ICIS 2022 Proceedings

Digital Innovation, Entrepreneurship, and New Business Models

Dec 12th, 12:00 AM

Evolution of Digital Innovation Units for Digital Transformation – The Convergence of Motors of Change

Annalena Lorson
Hasso Plattner Institute, annalena.lorson@hpi.de

Christian Dremel
Department of Computer Science, christian.dremel@ntnu.no

Falk Uebernickel
Hasso Plattner Institute, falk.uebernickel@unisg.ch

Follow this and additional works at: https://aisel.aisnet.org/icis2022

Recommended Citation

Evolution of Digital Innovation Units for Digital Transformation – The Convergence of Motors of Change

Completed Research Paper

Annalena Lorson
Hasso Plattner Institute,
University of Potsdam, Germany
annalena.lorson@hpi.de

Christian Dremel
Norwegian University of Science and
Technology, Norway
christian.dremel@ntnu.no

Falk Uebernickel
Hasso Plattner Institute,
University of Potsdam, Germany
falk.uebernickel@hpi.de

Abstract

To face the challenge of digital transformation as well as to implement digital innovation many incumbent companies have set up digital innovation units (DIUs). Despite a steadily growing body of knowledge, there is a rather static picture of DIUs in the literature to date, and we have little knowledge of how these units evolve over time to continuously contribute to digital transformation and innovation. To lay the foundation for an understanding of DIUs as dynamically evolving entities, we conduct a multiple-case study with DIUs of five manufacturing companies and identify DIU evolution as a process driven by an interplay of life-cycle and dialectic motor of change. In the course of this, we also outline specific triggers, sequences, and the nature of change. We generalize our findings with a conceptual process model of DIU evolution and three propositions on their current and future development to inform the existing and forthcoming literature.

Keywords: Digital transformation, digital innovation units, organizational change

Introduction

Those who do not adapt will disappear. This is true for both incumbent companies that have to cope with the continual change brought about by emerging digital technologies (Hinsen et al., 2019) and for the initiatives they implement for this purpose. The underlying phenomenon, digital transformation, is a complex topic that affects many or all areas of a company (Hess et al. 2016) and is "perhaps *the* technology-related phenomenon of our times" (Wessel et al. 2020, p.2). In recent years, a large body of academic literature and practitioner conversations have addressed this topic, which (re)defines a company's value proposition and creates a new organizational identity (Hanelt et al. 2020; Wessel et al. 2020). In particular, pre-digital organizations that belong to traditional industries - e.g. retail, manufacturing, automotive, or financial services - and were financially successful in the pre-digital economy (Chanias et al. 2019) face the challenge of quickly and continuously integrating digital technologies into products, processes, and business models in order to successfully develop and implement digital innovations (Fichman et al. 2014). To this end, they often need to change their entire business model, processes, and organizational structure, and are increasingly deploying digital innovation units (DIUs) to do so (Barthel et al. 2020; Bharadwaj et al. 2013; Holotiuk and Beimborn 2019; Raabe et al. 2020a; Sebastian et al. 2017; Tumbas et al. 2017). Some

examples for incumbents' DIUs are VW Digital Lab, Audi Business Innovation GmbH (Dremel et al. 2017), Deutsche Bank Labs, or Digital X Lab of the Toyota Tsusho Group.

DIUs are characterizes by a new form of organizational design that is particularly well suited to managing the trade-off between exploration - handled by the DIU - and exploitation, i.e., initiating and enabling ambidexterity (Fuchs et al. 2019; Göbeler et al. 2020; Holotiuk and Beimborn 2019), making them an important initiative for the digital transformation of pre-digital companies (Fuchs et al. 2019; Jöhnk et al. 2020). Due to their reduced socio-technical organizational complexity, DIUs can take advantage of dedicated, smaller structures (faster adaptation) within the remaining organization and are able to scale the development of digital innovations (Arvidsson and Mønsted 2018; Fuchs et al. 2019; Holotiuk and Beimborn 2019; Matt et al. 2015; Yoo et al. 2010). They are recognized for their high degrees of freedom, interdisciplinary teams, a fully exploratory and agile way of working, as well as participation in all levels of a company's digital innovation management (Fuchs et al. 2019; Holotiuk and Beimborn 2019; Raabe et al. 2020b). As mentioned in the beginning, not only the main organization must come to terms with the new reality of the digital age, but also the DIU should continuously adapt to its internal and external business environment. Since a number of cases are already known in which this adaptation has apparently not succeeded - the DIU has been dissolved or sold (Fecher et al. 2020; Tödtmann 2020) - it is important to better understand how DIUs (continue to) evolve over time to meet the needs of the main organization and make a sustainable value contribution to its digital transformation. So far, DIU literature is primarily concerned with considerations of a DIU's status quo, as if it was a static entity, with only sporadic initial attempts to gain a clearer picture of its evolution process (see e.g., Barthel et al. 2020; Holotiuk and Beimborn 2019; Raabe et al. 2020a). Barthel et al. (2020) and Raabe et al. (2020a) therefore propose to investigate how DIUs evolve within an incumbent company to arrive at a more dynamic picture of these units. We take this as an opportunity to shed light on the topic and aim to contribute to a deeper understanding of DIU evolution, its triggers and characteristics in information systems research. To this end, we adopt an organizational change perspective and attempt to answer the following research question:

How do DIUs evolve over time to meet the needs and expectations of the main organization and contribute to or drive its digital transformation?

To answer our research question, we perform an explanatory, interpretive, multiple cross-case synthesis with five DIUs in the manufacturing industry and identify triggers, processes, and characteristics of DIU evolution. Our focus is primarily on the first development step that a DIU goes through, as this is where we expect the greatest changes and deviations from the initiating setup. Based on our empirical findings we try to extend the extant body of knowledge in three ways. First, we show that the evolution of a DIU is determined by an interplay of life-cycle and dialectic motor of organizational change. Second, we develop a conceptual process model to illustrate current as well as potential future evolution. Third, we formulate three propositions with regard to DIU evolution that can be validated in the course of future research.

Theoretical Background

Digital Transformation and Digital Innovation Units

Incumbent companies strive to "become digital" by creating value in the form of digital product, service, process, and business model innovations as well as by digitalizing their internal processes to remain successful in today's rapidly changing business environment (Fichman et al. 2014; Hess et al. 2016; Nambisan et al. 2017). This phenomenon, wildly described as digital transformation, is much considered and discussed in both research and practice as the diverse and extensive academic literature and a multitude of practitioner conversations show (Hanelt et al. 2020). Digital transformation is a complex topic that affects many or all areas of a company and deals with the "changes digital technologies can bring about in a company's business model, which result in changed products or organizational structures or in the automation of processes" (Hess et al. 2016, p. 124). To make this comprehensive phenomenon and its implications more tangible, Vial (2019, p. 121) developed a conceptual definition of digital transformation as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies". DIUs can be seen as a part of the "structural changes" building block of the digital transformation process that concerns changes in the value creation paths of a company enabled by the use of digital technologies (Vial 2019). This classification is in line with the designations of other researchers, who, for example, refer to DIUs as one of

the various initiatives of digital transformation (Jöhnk et al. 2020), or as part of a firm's digital transformation strategy (Wiesböck and Hess 2019). In this context, DIUs have already been identified as a promising, new form of organizational design that initiates and enables organizational ambidexterity - managing the trade-off between exploration and exploitation - and thus form the necessary breeding ground for the emergence of digital innovations (Holotiuk and Beimborn 2019; Göbeler et al. 2020). We define DIUs as "organizational units with the overall goal to foster organizational digital transformation by performing digital innovation activities for existing and novel business areas" following Barthel et al. (2020, p. 2). They have a structured organizational embedding - sometimes in form of a department within the main organization, sometimes a separate legal entity - secured financial resources and carry out innovation projects alone or together with the main organization (Fuchs et al. 2019). Acting autonomously within a predefined framework, DIUs introduce digital solutions, foster an innovation-friendly culture and strengthen digital competence in an incumbent company (Fuchs et al. 2019). In addition, they build and leverage digital, customer-centric expertise and agile methods as well as maintain digital innovation ecosystems (Raabe et al. 2021). Consequently, a DIU represents an important option for managing digital transformation, especially for pre-digital companies (Fuchs et al. 2019), those belonging to traditional industries such as retail, manufacturing, automotive, or financial services (Chanias et al. 2019). The digital economy poses an existential threat to representatives of these industries, as they often have to adapt their entire business model, processes and organizational structure to implement digital technologies (Bharadwaj et al. 2013; Chanias et al. 2019; Sebastian et al. 2017).

