our research methodology. In section 4, we present our main results, the two types of DIUs, linking mechanisms and evolution strategies for embedding DIUs in the organizational context. Finally, we discuss our findings and conclude with future research opportunities.

2 Related Research

2.1 Bimodal IT as an Enabler for Digital Innovation (DI)

DIs may be characterized based on different dimensions, which are not mutually exclusive. While some emphasize their type [1, 2], others focus on the intended impact [19–21] or the unit of adoption for which a DI is perceived as new [22]. DI types can be a digital product, service, business model or process [2]. While process innovations are still valid for optimizing internal business operations [24], product and business model innovations are increasing in popularity, as they enhance the company's position in the market [23]. For all types, the intended impact of DIs can be of incremental, radical or disruptive nature [19–21]. Incremental DIs refer to continuous improvement of existing opportunities [19], while radical DIs create novel and unique opportunities instead of exploiting existing ones [20]. However, they still need to fit within the main organization's business [21]. In contrast, disruptive DIs are technologically a non-linear break, which create completely new markets while 'disrupting' others [19, 21]. Units of adoptions for which a DI is perceived as new may be the main organization, its customers or competitors [22, 24]. Despite the different dimensions of DIs, several stages for innovation elicitation and implementation have to be undertaken (e.g. [22, 25]). Especially for DIs, four stages, which are of an iterative nature and may overlap, are perceived as crucial [1]. The discovery stage identifies new ideas that could potentially represent a DI type. Core tasks within this stage are invention and selection. In the development stage, an idea is transformed into a DI. The focus is on developing, updating the core technology and refining it with complementary products and services. In the diffusion stage, a DI diffuses into a group of potential users. This includes setting up necessary resources to convince potential users or companies and to enable the adoption. The impact stage focuses on both, the intended and unintended effect of DIs after internal and external diffusion on individuals, organizations, markets or society.

Although DIs are seen as crucial for corporate success, knowledge about how to create organizational structures to facilitate DI is yet scarce. Although approaches like bimodal IT [9, 26] are recommended and applied to facilitate DI [10, 27], e.g. via dedicated digital divisions [8, 27] (see Figure 1), they mainly focus on agility and incremental customer-focused innovation. Others [28, 29] define some

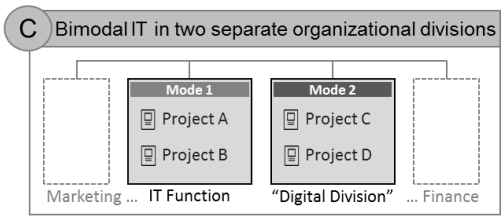

Figure 1. Bimodal IT with a separate agile digital division [8]

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implementation options of digital divisions as fully agile IT setups. While this may involve DIs, the literature does not yet provide insights into how they organize in order to develop and implement radical and disruptive DIs.

2.2 Digital Innovation Units (DIUs) and other Characterizations

Neither innovations nor innovation units/labs are new phenomena [30], since innovation has always been essential for business success [31]. However, *"what is different and noteworthy within the past 25 years of digital history […] is the speed with which innovation is transforming our world. […] If [DI] labs do one thing, they give innovation a home within your company, which allows it to […] improve your chances of survival in the Darwinian process of digital evolution"* [30]. Various names and characterizations for DIUs exist, e.g. (digital) innovation labs, company builders or accelerators [32]. Others refer to them as digital labs, which contain innovation labs, company builders, incubators and digital units [15, 16]. Despite their names, the main differences between these forms are whether the innovation activities occur within or outside of the main organization [17]. Company builders, incubators and accelerators offer DIs directly to the market(s). Company builders also focus on implementing new ideas, but they seek to turn them into a startup [15, 16, 32]. These startups represent subsidiaries, established for the purpose of using internal and external resources to develop digital business models throughout the entire lifecycle [15, 16, 32]. Incubators and accelerators are programs for identifying and selecting external startups or firms to further develop and scale their business ideas [32]. Incubators participate in existing startups on a long-term basis and make their expertise and working environment available in exchange for company shares [15, 16]. While incubators usually assume a period of cooperation of 6 to 24 months, accelerators provide programs that are designed for a shorter time, approximately 3 to 6 months [15]. In contrast, DIUs have a primary internal focus to change existing processes and products inside the main organization. Therefore, DIUs are not company builders, incubators or accelerators. Even though recent papers address DIUs' organizational design options [17] and show how DIUs facilitate ambidexterity [4] or knowledge management [18], the structures and processes of DIUs as well as their linking mechanisms to the main organization and their role in bimodal IT settings are not yet explored.