Research on DIUs and their role in the digital transformation of non-digital natives has been steadily increasing over the last four years, as evidenced by the growing number of publications, especially in the field of information systems research (Barthel et al. 2020; Holotiuk and Beimborn 2019; Raabe et al. 2020b). They are considered from a wide variety of theoretical perspectives, for instance, with respect to their role in a bimodal IT structure (Raabe et al. 2020a), in the context of (IT-) ambidexterity (Holotiuk and Beimborn 2019; Jöhnk et al. 2020), or from a dynamic capabilities perspective (Göbeler et al. 2020). Overall, previous research has presented a rather static picture of DIUs, mainly analyzing their status quo. However, this can only explain the current role of a DIU within the main organization, not possible evolution and its reasons. There are initial attempts to better understand these processes by Raabe et al. (2020a), for example, who describe DIU setup strategies and evolution within a bi-modal IT context along two DIU types. The authors thereby adopt a rather life-cycle oriented perspective of a natural evolution of the DIU with an expansion of its goals and tasks over time. Since these findings are only part of the results of their study, it remains unclear how such an evolution process takes place in detail and what other triggers - besides natural further development - there may be. Another study in the field of DIU research specifically mentions DIU evolution, as an interesting topic for future investigation (Barthel et al. 2020) in order to better understand how DIUs can make a positive value contribution to the main organization's digital transformation in the long-term. We take this as an opportunity for a specific consideration of the unfolding of a DIU's evolution process from an organizational change perspective, concentrating primarily on the first stage of development, which occurs after the DIU is established, since we assume that the greatest changes take place in this time frame. Our focus is on manufacturing companies as representatives of an incumbent industry that are permanently challenged between maintaining the traditional business - building large, physical machines and plants - and meeting the demands of the digital age in parallel (Hylving and Selander 2012). For these companies, it is particularly relevant that the DIU not only makes a temporary contribution to digital transformation but can also adapt to the needs and expectations of the main organization in order to be able to make a long-term value contribution.

Organizational Change

The pervasive nature of digital technologies and its sociomaterial impact on organizations (Leonardi and Barley 2008), their organizing practices and organizational forms in the context of digital transformation and innovation (Zammuto et al. 2007), bring into focus organizational change in the context of information systems, which per se has a long-standing tradition in IS research (Keen 1981; Leavitt 1965; Robey et al. 2013). In this light, several authors call for research on new forms of organization design and their practices (Hanelt et al. 2020; Yoo et al. 2012; Zammuto et al. 2007). We follow this call and adopt a process narrative to understand how a DIU as a real organizational entity changes overtime (Van de Ven and Poole 2005).

In this endeavor, we draw on the concepts of Van De Ven and Poole (1995) who define four ideal type theories of organizational change: (1) evolution, (2) teleological, (3) life-cycle, and (4) dialectic theory.

These theories differ, for instance, in their organizational level and their conceptual motors which drive peculiar sequences of change events (Van De Ven and Poole 1995): First, the evolutionary model, "consists of a repetitive sequence of variation, selection, and retention events among entities in a designated population" (Van De Ven and Poole 1995, p. 521). This evolutionary cycle is triggered by competition among entities within the population for scarce environmental resources. Second, a teleological model views organizational change as a cycle of goal formulation, implementation, evaluation, and change of goals based on what the unit has learned. This sequence results from the goal-directed social construction between individuals within the single entity. Third, in a life-cycle model, the change process of a single entity is represented by a necessary sequence of phases. In this case, an institutional, natural or logical program prescribes the specific contents of these phases. Fourth, the dialectical model of change describes change processes as conflicts between two or more entities representing opposing theses and antitheses. When they clash, they produce a synthesis that over time becomes the thesis for the next cycle of a dialectical progression. Overall, these four motors of change are distinct with regards to the unit of change - single or multiple entities - and the mode of change - prescribed or constructive. As such, their suitability changes depending on the phenomenon of interest - in our case the peculiarities of DIU evolution. Within our iterative data collection and analysis, it became apparent that we see evidence for both the life-cycle and dialectic theory across our multiple cases. Due to their high relevance as theoretical lenses through which we make sense of our empiric observation, we explain these two motors in more detail.

Life-cycle theory incorporates a prescriptive mode of change of a single entity and assumes this change as immanent. That is, underlying the evolving entity is a form, logic, program, or code that guides the process of change and moves the entity from a particular starting point to a subsequent end that is predetermined in the present state. Within the context of organizational entities, the development is often explained in the form of institutional rules or programs that prescribe a specific sequence of development activities. Life-cycle theory refers to a single entity - a team, a department, an organization - whose environment and other entities may influence the way this immanence manifests itself, but the actual impetus for development always comes from within. In the course of its evolution process, the entity passes through stages or phases that differ in form or function, but always maintains its identity. Each stage of evolution is considered a necessary precursor to subsequent stages. The typical sequence of change events in a life-cycle model is a unified sequence that follows a single sequence of stages or phases, with characteristics acquired in earlier stages being retained in later stages. The stages are interrelated in such a way that they trace back to a common underlying process. Figure 1 illustrates such an ideal typical sequence. Dialectic process theory is the complete opposite of life-cycle theory as it operates on multiple entities and incorporates a constructive mode of change. The underlying assumption is that an "organizational entity exists in a pluralistic world of colliding events, forces, or contradictory values that compete with each other for domination and control" (Van De Ven and Poole 1995, p. 517). These contradictions can occur both internally - multiple competing goals or stakeholders vie for priority - and externally - the organization pursues directions that conflict with those of other organizations. In each case, a dialectical theory presupposes that two or more distinct entities - the thesis and the antithesis - collide and come into conflict from which a synthesis eventually emerges. Over time, this synthesis can become the thesis for the next cycle of a dialectical process. As a dialectical model incorporates a constructive mode of change, the temporal sequence in which thesis and antithesis confront and engage in a conflict is highly uncertain. Regarding organizational change, maintaining the status quo represents stability, while replacing it with the antithesis or synthesis represents change - be it for the better or worse. Figure 1 shows a change process according to dialectic theory.
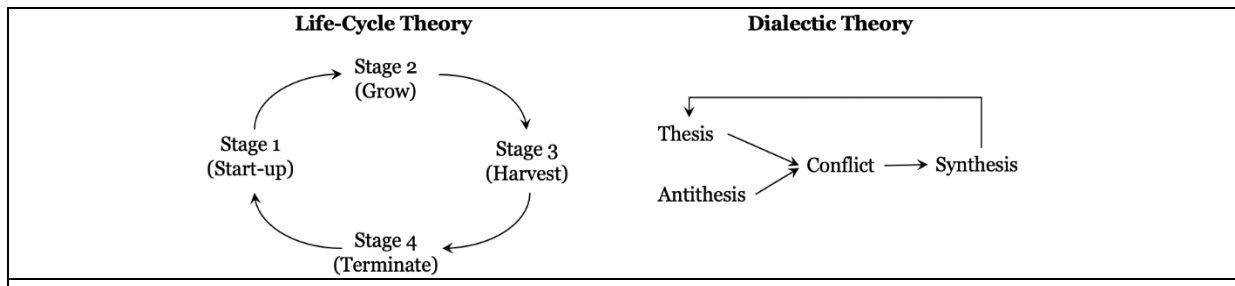

Figure 1. Life-cycle and dialectic change theory following Van De Ven and Poole (1995)

Methodology

Research Design and Data Collection

For our research design, we decided on an explanatory, interpretive case study that is particularly suitable for investigating a contemporary phenomenon within its real-world context (Yin 2018). Between January and July 2021, we conducted a total number of 27 interviews with five DIUs of German and Swiss companies to gain deeper insight into the evolution of DIUs from an organizational change perspective. We opted for a multiple cross-case synthesis because we intend to explain both within-case patterns, i.e., specific characteristics of DIUs along different dimensions, and to determine whether there are replicative relationships among the five cases in terms of DIU evolution processes (Yin 2018). Our focus was on manufacturing companies as representatives of an incumbent industry whose robust timeframes of up to 10 years for product development and production (Dremel and Herterich 2016) differ considerably from the fast-moving, agile environment of a DIU. They, therefore, provide an interesting research subject to study how DIUs change over time to help the main organization manage the balancing act between traditional business - building large machinery and equipment - and the demands of the digital age (Hylving and Selander, 2012). Using a theoretical replication logic, we searched for manufacturing companies - machine and plant engineers as well as manufacturers for systems for raw material extraction - that implemented a DIU as part of their organizational digital transformation and to drive their digital innovation efforts (Yin 2018). All five companies have a business-to-business focus, are older than 70 years, and have more than 10,000 employees today.

The DIUs themselves were two or three years old at the time of data collection, and their operations went beyond conceptualization (Yin 2018). All five (now) have a core business-related mandate and focus on innovation "around the machine", i.e., digital products and services that complement and enlarge the existing business - such as predictive maintenance solutions or digital platforms that cover the entire customer journey - and are to build a digital innovation ecosystem consisting of diverse internal and external partners. In addition, at the time of data collection, each DIU had gone through the first step of its evolution process that resulted in substantial changes in at least three of the five characteristics considered, which are explained in more detail in the results section. To obtain a realistic picture of the respective DIU, we interviewed people with various roles and hierarchical levels within the DIU as well as at least one representative from the main company for each case. The data collection took place after the evolution process was completed in order to examine it holistically, as well as to compare the previous DIU setup with the current one and identify key differences. The interviews took place via video call, lasted an average of 57 minutes, and were tape-recorded and transcribed. Since we chose to use a qualitative and interpretive research approach, following Gioia et al. (2013), we worked with a semi-structured interview guide to obtain both retrospective and real-time accounts from individuals experiencing the phenomenon of DIU evolution from an organizational change perspective. The interview guide contained both more general questions about the DIU's evolution process and more specific questions about triggers and changes. The interviews were collected, stored, and analyzed using ATLAS.ti a qualitative data analysis tool. In addition, we used publicly available information (company website, press releases) and internal documents (e.g., management reports, and presentations) provided to us during the interviews for the data triangulation.

ID	Founding Year	Legal Entity	DIU Size, Main Org. Size	# of interviews	Interviewee Positions
Case A	2018	Yes	17 > 20,000	4	Managing Director DIU, Senior Consultant Strategic Design, Principal Consultant, Vice President Digital of one division (main org.)
Case B	2018	Yes	40 > 20,000	6	Director Digital Transformation, Interim Head of Digital Customer Interaction, Head of Technology & Architecture, Product Manager, Product Portfolio Manager, Head of Digital Excellence of one division (main org.)

Case C	2018	No	60 > 11,000	6	COO and Head of Digital Innovation & Data Science, Team Lead Data Science, Product Owner, Innovation Manager, Head of Digital Platforms (DIU) & Head of Application Development (main org.), Managing Director DIU & Global Head of Sales & Marketing (main org.)
Case D	2018	Yes	130 ≈ 35,000	6	CEO & Managing Director DIU, Head of Innovation, Product Design and Strategic Innovation, Senior Venture Architect, Digital Project Lead, Digital Ideation and Innovation Manager (main org.)
Case E	2019	No	25 > 10,000	5	Global Head of DIU, Head of Operations, Senior Program Manager Digital Sales, Program Manager Operations, COO (main org.)
Table 1. Case Overview					

Data Analysis

We started the data analysis by creating first-order codes from the transcripts while trying to "adhere faithfully to informant terms" as suggested by Gioia et al. (2013, p. 20). From this first coding step which resembled an open coding step (Gioia et al. 2013; Strauss and Corbin 1998) 642 first-order codes emerged. Based on our comprehensive compendium of first-order codes we distilled our second-order codes (295 in total) according to Gioia et al.'s (2013) approach. Our organizational change lens guided us in this step, allowing us to specify theoretical dimensions. The initial first- and second-order coding was hereby undertaken by the first author followed by a discussion and validation within the authoring team. The same procedure was applied to the creation of the aggregated dimensions for the analysis of triggers that initiated the DIU evolution leading to the resulting data structure. We derived three main categorizations of codes from our research framework. First, we focused on the characteristics *goal, mandate, governance, team, processes*, and *technology* of the original DIU setup and the post-development setup. Second, we intended to identify active and passive, internal and external triggers that initiated to the evolution process. Third, the evolution process itself was coded to understand which individual steps were necessary. Based on our data structure and with a "focus on our ultimate goal of building a vibrant inductive model that is grounded in the data" (Gioia et al. 2013, p. 22) we incorporated our background knowledge of theories related to digital transformation, DIU and organizational change - with particular influence from the ideal typical motors of change defined by Van De Ven and Poole (1995) - and derived a conceptual process model that explains a DIUs evolution. With regards to the characteristics and the evolution process, we decided to use the second-order codes as a basis for our results because we wanted to present these aspects in sufficient detail on a case-by-case basis. For the evolution triggers, we developed ten aggregated dimensions based on the second-order codes, as we sought a comparison across all five cases in order to identify repeating patterns. Each of the aggregate dimensions is grounded in the statements from at least three different DIUs to ensure that they provide the necessary foundation for the findings that build upon them. Figure 2 provides an example of the data encoding for the evolution triggers.

Figure 2. Coding Example
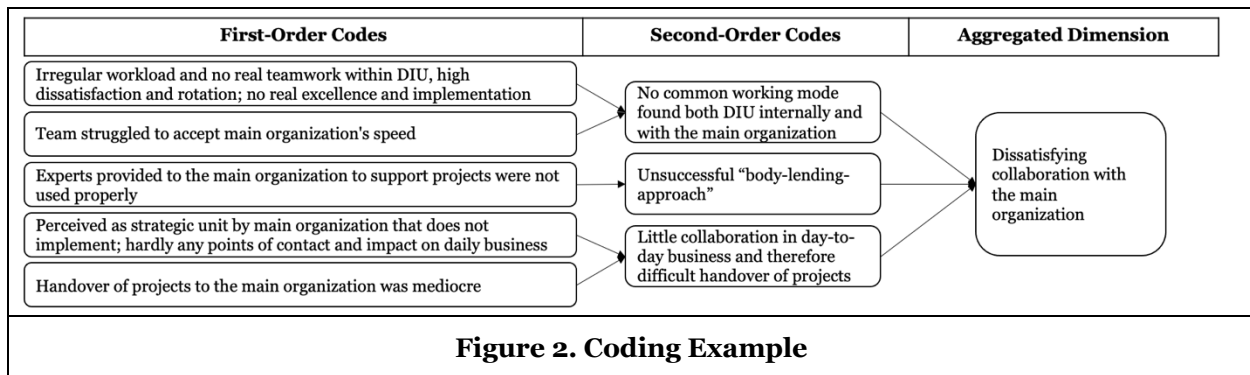
Results

Our goal for this study was to identify how DIUs evolve over time - with a specific focus on the first evolution step they undergo - to contribute to or drive the main organization's digital transformation. To this end, we have looked primarily at the organizational motors of change according to Van De Ven and Poole (1995) and have concluded that the evolution of a DIU is driven by an interplay of a life-cycle and a dialectical motor of change. Figure 3 illustrates the conceptual synthesis of our empirical data. We are able to observe that the implementation of a DIU is planned along certain phases - mostly three to four - which are usually accompanied by an expansion of the DIU's objectives, mandate, and team. Thus, the evolution of a DIU can be partially explained with a life-cycle motor of change as the underlying driver. In the graphic we, therefore, depict four phases - start-up, grow, harvest, and terminate - that correspond to the ideal-typical sequence according to Van De Ven and Poole (1995). The width of the phases has only been chosen for the sake of clarity, but do not imply how long or short the respective phase is. The last phase - terminate - is of a lighter shade because none of the five cases plans - at least in the middle term - with any kind of dissolution of the DIU. Besides a life-cycle motor of change we also identified the influence of a dialectic motor of change on DIU evolution. In all five cases, the DIU had completed the start-up phase and was at some point in the growth phase when the DIU was challenged by external factors from the main organization or the company's external environment. The growth phase hereby includes, for instance, the familiarization of the team, the processes, and the work routines. The resulting conflict finally led to a certain, new DIU setup - be it in terms of goals, tasks, organizational embedding, etc. - which is shown in Figure 3 as the synthesis. For better comprehensibility, we will refer to the initial DIU setup - the thesis - as DIU 1.0 and the setup after the evolution process - the synthesis - as DIU 2.0. The dashed arrow behind the synthesis indicates the further evolution of the DIU along the life-cycle stages, which is no longer covered by our data collection.
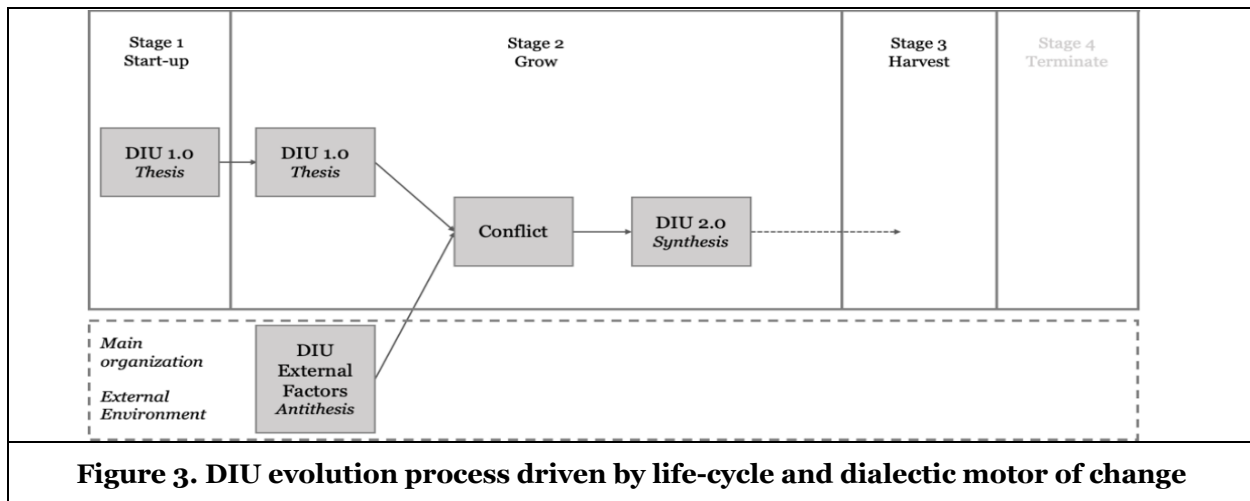