3 Research Methodology

Though many enterprises established DIUs during the last years, research on them is still sparse and in a nascent state. As DIUs may be an accelerator for digital endeavors, we seek to develop initial models of DIU setups and to understand their link to the main organization. Recommended by Edmondson and McManus [33] for a nascent state of prior research, we conducted an explorative qualitative-empirical study with nine organizations from October to December 2018 to analyze established DIUs in practice. The field study spanned multiple industries, as we aimed to gain

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insights on a variety of units. The participants were selected based on the following criteria: First, the main organization involves at least 1000 employees. With this size, we assume high complexities with 'legacy IT' systems and non-agile processes within the organization, which draws a clear line compared to a DIU and its tasks. Second, the organization is a non-digital-native and established at least for 30 years or more. We assume, that older enterprises have a historically grown IT, where parts of a bimodal IT mode 1 are still present. Third, the participants hold a position with in-depth insights regarding the DIU and have general knowledge about the whole organization. Therefore, we mainly contacted Chief Digital Officers (CDOs), DIU Leads or DI Managers. Table 1 gives an overview of all interviewed DIUs. We used semi-structured interviews, preferably in face-to-face meetings, for detailed discussions and a comprehensive exploration of participants' views and experiences. We asked each participant to thoroughly describe the organizational setup of the DIUs, their position and integration in the main organization and the applied workflows, processes and methods as differentiated by the DI stages discovery, development, diffusion and impact [1]. The interview sessions took 45–90 minutes, were audio-recorded and transcribed. For our analysis, the first author conducted a deductive qualitative content analysis according to Mayring [34] in the tool MAXQDA. As categories for coding, we utilized the thematic elements from the semi-structured interview guideline. Therefore, three main code areas were used for the analysis: (1) the DIU in its structure, processes, methods & resources, (2) the main organization with focus on its structures and its responsibilities in relation to DI management and (3) the overlap via bimodal IT as well as specific integration and positioning of the DIU. In total, 337 encodings emerged, which compose of 238 codes assigned to DIUs (1), 33 to the main organization (2) and 66 to the overlap (3). A segment matrix was utilized to support the analytical process. Based on the three main code areas, the codes of each interview were consolidated by their commonalities, first by DIUs objectives, their structural setup and tasks within each DI stage, and then based on their position within the main organization.

Table 1. Overview of analyzed DIUs

ID	Size[1]	Legal Entity	Main Org. Size[2]	Main Org. Industry	Interviewee Position	Reporting Level
DIU1	Large	No	Upper Large	e-commerce	DIU Lead	to advisory council
DIU2	Medium	No	Lower Large	real estate	CDO (DIU Lead)	to CEO
DIU3	Medium	Yes	Upper Large	e-commerce	DIU Lead	to advisory council
DIU4	Medium	Yes	Upper Large	banking	DI Manager	to DIU Lead
DIU5	Small	No	Large	public transport	DIU Lead	to board of directors
DIU6	Medium	Yes	Lower Large	energy	DI Manager	to CEO
DIU7	Small	No	Upper Large	healthcare	DIU Lead	to board of directors
DIU8	Medium	No	Large	parcel delivery	DIU Lead	to CDO
DIU9	Small	No	Lower Large	public transport	DI Manager	to CDO

[1]DIU size (number of full time equivalent [FTE]): Small = < 6; Medium = 6 – 15; Large > 15
[2]Size: Lower Large = < 5k FTE & revenue < 1B€; Large = 5k–20k FTE & revenue 1–5B€; Upper Large = > 20k FTE & revenue > 5B€

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4 Results

Based on our empirical data, we developed three key findings. First, we identified two different ways of how organizations set up and anchor DIUs. Second, we found two linking mechanisms between DIUs and the main organization. Third, we derived four evolution strategies of DIUs from the data.