Figure 3. DIU evolution process driven by life-cycle and dialectic motor of change

In the following, we go from abstract to concrete and start with a presentation of the DIU external factors - both from the main organization and the external environment - that together form the antitheses and trigger a conflict with the thesis DIU 1.0 resulting in the synthesis DIU 2.0. Afterwards, we briefly explain how the conflict between thesis and antithesis gives rise to the synthesis. Both findings - triggers of antithesis and conflict solution - are case agnostic and based on an aggregation across all five cases. Finally, on an individual case basis, we go into more detail regarding the changes that we observed between DIU 1.0 and DIU 2.0 in all five cases to give an impression of the potential extent and facets of a DIU's evolution.

Antithesis - Triggers for the DIU Evolution Process

On the basis of our data, we identified ten triggers that initiated the DIU evolution from thesis DIU 1.0 to synthesis DIU 2.0 originating from the main organization and the external environment. We were able to detect three active and seven passive triggers, which together form the antithesis for each case. For this part of the results, we sought to find similarities across the five cases and present them based on ten aggregate dimensions we were able to identify. We derive these from 96 first-order codes and 43 second-order codes.

Passive Triggers

In all five cases, one of the passive, internal triggers was inappropriate staffing and/or team composition, such as a lack of key functions or an incomplete set of skills to create digital innovation. In Case A, for example, the DIU 1.0 team mainly consisted of business graduates without industry expertise, which led to negative experiences for the main organization when working with the DIU. A similar situation existed in Case B. In Case D and E, it was rather a problem of missing expertise for the development of digital products and services: Case D was mainly staffed with designers that have not placed sufficient focus on economic value generation. Case E's DIU 1.0 on the one hand, did not have its own software developers to implement digital innovation projects, and on the other hand, the data scientists lacked a clear assignment within the DIU, which made the collaboration with the main organization unsatisfactory. In Case C two different kinds of contracts for DIU employees were a burden both administratively and for the team dynamic. A second internal trigger - observed in four out of five cases - were unsatisfactory results of DIU (supported) projects as they were either too abstract - on the level of a presentation rather than a real implementation of a digital product or service (Case B) - or had too little economic potential and thus an insufficient impact on the main organization's overall value creation (Case A). In Case E, DIU 1.0 worked on too many projects in parallel with too few personnel so that in some cases there was no concrete implementation possible. Case D was even on the verge of dissolution due to output problems. In three out of five cases, we see insufficient acceptance of DIU 1.0 from the main organization as another internal trigger. In Case E, it stems from a strained relationship of the main organization to "digital" due to previous experiences with a digital venture unit that did not work as planned. In addition, the DIU team had no industry expert in its ranks and therefore insufficient understanding of the core business for which it is supposed to develop digital innovations. A similar observation can be made for Case B. In Case C, we identified both cultural and political reasons as DIU 1.0 was never fully accepted by the main organization because the works council had no access to the employees of the limited liability company - finding this an unsatisfying situation - and the unit's employees were partly perceived as arrogant and casual. The DIU's different ways of working with an agile rather than a waterfall approach and interdisciplinary teams - which is sensible when developing digital innovation - in modern, new office spaces is sometimes regarded as "playing around" rather than a true value contribution by employees of the main organization. Also in three out of five cases, the main organization found the collaboration with the DIU to be dissatisfying. In case A, there was a lack of mutual understanding of the respective working methods, so that no common working mode was found. DIU 1.0 in Case B had little direct day-to-day collaboration with the core organization, making the handover process of innovation projects for implementation and operation difficult. The parent organization found itself left alone by the DIU with digital innovation projects without the necessary knowledge and expertise in its own teams. Case E experienced that the experts from the DIU team who assisted the main organization in its innovation projects were not being used properly. The approach of lending individuals to existing teams was therefore deemed unsuccessful. Triggers five and six could be observed in two of five cases each. On the one hand, we found challenges with the DIU's funding approach a trigger. Case A's DIU 1.0 charged the main organization for its services, causing the latter to be dissatisfied because the results did not meet expectations. In Case D it was the exact opposite, DIU 1.0 did not charge the other divisions for its services and recorded financial losses as a result. On the other hand, DIU 1.0 was a half-hearted or actionist, strongly individual-driven initiative. The then-CEO of Case A initiated the company's digital transformation at the end of his career - DIU 1.0 being one part of it - but left the company soon after, depriving the initiative of a strong advocate. In Case D, the setup of DIU 1.0 was - from a present-day perspective - a fairly half-hearted attempt to kick off the company's digital transformation, with innovation projects that were rather feature developments than new business models. While the six triggers described so far are all negative, in three out of five cases we found a seventh, internal trigger that is positive in nature: The DIU had fulfilled parts of its goals. DIU 1.0 in Case B had its first MVPs in the market but could not scale them without access to the main organization's IT infrastructure; the previously anticipated glass floor was reached and a new mandate for the DIU is necessary. In Case E, DIU 1.0 has largely succeeded in convincing the main organization of its value and thereby qualify for greater responsibility. In Case C, the DIU's embedding as a limited liability company to attract digital talents is not necessary anymore as the brand is now established in the labor market. We could not identify a passive, external trigger.

Active Triggers

Besides the passive triggers, we found three active triggers across the five cases - two internal and one external. Four out of five cases involved a high-level/c-level management change, as either initiators of DIU 1.0 left the company (Case A and Case C) or people with experience and specific responsibility for digital transformation joined (Case B and Case D). Against the background of and in interaction with the passive triggers, it was the new staff that initiated the transformation to DIU 2.0. The second internal trigger - observed in three out of five cases - the DIU evolution was the result of a strategic decision or realignment of the main organization. In Case B, DIU 1.0 was evaluated and redesigned as part of a strategy project for the new overall digital transformation strategy of the main organization. Case C undertook a complete restructuring of the entire company from a matrix to a product-oriented structure in the course of which the setup of DIU 1.0 was also critically scrutinized and finally transformed into DIU 2.0. Finally, DIU 2.0's takeover of responsibility for four new focus projects in Case E, is the result of a strategic decision by the top management of the main organization. For the category active, external triggers we found one example, in two out of five cases. The only external trigger we identified is the deterioration in the market conditions of the main organization - partly due to Covid. The market in which Case C operates in collapsed by up to 50% in summer 2020 leading to a need for restructuring of the whole organization. As a result, the DIU was no longer affordable to the same extent as before, which is why the new DIU 2.0 was chosen. In Case E, due to financial constraints - triggered by the corona pandemic - it was decided to abandon the DIU's central funding earlier than planned and to adopt a mixed form of cost center approach and central funding.

Conflict and Transition to the Synthesis – the DIU evolution

The conflict triggered through the clash of the thesis and antithesis was dealt with quite similarly across the five cases. In all of them, there was a phase of strategic realignment - in some cases company-wide (Cases B and C), in others only related to the DIU (Cases A, D, E). These lasted in part for different lengths of time and took place in different settings. In Cases A and B, for example, there was a strategic project of about six months, during which (among other things) the new DIU 2.0 setup was decided and designed. The project was followed by an approx. three-month reorganization phase. In cases C and D, the strategic realignment was much shorter, lasting around two months. This was followed in case C by a nine-months merger project - as the DIU was legally re-integrated into the main organization - and in case D by a reorganization phase lasting three to four months. Case E undertook the least overall change of all five cases, and developed the new DIU 2.0 tasks, mandate, and processes, as well as the additions and restructurings to the team, dynamically over a period of seven to eight months. The original DIU team was not involved at all (Cases A and D) or only partially (Case B) in resolving the conflict and developing the new DIU 2.0 setup. This task was taken over either by an external consulting firm or by the new DIU management in consultation with the management of the main organization. In cases C and E, on the other hand, the DIU management itself was responsible, partly also with the involvement of other people from the DIU team. Overall, we see two positive changes or expansions of DIU goals and responsibilities (Cases B and E), because the work of DIU 1.0 has highlighted the need to seriously address the topic of digital transformation and roll it out on a larger scale, for which the extension of the DIU's role makes a substantial contribution. In these two cases, one can clearly see how the DIU changes according to the initially conceived phase logic - in line with the life-cycle motor of change. In Case B, for example, DIU was in the second of three development phases - the company calls it the professionalization phase - when the reorganization came and is now on its way to the third - the impact phase. The situation is similar for DIU 2.0 in Case E, which is now in the second of four phases and is equipped with various characteristics that were planned for this phase. In addition, there are two major changes to DIU goals, tasks, processes, and team in Cases A and D, as the previous setup DIU 1.0 was perceived as unsatisfactory by the main organization. Finally, Case C is characterized above all by the reintegration of the DIU into the main organization for economic and corporate strategy reasons on the one hand, but also because the limited liability company has fulfilled its role as an employer branding initiative on the other.

Thesis and Synthesis – Changes from DIU 1.0 to DIU 2.0

Since this article is primarily concerned with the first evolutionary step of a DIU, we will focus in this section on the aspects where changes have occurred. As mentioned above, we refer to the initial setup as DIU 1.0 and the state after the evolution as DIU 2.0. We describe the differences between DIU 1.0 and DIU 2.0

based on five different categories: *goal, mandate, governance, team*, and *processes*. These categories are drawn from current DIU literature (Fuchs et al. 2019; Barthel et al. 2020; Holotiuk 2020) and inspired by findings from our data collection. The presented results in this section are on the level of 218 second-order codes based on 452 first-order codes and subsequently aggregated at an individual case level.

Case A

Goal. The initial goal of generating disruptive innovation outside the main organization changed to supporting the main organization to generate incremental innovation with a clear focus on the core business. This also includes creating (IT) infrastructural foundations to be able to build up and offer digital products and services that can be offered as a complement to machines and plants.

Mandate. Both DIU 1.0 and 2.0 are one initiative but not the driver of the main organization's digital transformation. However, while DIU 1.0 was merely a flow heater for innovation to quickly develop ideas and validate them for investment decisions, DIU 2.0 implements concrete digital innovation projects as blueprints to show the main organization another way of company growth through digital offerings. DIU 2.0's core activities consist of exploring idea potentials, supporting the main organization with digital product and service development (user research, business modeling, agile project management, etc.), creating a partnership network and ecosystem as well as providing education and methodological sparring.

Governance. The legal entity established for DIU 1.0 continues to exist on paper but in effect becomes the responsibility of a consultancy previously acquired by the main organization that also specializes in digital business modeling. Furthermore, DIU 2.0 receives a steering committee that meets quarterly to take strategic decisions consisting of the Head of DIU 2.0 and two representatives from the main organization. With the transition from DIU 1.0 to DIU 2.0, the funding strategy changes to a central funding instead of the DIU charging the other divisions for its services. DIU 2.0 continues to be part of the "Innovation & Technology" division and retains its offices in a different city than the main organization.

Team. All approx. 15-20 employees of DIU 1.0 resigned after the new setup was announced and thus made room for a complete reorganization. In fact, DIU 2.0 now no longer has a permanent staff, but receives an annual budget of about 17 full-time equivalents to assign employees of the acquired consultancy, or from its network of freelancers, to work on DIU projects. Furthermore, DIU 2.0 projects now primarily involve people who are familiar with the working environment of the main organization and can mediate between the technical and digital worlds, as collaboration between the DIU 1.0 team - mainly business graduates without specific industry knowledge - and the main organization was difficult. Additionally, all DIU 2.0 project teams include at least one representative from the main organization to ensure domain know-how.

Processes. DIU 1.0 followed a structured design thinking approach to quickly validate ideas and derive an investment decision for one single project at a time. In contrast, DIU 2.0 implemented and now follows a 5-phases innovation process from idea generation until the development of a minimum viable product and its handover to the main organization for several projects simultaneously. DIU 2.0 also accompanies the innovation process from an early phase and assists the main organization e.g., with user research, visual design, and business modeling. In addition, its employees are involved in projects over a longer period of time, which makes the teams more stable and facilitates the handover to the main organization for continuous operation. Projects are now selected by the steering committee on a quarterly basis.

Case B

Goal. The DIU's goal has changed from an experimental and explorational DIU 1.0 that defines strategic priorities, discovers new innovation fields for the main organization and implements pilot projects to an implementation DIU 2.0 that realizes some of the projects previously identified and scales them globally. DIU 2.0's innovation focus is hereby strongly on digital products and services "around the machine" to establish digital offerings as second growth muscle alongside the core business. In addition, efforts are being directed primarily at digital innovations that have an interface with the customer in order to strengthen the link between "digital" and sales.

Mandate. DIU 1.0 cut the topic of digital transformation into smaller pieces and developed, tested, and validated new digital products, services, and business models in a restriction-free environment to afterward return them to the main organization. DIU 2.0, by contrast, is an integral part and driver for the new digital

transformation strategy of the main organization and implements projects of the previously defined roadmap globally. In addition, there is a lot of groundwork to lay the foundation for the digitization of the company, for example by setting up a unified (IT-) infrastructure, digitizing existing processes, and creating an understanding of the topic "digital" among employees. From being a flow heater for innovative ideas that develops solutions for individual markets and customers to test needs, the DIU becomes an entity that implements globally scalable digital innovations.

Governance. The legal entity of DIU 1.0 remains the container for DIU 2.0 the "digital" brand, however, disappeared i.e., there is no demarcation as a separate legal entity anymore. Furthermore, DIU 2.0 receives an additional office location at the headquarters to enable more proximity to the core business. Overall, DIU 2.0 is now at group level in terms of its activities and embedding to function as a global entity and reports to the Group Commercial Officer. There are four newly created departments within DIU 2.0 primarily one large business-oriented team for digital customer interaction as well as a technology-oriented team and a "Global Digital Steering Committee" that meets on a quarterly basis to make strategic decisions on the project portfolio and the roadmap.

Team. The team of DIU 1.0 included between 20 and 25 people and consisted mainly of employees with a background in business and economics or related disciplines. As DIU 2.0 is an implementation rather than an exploratory unit the necessity for an additional IT team with in-house software developers arose to complement the existing skill-set and build interdisciplinary projects teams. Thus, in addition to the employees from DIU 1.0, various new hires, as well as some people and departments from the parent company with a digital and customer-focused mandate, constitute the DIU 2.0 team. The target size for DIU 2.0 is initially about 100 people.

Processes. Both DIU 1.0 and 2.0 follow an agile, customer-centric development approach for digital products and services. DIU 1.0 had high degrees of freedom regarding the projects it selected as well as an end-to-end responsibility from the idea until the minimum viable product, whereas DIU 2.0's works on a clearly defined project portfolio with a respective roadmap. However, DIU 2.0 is fully responsible for digital innovation projects from development through implementation to ongoing operation. Workflows have become slower, as digital innovations are no longer quickly experimented in a standardized three-stage innovation process to develop products with greatly reduced complexity for individual markets, but are implemented globally on a large scale. Finally, the collaboration between DIU 2.0 and the departments in the main organization, such as core IT, marketing or sales, has become closer.

Technology. This category *is listed as* compared to the other cases, substantial changes in the IT infrastructural embedding of DIU 2.0 can be observed. The considerable difference between DIU 1.0 and DIU 2.0 regarding the criteria *Technology* is the granted access to the main organizations IT infrastructure for DIU 2.0 as well as the take-over of all customer-facing IT responsibilities from the core IT which was not the case before.

Case C

Goal. None of the initial goals of DIU 1.0 is supposed to change with the new setup. These include developing core-business-related, data-driven, digital business models with recurring revenues to complement machine sales, attracting digital talents, and turning a product-centric into a user-centric company. The attainability of the latter goal, however, has become questionable due to the reintegration into the main organization. In addition, DIU 2.0 aims to clearly strengthen the ecosystem approach between DIU and the main organization.