4.1 Setting Up and Anchoring DIUs in the Main Organization

The DIUs of our dataset can be divided into two basic types, the Coaching & Screening (C&S) type and the Center of Excellence (CoE) type. The division of the two types mainly results from the different focus and modus operandi of the units, but it is also in line with the DI stages by Fichman et al. [1]. A C&S unit solely concentrates on the first stage of innovation discovery, while a CoE unit also includes development, diffusion in the main organization and impact measuring. However, the two unit types cannot be separated according to the type of DI, as all interviewees stated that their DIUs concentrate on digital product and service innovations. The intended impact should at least be radical, as incremental innovations are the responsibility of the business units or of product-oriented agile development teams in the main organization. All interviewees stated that DIUs are not averse to discover and integrate disruptive innovations. However, little attention is given to them, as these types are not simply transferable into the main organization. Except DIU8, all DIUs are referencing their main organization as unit of adoption for which a DI is perceived as new. DIU8 additionally focuses on the customers of a main organization's business unit, for which a digital product or service innovation is implemented. Almost all DIUs are located separately, but in the immediate vicinity of the main organization. Only DIU1 is located within its main organization. All DIU offices are creatively furnished, as the environment is expected to positively influence the DI activities. Surprisingly, we found no differences between DIUs, which are established as legal entities or as divisions in terms of objectives or tasks. However, a clear line of DIUs from accelerators, incubators or company builders cannot be drawn in every case (see Table 2). An 'x' refers to their main characteristics, whereas brackets show partial overlaps to other types. DIU1 and DIU3 stated that although the focus clearly matches the tasks of a CoE, some good ideas could also be implemented within a startup (company builder). This also applies to DIU6, which is currently transforming into a CoE. As DIU6 and 7 currently transform from a C&S to a CoE,

Table 2. DIU types with overlaps

		DIU1	DIU2	DIU3	DIU4	DIU5	DIU6	DIU7	DIU8	DIU9
DIU Type	C&S				x		x	(x)		x
	CoE	x	x	x		x	(x)	x	x	
Company Builder		(x)		(x)			(x)			
Incubator				(x)				(x)		
Accelerator										

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we assigned them to the type which captures their dominant character. DIU3 and DIU7 indicated that they are not averse to also supporting potential partners in the form of an incubator.

In the next two subsections, we describe the DIU types C&S and CoE in detail.

Supportive Coaching & Screening (C&S) type. As stated, C&S units mainly address innovation discovery. This implies promotion of an agile mindset in the main organization and the development of new digital skills. DIUs conduct a trend screening, which includes the analysis of concrete digital search fields and their relevance for the main organization. DIU4 and DIU9 explicitly screen for radical, innovative solutions to problems. DIU6 further identifies potential disruptive innovations, which can also be spun off as separate companies if required. This indicates that DIU6 also has some characteristics of a company builder. *"We're just working up to a [minimum viable product] now. After that, the project is no longer with us and a handover takes place. Once you've found something good [a DI], the goal is actually to make resources available. It may be usable within the main organization or perhaps also externally towards the direction of a spin-off"* (DIU6).

However, both discovery and enabling the main organization to think about new products or services in a new way are key. Thus, screening DI trends, coaching and the use of agile methods to enable the creation and processing of minimum viable products (MVPs) are essential. According to our data, C&S units have dedicated coaches who offer special training courses and programs for digital expertise, sometimes in cooperation with external partners as specialists in new methods or technologies. The teams in these units are interdisciplinary, composed of former employees of the main organization and external employees, who usually have several years of experience in a startup environment. C&S units tend to be smaller than CoE units (small to medium DIU size). In general, we identified three forms in DIU4, 6, 7 and 9:

1. In one to three day workshops, groups from the main organization are trained in agile working methods such as Design Thinking, Lean Startup, Personas, Customer Journey or Scrum. The workshops are voluntary and intended for all employees throughout the whole organization.
2. In six-week events, five to seven employees from the main organization who applied for this event are assembled in an interdisciplinary team and work on a problem using agile methods. The coaches support the teams. Problems or issues are sponsored from divisions of the main organization, selected and prioritized by employees of the C&S and assigned to an agile team. The aim is, from a training perspective, to develop a problem solution, possibly by creating a prototype, which provides a value for the sponsor of the problem.
3. Mentoring includes the support of traditional departments within the main organization to change existing structures or processes so that agile methods can be applied. This requires a fundamental openness within a department or in the teams to approach topics in a different way. The prior participation in the other formats would be advantageous.

In addition to the coaching tasks, partner management and marketing are established in all units of this type. In particular, marketing includes the promotion of

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the unit within the main organization. DIU9 conducts early acceptance tests for its six-week events by doing social media surveys and asking potential users for feedback.

Based on these insights, we are able to describe a good practice (see Figure 2). The unit is divided into three core areas. Trend Screening, Problem Scouts and Agile Coaching. Trend Screening, consisting of two to three employees, analyzes current external trends and produces a Digital Trends Catalogue available to the main organization at regular intervals. Employees use internet sources and conferences for this purpose and exchange information on trends with partners. The Problem Scouts specialize in digital focus topics and have the task to identify problems inside the main organization for which a solution can possibly be developed within a six-week full time equivalent (FTE) event using agile methods. Approximately two people, ideally former employees of the main organization, work on a digital focus topic. The problem scouts should be well connected within the organization. In addition to the independent search for problems, the problem scouts are also responsible for providing a channel on which, for example, business unit leads can invest their own problems. The potential problems are collected centrally within a problem pool and evaluated together with Trend Screening and the coaches. Agile coaches are responsible for all mentioned formats. The teams work full-time on prototypes with the focus on learning new agile methods and should be exempted from daily business tasks. In order to maintain a continuous flow of applications for these formats, marketers can optionally provide social marketing campaigns that carry the offered formats into the main organization and invite other people to participate as well.