Mandate. DIU 2.0 continues to be a vehicle for the main organization's digital transformation, with a focus on driving overall digital marketing, establishing and growing a digital ecosystem, and developing and implementing digital innovation. It also retains the task of building competencies to design the digital user experience, as well as the freedom to develop digital innovations with greater speed and certain independence. Additionally, DIU 2.0 overtakes all external communications for the main organization as well as the responsibility for certain IT systems from core IT and receives a stronger mandate for the offering of various subscription models and the overall data-driven sales approach.

Governance. It was decided to abandon the approach of a separate legal entity and fully reintegrate DIU 2.0 into the main organization's global sales and marketing department. In the course of this, parts of the DIU 1.0 team move to other departments in the main organization and received a larger mandate for their

tasks. The unit's original purpose as an employer branding initiative to attract digital talents and offer them industry-standard contracts, as well as its "digital" brand and dedicated website, remain in place. Furthermore, the original office space in a newly renovated building on the premises of the main organization, the modern work organization with a people-oriented management style, and agile working in interdisciplinary teams are to be maintained in order to preserve the spirit and culture of DIU 1.0.

Team. The team itself remains more or less unchanged, with some parts of the DIU 1.0 team now being assigned to other departments of the main organization, as mentioned in the previous section. However, of the 60 employees of DIU 1.0, about two-thirds were employed by the main organization the other one-third had a contract with the limited liability company. As the separate legal entity is given up, all DIU 2.0 employees now receive a new contract from the main organization.

Processes. All workflows, processes, and routines of DIU 1.0 are intended to be maintained. This includes success measurement against annual goals and monthly reviews with the "Objectives and Key Results" method, a four-phased innovation process to implement and continuously further develop digital innovation as well as the strong collaboration with the main organization in its process. Since the reintegration was announced, however, there are noticeably more requests for joined projects with DIU 2.0 from the main organization.

Case D

Goal. Whereas DIU 1.0 was a classical corporate innovation lab with the goal to develop minimum viable products of digital innovations and drives the cultural transformation to kick off the digital transformation journey of the company, DIU 2.0 is a company builder with a focus on industrial software as a service companies. Its goal is to create commercial value with user-centric, machine-agnostic, AI-powered software solutions for manufacturing companies with a revenue potential of €50 million or more. The current focus is on core business-related digital innovation along the main organization's value chain. Driving the main organization's overall digital transformation and initiating cultural change became merely a secondary goal for the time being.

Mandate. DIU 1.0 was supposed to generate a variety of ideas and initiate digital innovation projects as well as support other divisions with their projects. In addition, it should spark enthusiasm for digital topics among the workforce. In contrast, DIU 2.0 is to create one to two new digital ventures per year and acquire startups in the manufacturing sector for its portfolio. The innovation team no longer supports other divisions with digital innovation projects that are not supposed to become standalone ventures; a new separate software development hub is now responsible for this. Furthermore, learning formats like webinars and workshops as well as agency support for the main organization are only secondary tasks.

Governance. DIU 2.0 remains a separate legal entity and a division of the main organization with its offices located in a different city than the headquarters. However, DIU 2.0 now has a specific digital innovation team that owns the digital innovation process with a new Head of Digital Innovation as the team lead. Furthermore, DIU 2.0 set up its own software development structures with the new hub mentioned above. Financially, the goal is to become a profit center, and DIU 2.0 has begun charging other divisions for its services which was not the case before, resulting in losses for DIU 1.0. Finally, the spin-offs created in DIU 2.0 become 100% subsidiaries of DIU 2.0 limited liability company.

Team. The organizational structure of DIU 1.0's digital innovation team was dominated by designers, which meant that innovation projects were rather focused on consumer and design, than economic value creation. In addition, there were not enough in-house software developers to implement digital innovations. As a result, the team for DIU 2.0 was fundamentally restructured, with both the recruitment of experts in building independent businesses - e.g., venture architects and innovation managers - to give the unit a stronger business focus, and a dedicated software development team. DIU 2.0 now has an interdisciplinary team with a new Head of Digital Innovation, and the innovation project teams are interdisciplinary as well.

Processes. Many ideas that were fed into DIU 1.0's initial stage-gate innovation process had low financial potential and were feature developments rather than standalone digital products or services. Furthermore, no project made it past the fourth phase of six because the innovation committee always decided on a case-by-case basis instead of selecting the best of all the projects presented for the next phase. The innovation process for DIU 2.0 is now longer - approx. 1 year instead of 6 months - consists of only three phases and is being continuously developed. In addition, the DIU 2.0 team supports the other divisions in joint workshop

sessions for idea generation and projects selection to ensure that sufficient spin-off potential is available. Every project team requires a co-development partner - within the main organization or external - and has weekly sparring sessions with the DIU's CEO to ensure management buy-in.

Case E

Goal. Compared to DIU 1.0, the goals for DIU 2.0 were mainly sharpened and now include four focus areas: 1) supporting the business units in developing and marketing digital products and services, 2) pushing digital sales and e-commerce, 3) digital manufacturing (digitization of internal processes in the production area), 4) digital administration (internal process automation for finance, administration, etc.). What remains unchanged is the DIU's responsibility for developing and implementing digital innovations close to the core business together with the main organization, as well as for digitizing internal processes. It also aims to support the cultural change that goes hand in hand with digital transformation and to build and bundle digital competencies that the entire organization can use.

Mandate. Equivalent to the objectives, we also found only minor adjustments with regard to the mandate of DIU 2.0. The two essential ones are that - as a result of a top management decision - DIU 2.0 will primarily focus on and take overall responsibility for the four focus areas and that almost all digital innovation projects now converge at the head of DIU 2.0 so that there is a continuous exchange with the main organization. Its task as part of the digital initiative to support the maintenance and expansion of global market leadership and to anchor digital expertise and agile working methods in the main organization will remain.

Governance. DIU 2.0 keeps its office spaces and continues to be integrated into the overarching governance model of the main organization - e.g., common code of ethics, uniform travel expense, etc. - and in parallel maintains its own culture of trial and error, agile working methods, and interdisciplinary teams with a high level of ownership for projects. However, DIU 2.0 is now setting up its own governance structures, e.g., its own program management, and is changing its funding approach from central funding to a - currently still hybrid - cost center approach, and is partly already charging the other departments for its services.

Team. In addition to the original interdisciplinary team of DIU 1.0, own software developers were hired for DIU 2.0 to implement solutions and generate real value-added. Furthermore, each DIU 2.0 project needs both a business owner from the main organization to ensure a market need and a C-level sponsor from the division's board of directors to back the project, provide budget and resources, and support the business owner.

Processes. While DIU 1.0 did not really select projects, but supported the main organization with whatever is required to build reputation and credibility, DIU 2.0 now has a clear six-phase, stage-gate, innovation process. With this, four focus topics have been selected and are now being implemented with a defined project team, a strategy, and key performance indicators. DIU 2.0 can be both the lead or the support on projects and uses an agile product development process following a SCRUM logic. The coordination with the core IT became much closer ensuring compliance with the enterprise architecture and securing the operation for implemented digital innovation including customer support and service.

Discussion

DIU literature provides a rather static picture of DIUs as they are mostly analyzed at one point in time in terms of their current status quo (e.g., Raabe et al. 2020a; Barthel et al. 2020; Fuchs et al. 2019). To understand whether DIUs continue to contribute to the value creation of the main organization and its digital transformation in the long-term, it is important to examine how and whether they can evolve and adapt to new circumstances over time. As our cases show, in the manufacturing industry, a greater proximity to the core business is needed to make a real contribution to the main organization's digital transformation. Manufacturing companies - and we expect it to hold true for others - need time to familiarize themselves with the DIU, its new ways of working and different team structures, etc., because they have had little experience with digital innovation to date. The fact that the initial setup of the five DIUs considered often did not match the expectations and needs of the main organization made an evolution to DIU 2.0 necessary. We see a similar situation of "plan vs. reality" with regard to the type of change in the DIU. The DIUs development was regularly planned in a life-cycle model along which it is built and increasingly expands its scope of action. Yet, in all five cases, there were external triggers during the DIU