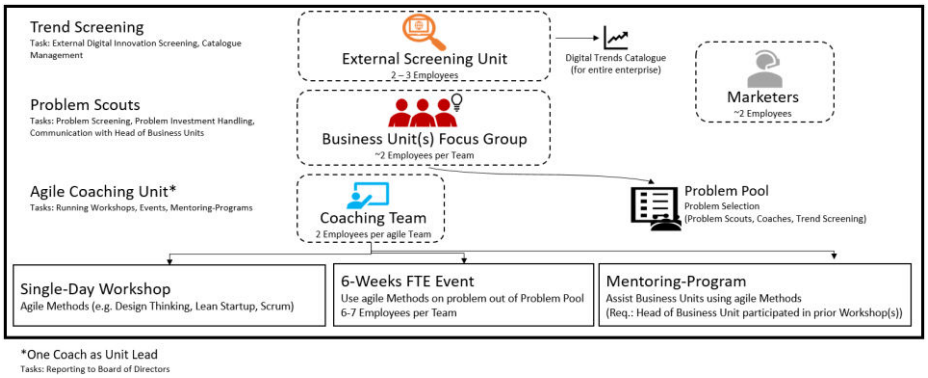

Figure 2. Coaching & screening unit setting

Center of Excellence (CoE) type. Contrary to C&S units, a CoE is responsible for the entire implementation of radical innovations, especially digital products and services, for integrating these innovations into the business units of the main organization and for measuring their impact. A CoE passes through all DI stages, with the particular focus on implementation and integration into the main organization.

All CoEs emphasized the need of autonomous budgets in order to fulfill and implement DIs within a short time period. *"So I have a budget and I don't have to get*

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permission to take individual actions. […] We don't do this with a business case approach. We believe that we spent the money anyway. My job is to make sure that we invest it in the right and best topics" (DIU8). This ensures fast decision-making processes and avoids lengthy discussions about individual investments (e.g. for an approval by the board of directors). With the exception of DIU1, all DIUs have a self-managed budget. As with the C&S, we have developed a good practice model based on the identified units (see Figure 3). CoE units are also split into three core areas and are usually slightly larger than a C&S unit. All interviewed CoE units had the explicit role of a unit lead. The CDO of the main organization takes the role or someone who reports directly to him (as seen in DIU2, 3 and 8). His or her task is to communicate with the collaborating business units, report to the board or advisory board and, if necessary, work as a product owner for one or more DIs. DIU8 has a separation between the Problem Scouts and the Agile Development Teams. Like the Unit Lead, Problem Scouts must possess strong communication skills and, as former employees of the main organization, must continue to be well connected within it. Problem Scouts have to be familiar with agile working methods and are responsible for the initial selection of identified problems that may be solved through DIs. The problem scouts are subdivided according to concrete digital focus topics, here called 'Honey Pots'. We call them 'Honey Pots' because they contain potential highly relevant innovations ('honey') which need to get extracted. The division into 'Honey Pot' topics allows scaling and represents the reason for the slightly larger size compared to a C&S. The preselected problems end up in one Problem Pool that forms the basis of the final selection. In addition to the identification and selection of problems for the digital focus area, impact measurement is also part of the problem scouts task area, as provided for in DIU2. User data is collected at fixed intervals, e.g. through surveys, which are returned to the entire CoE unit as feedback. Every 'Honey Pot' has two to three employees and one of them takes the Product Owner role. These employees must already have experience in agile settings and master the usual methods such as design thinking, lean startup or scrum.

The final selection of the topics within the Problem Pool is carried out in consultation with the Unit Lead (CDO), the CIO, and the management or advisory board. The CIO takes part to ensure that the required IT infrastructure is provided on time. The Agile Development Teams is interdisciplinary based on the different topic areas. The core team, which has expertise in the implementation of the digital focus topic, works together with employees of the business units who will use the solution in the future. The core team also has the task of identifying new potential partners and maintaining relationships with existing partners. The employees from the main

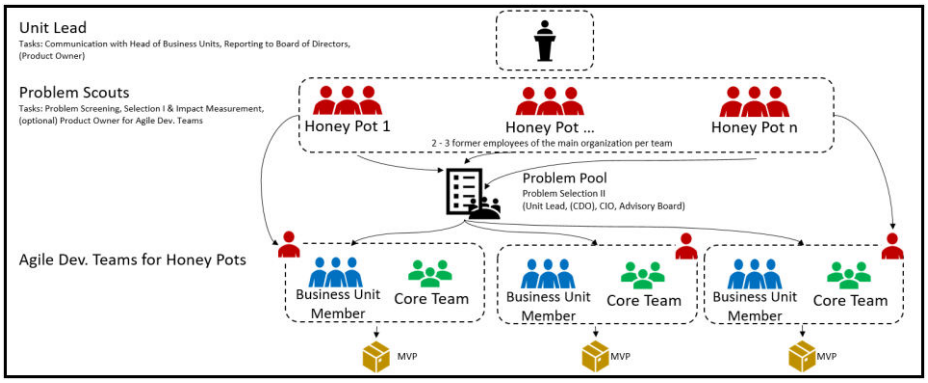

Figure 3. Center of excellence unit setting

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organization who temporarily work in the Agile Development Teams provide domain-specific input, which continuously introduce the customer perspective into the project right from the beginning (based on DIU2), and support the implementation or can work as product owners depending on their skill set. These employees also work full-time in the unit until an MVP is implemented. They also serve as positive communicators in their business unit. After developing the digital product or service, the team is dissolved.

4.2 Linking Mechanisms between DIUs and the Main Organization

We identified two basic prerequisites of DIUs. First, employee shifting enables collaboration between a DIU and the main organization. Second, as mentioned in 4.1, we found that DIUs are not responsible for operating and maintaining DIs for a longer period and therefore are interested in integrating DIs into the main organization.

Although each DIU has permanent staff, the units are very variable and cooperate closely with the main organization and external partners. In general, all interviewed DIUs compel themselves to collaborate with the main organization. In order to make this possible, employees of the main organization are temporarily sent to the DIUs either to learn (C&S) or to support (CoE) them with digital expertise. *"This team is built up of employees from the main organization. This means that they also return to their business units. They are just in the DIU for a certain time. Anyone, honestly anyone, can join. Students, managers, our CEO…"* (DIU9). This shifting requires tolerance of the managers and special employee's skills to work in this agile working environment. This way of working leads to a strong collaboration. We believe that this strong collaboration, along a self-managed budget, enables high degrees of freedom, which reduces the risk for silo mentalities or a dog-eat-dog society. The closure of DIU5 a few months after the interview shows the significance of an employee shifting mechanism. Although there was a shifting mechanism established, these employees also had to take care of day-to-day business in their actual business unit in addition to the tasks in the DIU. *"If employees are only allowed to spend 50% of their working time in the DIU, this can be very difficult […]"* (DIU5).

The need of a strong collaboration between DIU and the main organization is also realized by bringing the DI and the employees back into their business units of the main organization. DIUs are not responsible for maintaining the implemented product as the business units of the main organization are in charge maintaining and innovating these DIs. Through the joint development of DIs with members of the business units and the concomitant transfer back, potential aversions to DIs can be opposed.

4.3 DIU Evolution Strategies within a Bimodal IT Setting

We derived four evolution strategies to classify the surveyed units (see Figure 4). Considering the life cycle of DIUs, we assume that the following options are transition stages, which leads to an approved digital alignment throughout the whole organization.

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Option 1: 'Transformer'. The main organization starts with establishing a C&S unit to bring agility and new working methods into the organization. As soon as digital expertise is built up inside the main organization, the tasks of a C&S are systematically expanded. Transformation refers to an expansion of tasks, which are common in a CoE, in order to address all DI stages. The collaboration with employees of the main organization within a CoE enables all units to implement DIs on their own. As a result, a separate CoE is no longer necessary in the long run. Therefore, the tasks can be reduced to a regular C&S unit again. C&S unit DIU4 and 6 both note that they are transforming into a CoE unit. They are already handling the development of MVPs, but they still do not perform change management or the integration of MVPs into the main organization at the time the interviews were conducted.

Option 2: 'Pure C&S'. Option 2 focuses on establishing digital awareness and an agile mindset in the whole organization. By means of the programs and events offered in a C&S, the DIs shall be fostered interdisciplinary without a CoE. The main organization of DIU9 pursues a cross-sectional strategy. DIU9 is not to be transformed into a CoE, in which the digitization is dealt with centrally. Its main organization wants digitization to be disseminated and embedded: *"It's not about building a lab with high potentials or any experts for agile work [like a CoE unit], but [we] want [...] this to be spread within the company"*. DIU9 tries to coach all employees with the aim to manifest digital expertise and especially agile methods holistically.