1.0's "grow" phase that challenged its previous implementation and, in the sense of a dialectical motor of change, led to a conflict that resulted in the conflict resolution of DIU 2.0. Respectively, we see evidence for an interplay of life-cycle and dialectic motor of change during DIU evolution. One person from Case C, for example, commented as follows: *"So I can't tell you yet how the [DIU] experiment will turn out in the next stage. Perhaps the pendulum will swing back again in three years and then everything will be a limited liability company again."* To account for this fact and to bring the conceptual synthesis of our empirical data from Figure 3 to a higher level of abstraction, we present a more generic and extended version of the DIU evolution process in Figure 4. The designations DIU 3.0 and 4.0 hereby refer to possible future evolutionary forms of a respective DIU.
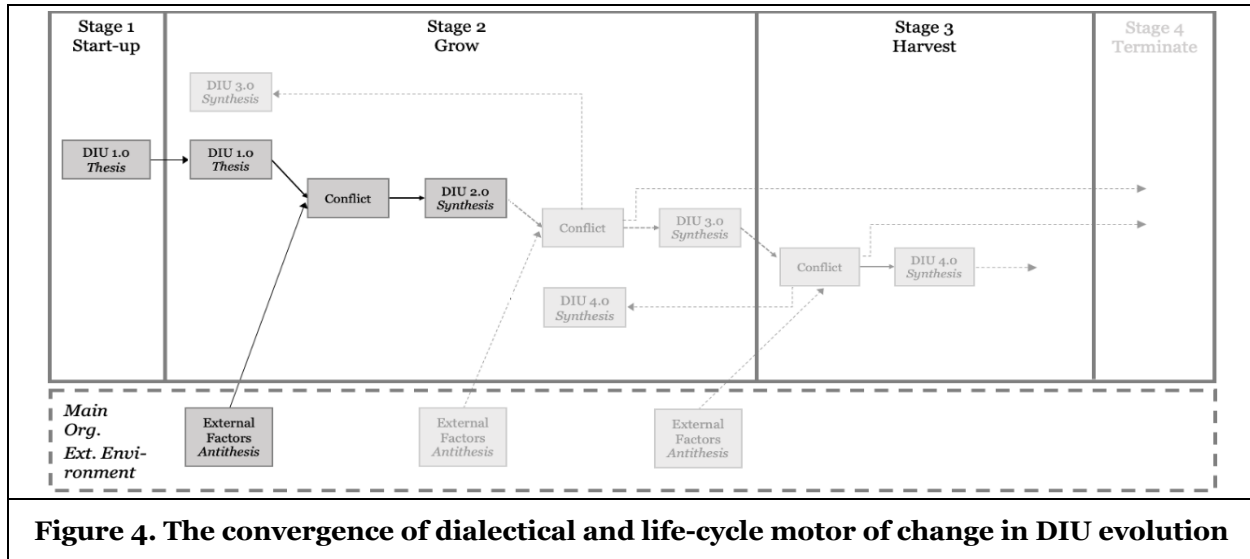

Figure 4. The convergence of dialectical and life-cycle motor of change in DIU evolution

At any given point in time, external factors can challenge the present DIU setup which initiates another conflict that needs to be resolved. How this happens may vary. For instance, a synthesis - i.e., a new DIU setup - is found and continues to evolve along the life-cycle phases. Our conceptual process model thus provides a starting point for developing an independent theory about the evolutionary process of DIUs in the course of incumbents' digital transformation. The empirical data suggest that the interplay of the two ideal-typical engines of change - life cycle and dialectic - forms the core. Furthermore, based on our findings and the model in Figure 4, we now present three propositions that can also be used as an inspiration for future research.

First, regardless of the exact, case-specific active and passive triggers that form the antithesis, they can often be aggregated to the fact of an inappropriate DIU setup - e.g., goals, tasks, team, processes, - for the respective company/industry. The manufacturing industry, for example, requires - for now - a core business related DIU that helps building the necessary (IT-) infrastructure for the company-wide digital transformation and leverages the potential of digital innovation "around the machine". An exploratory DIU that identifies new business areas but does not support the main organization in laying the groundwork is not the right path so far. We observed this need in all five cases, which led to a stronger focus on the core business after the evolution, especially in cases A, B and D. We thus conclude that the design of a DIU must be sensitive to specific industries or individual companies in order to generate value and contribute to digital transformation and propose: *Proposition 1: The lack of an industry-specific DIU design results in an inability to meet the expectations and requirements of the main organization, necessitating evolution.*

Second, in the five cases we considered, we could identify changes - sometimes major, sometimes minor - in all dimensions within the context of DIU evolution. It has never happened that only part of the dimensions was affected. This is mainly due to the fact that the evolution is strongly driven by the adjustments to the DIU's goals. In four out of five cases, these were set first, followed by the necessary modifications in the other dimensions. A reverse scenario is only found in Case C, where changes are made that primarily affect the DIU's *governance* structure. However, these result only in marginal changes of the other dimensions. We therefore conclude: only changes in the goals trigger major changes in the other dimensions. Furthermore, both active and passive (internal) triggers are needed to initiate DIU evolution;

one category alone is not sufficient. As such, we propose: *Proposition 2: Through the interplay of several passive and active triggers a DIU evolution is initiated that encompasses all five dimensions - goal, mandate, governance, team, processes.*

Third, in the first dialectical cycle we see an evolution that changes the DIU from its initial setup - which is influenced by best practice from other industries - to one that actually meets the needs and requirements of the main organizations. Now that the DIU has reached the stage where it is contributing to the digital transformation of the main organization, further DIU evolution steps are more likely to serve the expansion of its goals and tasks and are therefore less extreme. The DIU has achieved a kind of punctuated equilibrium. In addition, its further development is likely to be increasingly shaped by the self-reflection of the DIU team, so that no or fewer external triggers are needed. We see first evidence across our cases of the diminishing role of the dialectical motor as cases B and E, for example, are working intensively with continuous adjustments to their processes, primarily managed by the DIU team itself. We therefore propose: *Proposition 3: Over time, the influence of the dialectical motor of change diminishes and DIU evolution is more strongly driven by a life-cycle motor of change.*

Implications for Research and Practice

With our research at hand, we follow the call of several authors to better understand new forms of organization design and their practices (Yoo et al. 2012; Zammuto et al. 2007; Hanelt et al. 2020). Extant literature argues for malleable designs of organizations as a solution to countering the challenges that digital transformation imposes on organizations (Hanelt et al. 2020). Based on our findings, we argue that DIUs - with their goal of sparking digital innovation and digital transformation of the main organization - will evolve naturally, not by design, through the convergence of a dialectical and a life-cycle motor of change. In this way, they exploit their higher degree of malleability and adapt to the antitheses they face through a mechanism of conflict resolution. By building on the work of Van De Ven and Poole (1995) we provide empirical insights on the nature of DIU evolution in a multiple-case setting of five real-world cases and inform theory building on continuous organizational design change in the course of digital transformation. In addition, we lay the foundation for research on DIUs that views these units as dynamically evolving in order to meet the needs and requirements of the main organization and to make a lasting contribution to its digital transformation. Finally, to inform the extant of knowledge, we depict three propositions which illustrate the multi-faceted nature of DIU evolution in the context of incumbents' digital transformation which can also be used as a starting point for future research. In some of the manufacturing cases we studied, the evolution of the DIU became necessary because the initial setup did not have a clear focus on digital innovation for the core business and thus lacked important (IT) infrastructural foundations and could not properly take the main organization along on the digital transformation journey.

Drawing on our conceptual process model, future research may, for example, investigate whether typical time courses can be observed with respect to DIU evolution stages and how future transformation processes - especially also in the "harvest" phase - differ from the one examined in this study in terms of the triggers, sequence, and nature of change (on the basis of the manifestation of the various characteristics). The strength of the respective changes could also be determined in this way. An additional avenue for research is the "Terminate" phase of DIUs and if it is ever reached in reality or whether a DIU exists continuously evolving while altering slightly in their mandate from time to time.

For practitioners, our results show that a high sensibility to the company specific requirement and an evaluation of the status quo before setting up the DIU is advisable. It must be firmly embedded in the overarching digital transformation strategy, as a half-hearted, actionist approach will not lead to satisfactory results. Sufficient resources (e.g., budget and staff) and commitment from all stakeholders - management, employees from the main organization, and DIU team - are needed so that the DIU can deliver its desired value. Furthermore, we observed that the goals of the initial DIU setup in our five cases, were partly too ambitious - such as developing disruptive innovations - and did not fit the reality of the industry, which is why we advocate to move to a rather industry-specific understanding of DIUs to meet the respective requirements. DIU managers, for example, can use our findings to build or transform their DIUs as we provide an orientation for resolving the conflict between thesis and antithesis and show examples for designing the synthesis, i.e., the next stage of a DIU's development. We would also like to raise awareness of the fact that a DIU is an agile organizational form whose structure can be planned in phases, but is always subject to external influences to which it needs to respond.

Conclusion

By answering our research question of *how DIUs evolve over time to meet the needs and expectations of the main organization and contribute to or drive its digital transformation,* we contribute to a more dynamic DIU understanding. Based on an explanatory, interpretive, multiple cross-case synthesis with five DIUs from the manufacturing industry, we show that in addition to the planned, phase-by-phase development and expansion, DIU external, active and passive triggers - from the main organization or the market environment - are key contributors to DIU evolution. We provide insights into the course of the evolution process and present possible changes at an individual case level based on the categories *goal, mandate, governance, team and processes*. These changes were mainly necessary because the initial DIU setup did not meet the needs and expectations of the main organization, resulting in a new setup that is more closely aligned to the core business and adds tangible value to its digital transformation. To abstract and extend our results, we also develop a conceptual process model of the further, potential evolution steps of a DIU and formulate three falsifiable propositions in this regard that can be examined in future research.

References

Arvidsson, V., and Mønsted, T. 2018. "Generating Innovation Potential: How Digital Entrepreneurs Conceal, Sequence, Anchor, and Propagate New Technology," *The Journal of Strategic Information Systems* 27 (4), pp. 369–383.

Barthel, P., Fuchs, C., Birner, B., and Hess, T. 2020. "Embedding Digital Innovations in Organizations: A Typology for Digital Innovation Units," in *Proceedings of 15th International Conference on Wirtschaftsinformatik*, pp. 780–795.

Bharadwaj, A., El Sawy, O. A., A, P. P., and Venkatraman, N. 2013. "Digital Business Strategy: Toward a Next Generation of Insights," *MIS Quarterly* 37 (2), pp. 471–482.

Chanias, S., Myers, M. D., and Hess, T. 2019. "Digital Transformation Strategy Making in Pre-Digital Organizations: The Case of a Financial Services Provider," *The Journal of Strategic Information Systems* 28 (1), pp. 17–33.

Dremel, C., and Herterich, M. 2016. "Digitale Cloud-Plattformen Als Enabler Zur Analytischen Nutzung von Operativen Produktdaten Im Maschinen- Und Anlagenbau," *HMD Praxis Der Wirtschaftsinformatik* 53 (5), pp. 646–661.

Dremel, C., Wulf, J., Herterich, M. M., Waizmann, J.-C., & Brenner, W. 2017. "How AUDI AG Established Big Data Analytics in Its Digital Transformation," *MIS Quarterly Executive* 16 (2), pp. 81–100.

Fecher, F., Winding, J., Hutter, K., and Füller, J. 2020. "Innovation Labs from a Participants' Perspective," *Journal of Business Research* 110 (C), pp. 567–576.

Fichman, R. G., Dos Santos, B. L., 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," in *Proceedings of the 14th International Conference on Wirtschaftsinformatik,* Siegen, Germany, pp. 632–646.

Gioia, D. A., Corley, K. G., and Hamilton, A. L. 2013. "Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology," *Organizational Research Methods* (16:1), SAGE Publications Inc, pp. 15–31.

Göbeler, L., Schaar, D., and Hukal, P. 2020. "Initiating Ambidexterity through Digital Innovation Labs," in *Proceedings of the 28th European Conference on Information Systems*, A Virtual AIS Conference.

Hanelt, A., Bohnsack, R., Marz, D., and Antunes Marante, C. 2020. "A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change," *Journal of Management Studies* 58 (5), Wiley, pp. 1159–1197.

Hess, T., Matt, C., Benlian, A., and Wiesböck, F. 2016. "Options for Formulating a Digital Transformation Strategy," *MIS Quarterly Executive* 15 (2), pp. 123–139.

Holotiuk, F. 2020. "The Organizational Design of Digital Innovation Labs: Enabling Ambidexterity to Develop Digital Innovation," in Proceedings of 15th International Conference on Wirtschaftsinformatik, Potsdam, Germany, pp. 1019–1034.

Holotiuk, F., and Beimborn, D. 2019. "Temporal Ambidexterity: How Digital Innovation Labs Connect Exploration and Exploitation for Digital Innovation," in *Proceedings of Fortieth International Conference on Information Systems*, Munich, Germany.

Hylving, L., and Selander, L. 2012. "Under the Guise of Openness: Exploring the Digital Innovation User Interface Design," in *Proceedings of the 20th European Conference on Information Systems*, Barcelona, Spain.

Jöhnk, J., Ollig, P., Oesterle, S., and Riedel, L.-N. 2020. "The Complexity of Digital Transformation – Conceptualizing Multiple Concurrent Initiatives," in *Proceedings of 15th International Conference on Wirtschaftsinformatik*, Potsdam, Germany, pp. 1051–1066.

Keen, P. G. W. 1981. "Information Systems and Organizational Change," *Communications of the ACM* 24 (1), pp. 24–33.

Leavitt, H. J. 1965. "Applied Organizational Change in Industry: Structural, Technological and Humanistic Approaches," in *Handbook of Organizations*, J. G. March (ed.), Chicago: Rand McNally & Co, pp. 1144–1170.

Leonardi, P. M., and Barley, S. R. 2008. "Materiality and Change: Challenges to Building Better Theory about Technology and Organizing," *Information and Organization* 18 (3), pp. 159–176.

Matt, C., Hess, T., and Benlian, A. 2015. "Digital Transformation Strategies," *Business & Information Systems Engineering*, pp. 339–343.

Nambisan, S., Lyytinen, K., Majchrzak, A., Song, M. 2017. "Digital Innovation Management: Reinventing Innovation Management Research in a Digital World," *MIS Quarterly* 41 (1), pp. 223–238.

Raabe, J.-P., Drews, P., Horlach, B., and Schirmer, I. 2021. "Towards an Intra- and Interorganizational Perspective: Objectives and Areas of Activity of Digital Innovation Units," in *Proceedings of the 54nd Hawaii International Conference on System Sciences,* Virtual Conference.

Raabe, J.-P., Horlach, B., Schirmer, I., and Drews, P. 2020a. "Digital Innovation Units: Exploring Types, Linking Mechanisms and Evolution Strategies in Bimodal IT Setups," in *Proceedings of 15th International Conference on Wirtschaftsinformatik*, pp. 844–858.

Raabe, J.-P., Horlach, B., Schirmer, I., and Drews, P. 2020b. "'Forewarned Is Forearmed': Overcoming Multifaceted Challenges Coming Multifaceted Challenges of Digital Innovation Units," in *Proceedings of the Twenty-Sixth Americas Conference on Information Systems,* Virtual Conference.

Robey, D., Anderson, C., Raymond, B., and Laval, U. 2013. "Information Technology, Materiality, and Organizational Change: A Professional Odyssey," *Journal of the Association for Information Systems* 14 (7), pp. 379–398.

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., and Fonstad, N. O. 2017. "How Big Old Companies Navigate Digital Transformation," *MIS Quarterly Executive* 16 (3), pp. 197–213.

Strauss, A. L., and Corbin, J. M. 1998. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, Thousand Oaks: Sage Publications.

Tödtmann, C. 2020. "Daimler Verkauft Zukunftsprojekt an GFT-Chef," *WirtschaftsWoche*, , December 19. (https://www.wiwo.de/unternehmen/auto/lab-1886-daimler-verkauft-zukunftsprojekt-an-gft-chef-/26637470.html, accessed December 31, 2020).

Tumbas, S., Berente, N., and vom Brocke, J. 2017. "Born Digital: Growth Trajectories of Entrepreneurial Organizations Spanning Institutional Fields," in *Proceedings of Thirty Eighth International Conference on Information Systems,* Seoul, South Korea.

Van De Ven, A. H., and Poole, M. S. 1995. "Explaining Development and Change in Organizations," *Academy of Management Review* 20 (3), pp. 510–540.

Van de Ven, A. H., and Poole, M. S. 2005. "Alternative Approaches for Studying Organizational Change," *Organization Studies* (26:9), SAGE Publications Ltd, pp. 1377–1404.

Vial, G. 2019. "Understanding Digital Transformation: A Review and a Research Agenda," *The Journal of Strategic Information Systems* (28:2), pp. 118–144.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., and Jensen, T. 2021. "Unpacking the Difference between Digital Transformation and IT-Enabled Organizational Transformation," *Journal of Association for Information Systems,* 22 (1), pp. 102–129.

Wiesböck, F., and Hess, T. 2019. "Digital Innovations," *Electronic Markets* (30:1), pp. 75–86.

Yin, R. K. 2018. *Case Study Research and Applications: Design and Methods*, Thousand Oaks, California: SAGE Publications, Inc.

Yoo, Y., Boland, R. J., Lyytinen, K., and Majchrzak, A. 2012. "Organizing for Innovation in the Digitized World," *Organization Science* (23:5), INFORMS, pp. 1398–1408.

Yoo, Y., Henfridsson, O., and Lyytinen, K. 2010. "The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research," *Information Systems Research* (21:4), pp. 724–735.

Zammuto, R. F., Griffith, T. L., Majchrzak, A., Dougherty, D. J., and Faraj, S. 2007. "Information Technology and the Changing Fabric of Organization," *Organization Science* 18 (5), pp. 749–762.