Option 3: 'Big Bang'. Big Bang refers to establishing a DIU as CoE without having a C&S beforehand. All other interviewed DIUs can be classified in our option 3, without a C&S set initially. Big Bang is mostly chosen or led by a CDO with the goal for radical changes in the main organization within a very short time period.

Option 4: 'Concurrent'. Although this derived option is more expensive than the others, operating a C&S and CoE in parallel with a run-up time for C&S units is key to continuously strengthen the digital expertise and agile working capability. This option fits in particular, if the main organization has a traditional IT and is still in its infancies in terms of agile methods and digitalization. Like option 1 or 2, a C&S unit starts establishing digital awareness throughout the main organization. The cooperation of C&S and CoE enables employee shifting and integrating new digital products or services in the business units of the main organization. Similar to option 1, a separate CoE is no longer necessary in the long run. Therefore, the termination represents the reduction of tasks included in discovery stage (without development, diffusion and impact).

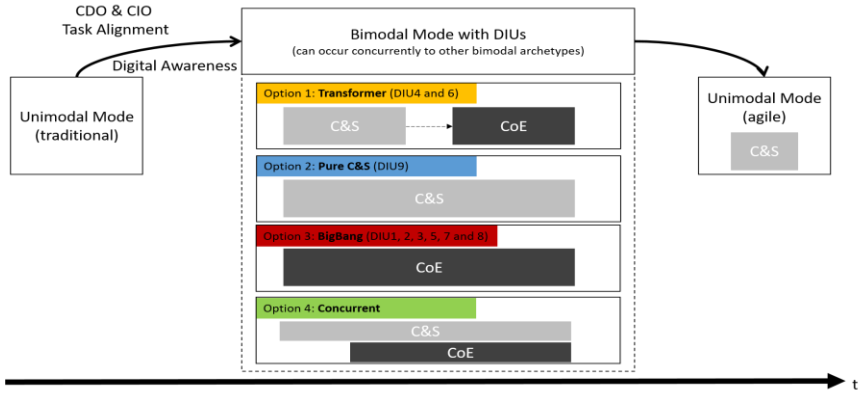

Figure 4. DIU evolution strategies

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The succeeding unimodal agile mode can, however, still be organizationally separated. Therefore, C&S units may always be set up in order to identify digital trends at an early stage and not to have a competitive disadvantage over competitors.

Depending on the actual situation and the agile maturity of the main organization, different implementation options can be employed. As mentioned above, other archetypes of bimodal IT modes can be established in the organization in addition to our focused agile mode with DIUs. We derived implementation options, which depend on the mode of the main organization, whether it is more traditional or agile-oriented. These recommendations are illustrated in Figure 5. For a very traditionally oriented main organization, a pure C&S (option 2) tends to be a good option to start maturing into an agile mode. Supporting already established smaller agile structures, e.g. on an agile project basis, a transformer strategy (option 1) is suitable, as it first rises the agile mode and then transforms into an executing CoE. Big Bang (option 3) can be applied, if the main organization has reached a high level of agile maturity and no agile trainings are needed. The concurrent option 4 is a secure and robust option, suitable for both, traditionally or agile mature main organizations as it combines the advantages of both types.

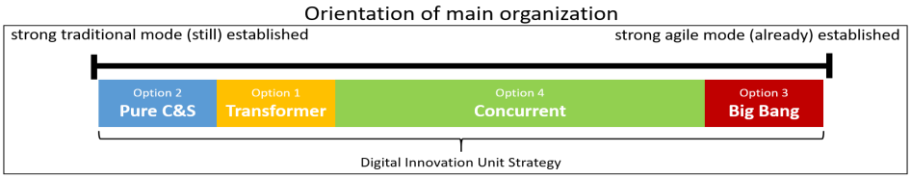

Figure 5. DIU implementation options

5 Discussion and Conclusion

As one of the first studies on the nascent phenomenon of DIUs for realizing DIs, we provide an integrated view on their organizational setup, linking mechanisms to the main organization and evolution strategies. We identified two types of DIUs: Coaching & Screening (C&S) units and Center of Excellence (CoE) units. While the C&S unit is responsible for DI discovery, the CoE type focuses on DI implementation and integration. Both DIU types have strong partnerships with external partners and work across enterprise boundaries, which does not necessarily apply to non-digital innovation labs or traditional R&D units [31]. DIUs focus on screening emergent digital trends on the market, which may be integrated into the main organization.

Our identified types and the suggestive good practice models fit Fuchs et al.'s [17] taxonomy of digital units, but we enrich their general categories by e.g. concretizing the dimension of the DIs and by describing workflows for the DIU types.

We further extend the knowledge on how to innovate in a bimodal IT setup [8, 10, 27] with our findings by differentiating the agile IT setup [28, 29] for DIs and their dimensions by substantiating DIUs as one implementation of an organizationally separated agile division focusing on DIs. Other agile units or digital divisions may also focus on DIs in general (as described by Haffke et al. [8]), but their goals may be different to the goals of a DIU. Other digital divisions may have a focus on other

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dimensions of DIs, e.g. incremental product and process innovations. DIUs are specific as we identified that they concentrate on (at least) radical product and service innovations (and not incremental or process innovations). This implies that DIUs may coexist with other digital divisions or agile IT units, which focus on other DI dimensions. With the resulting different types of DIUs and their alternative evolution stages, we introduce a dynamic view of bimodal IT explicitly for its specific type with separated divisions [8, 27]. This is in line with Dixon et al.'s [11] notion of (IT-)ambidexterity being in a constant flux, as the contexts for DIs are ever-changing. In line with literature, we assumed that the options for positioning DIUs are transitional stages [8, 29], which may result in an *"[…] unimodal design after it has adopted the learnings from the governance principles, working methods, and cultural aspects developed in Mode 2 throughout the IT function"* [8]. Depending on the current situation of the main organization, our options can assist explorative endeavors and consequently help enterprises to promote DIs. As Horlach et al. [10] point out, *"[…] bimodal IT is being criticized as a temporary and intermediate state […]"*, we take a more optimistic view on this and see bimodal IT structures as a necessary step for organizations in order to enable digital expertise and to digitally align the current processes for assisting enterprises to become ambidextrous.

Our identified linking mechanisms are further in line with Hund et al.'s [18] findings on how knowledge enters a DIU and how it is exchanged between units. In accordance with their insight that people rotation acts as one crucial step to ensure that new knowledge enters a DIU [18], we see this way of working as essential for ensuring close collaboration between DIUs and the main organization. It does not necessarily apply only to DIUs, as (non-digital) innovation labs may have similar working methods established [30]. Yet, this way of working is crucial for DIUs, as it resolves possible challenges like silo mentalities or 'digital aversions'.

The results of this paper are not without limitations. First, as they are solely grounded on empirical data based on nine organizations, the results are limited in terms of generalizability. We tried to solve this challenge by interviewing very knowledgeable experts in this field, as they both know their individual unit very well and are usually well-connected with units in other organizations. However, as we just interviewed leading positions within DIUs, the results might be biased because these people have a strong incentive to let their DIU 'shine'. Therefore, we recommend to extent our results with further cross-industry and in-depth case studies including additional interviews with people in non-leading positions and with people from the main organization. While we focused on DIUs in the first step, further insights on how the main organization acts in relation to DIs are necessary to understand DIs within the organization in its whole. Thus, our next phase will include an in-depth analysis of the link between DIUs and the main organization in order to identify design principles for facilitating the whole lifecycle of DIs. Furthermore, we will analyze overlaps between different forms of digital labs like company builders, incubators, accelerators and in-house consulting within one company to gain a deeper understanding on their interplay.

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References

1. Fichman, R.G., Santos, B.L.D., Zheng, Z.: Digital Innovation as a Fundamental and Powerful Concept in the Information Systems Curriculum. MIS Quarterly 38, 329–343 (2014)
2. Yoo, Y., Henfridsson, O., Lyytinen, K.: The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research. Information Systems Research 21, 724–735 (2010)
3. Shapiro, C., Varian, H.R.: Information Rules. A Strategic Guide to the Network Economy. Harvard Business School Press, Boston (1999)
4. Holotiuk, F., Beimborn, D.: Organizational Ambidexterity for Digital Innovation: The Approach of Digital Innovation Labs. Academy of Management Global Proceedings (2018)
5. Nambisan, S., Lyytinen, K., Majchrzak, A., Song, M.: Digital Innovation Management: Reinventing Innovation Management Research in a Digital World. MIS Quarterly 41, 223–238 (2017)
6. Dixon, J.: Seizing the Future: Enabling Digital Business Innovation through Digital Awareness. Administrative Sciences Association of Canada (2017)
7. Lee, O.-K., Sambamurthy, V., Lim, K.H., Wei, K.K.: How Does IT Ambidexterity Impact Organizational Agility? Information Systems Research 26, 398–417 (2015)
8. Haffke, I., Kalgovas, B., Benlian, A.: The Transformative Role of Bimodal IT in an Era of Digital Business. Hawaii International Conference on System Sciences, 5460–5469 (2017)
9. Gartner: IT Glossary: Bimodal IT, https://www.gartner.com/it-glossary/bimodal/
10. Horlach, B., Drews, P., Schirmer, I.: Bimodal IT: Business-IT Alignment in the Age of Digital Transformation. Multikonferenz Wirtschaftsinformatik, 1417–1428 (2016)
11. Dixon, J., Brohman, K., Chan, Y.: Dynamic Ambidexterity: Exploiting Exploration for Business Success in the Digital Age. International Conference on Information Systems (2017)
12. Vial, G.: Understanding Digital Transformation: A Review and a Research Agenda. The Journal of Strategic Information Systems 28, 118–144 (2019)
13. Urbach, N.: Bimodale IT, http://www.enzyklopaedie-der-wirtschaftsinformatik.de /lexikon/is-management/Software-Projektmanagement/bimodale-it
14. Svahn, F., Mathiassen, L., Lindgren, R.: Embracing Digital Innovation in Incumbent Firms: How Volvo Cars Managed Competing Concerns. MIS Quarterly 41, 239–253 (2017)
15. Velten, C., Michel, J., Özdem, A.: Digital Labs – How to Build, How to Run. crisp research, Kassel (2016)
16. etventure: Was ist ein Digital Lab? Einblicke in das Thema Digital Lab - und wie Unternehmen einen kreativen Raum für neue digitale Geschäftsideen schaffen können, https://www.etventure.de/digital-lab/
17. Fuchs, C., Barthel, P., Herberg, I., Berger, M., Hess, T.: Characterizing Approaches to Digital Transformation: Development of a Taxonomy of Digital Units. International Conference on Wirtschaftsinformatik, 632–645 (2019)
18. Hund, A., Holotiuk, F., Wagner, H.-T., Beimborn, D.: Knowledge Management in the Digital Era: How Digital Innovation Labs Facilitate Knowledge Recombination. European Conference on Information Systems (2019)
19. Christensen, C.M.: The Innovator's Dilemma. When New Technologies Cause Great Firms to Fail. Harvard Business School, Boston (1997)

https://doi.org/10.30844/wi_2020_h5-raabe

20. Dahlin, K.B., Behrens, D.M.: When is an Invention really Radical?: Defining and Measuring Technological Radicalness. Research Policy 34, 717–737 (2005)
21. Binetti, D.: The Three Innovation Types, https://blog.innovation-options.com/the-three-innovation-types-9eb5ec92ab72
22. Rogers, E.M.: Diffusion of Innovations. Free Press, New York (2010)
23. Yoo, Y., Boland, R.J., Lyytinen, K., Majchrzak, A.: Organizing for Innovation in the Digitized World. Organization Science 23, 1398–1408 (2012)
24. Hauschildt, J., Salomo, S.: Innovationsmanagement. Vahlen, München (2007)
25. Cooper, R.G.: Stage-Gate Systems: A New Tool for Managing New Products. Business Horizons 33, 44–54 (1990)
26. Gartner: Taming the Digital Dragon: The 2014 CIO Agenda. Insights From the 2014 Gartner CIO Agenda Report, https://www.gartner.com/imagesrv/cio/pdf/cio_agenda_insights2014.pdf
27. Horlach, B., Drews, P., Schirmer, I., Böhmann, T.: Increasing the Agility of IT Delivery: Five Types of Bimodal IT Organization. Hawaii International Conference on System Sciences, 5420–5429 (2017)
28. Jöhnk, J., Röglinger, M., Thimmel, M., Urbach, N.: How to Implement Agile IT Setups: A Taxonomy of Design Options. European Conference on Information Systems, 1521–1535 (2017)
29. Gerster, J., Dremel, C., Brenner, W., Kelker, P.: How Enterprises Adopt Agile Structures: A Multiple-Case Study. Hawaii International Conference on System Sciences, 4957–4966 (2019)
30. Turrin, R.: Innovation Lab Excellence. Digital Transformation From Within. Authority Publishing, Gold River (2019)
31. Chiesa, V.: Global R&D Project Management and Organization: a Taxonomy. Journal of Product Innovation Management 17, 341–359 (2000)
32. Sindemann, T., Buttlar, H.v.: Konzerne auf den Spuren von Startups 2018. Infront Consulting & Management, Hamburg (2018)
33. Edmondson, A.C., McManus, S.E.: Methodological Fit in Management Field Research. Academy of Management Review 32, 1155–1179 (2007)
34. Mayring, P.: Qualitative Inhaltsanalyse. Grundlagen und Techniken. Beltz, Weinheim (2015)

https://doi.org/10.30844/wi_2020_h5-raabe