BUSINESS MODEL INNOVATIONS AS PROCESSES OF THE DIGITAL BUSINESS TRANSFORMATION

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Abstract

With this paper we are presenting a concept of digital business transformation trying to closely analyze continuous forms and alternatives of the digital transformation within companies (periods of mismatch.)

We open the "black box" by reconstructing specific influential factors and dynamics as debatable processes of reconstruction and readjustment. With the help of the described forms of transformation and the relevant combination of different modes, we can identify transformation paths and typical patterns, which destroy the fundament of well-established companies and show the necessity of implementing new agents, structures, new business culture and processes.

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Introduction

The digital business transformation is well on its way (Preston,Rogers 2012.) The virtual world is challenging the real world (Mahler,Schulz 2014.) Like a digital revolution it is transcending all areas of everyday life.

Never before has the technical change taken hold of so many companies to such an extent, so deeply, and in so many economic sectors like today. Aggressive competitors flood into the marked with new digital business models putting pressure on established businesses, whether those are too arrogant, or too unflexible. (Leitl 2014;Giesa,Clausen 2014.). Only companies which stay innovative and are ready to radically change can survive (Wessel,Christensen 2012.) The needed basic technologies are available. The internet, mobile computers, and the Cloud by now are so far developed that they can be adapted to any industry, and any problem. While technology in the past was just a part of the economy, the digital technology today is taking over the economy in its entirety (Kim 2013.) and becomes an integral part thereof. A new, fourth industrial revolution is sending its precursors. And this although digitalization is not a new phenomenon, but has already been expanding for years. But it is the explosion of computer capacities and the mobile internet that created the infrastructure for the digital revolution. It expands into all areas of economy, even into those which so far seemed to be safe, it turns whole economic sectors upside down and turns once successful business models obsolete. Business transformation results in a radical re-orientation of a given business model, which changes the technological profile as well as the social coordinates.

It is a process with a step-by-step accumulation of numerous transformation processes (Bergek et al 2013). A business model describes how a company works and the specific way it earns profits. Substantial changes of the ecosystem (Henningsson, Hedman 2014) can make a business model innovation necessary (Brusoni,Prencipe 2013.) The underlying concept is closely related to the burst of the new-economy-bubble, which forced many companies to radically change and re-adjust their business model (Budde et al 2000.) In the course of globalization, the outsourcing of value-adding activities, and numerous new competitors, companies faced the challenge of changing their existing value creation structures, which they had sometimes relied on for decades. (Frackiewicz 2010.) Central to a new business model are the customers' needs. The forecasters of digital change are promising an economy which only focuses on the customer, which knows his desires better than he does himself, and tailors is services entirely to his wishes

(Pentland 2014.). The producer takes more and more the role of a service agent, who helps the customer to better meet his desires. Typically, due to their long-term orientation, business model innovations, which are caused by business transformation processes, can be described as a long, step-by-step process (Storbacka et al 2013.) The number of personal computers in use worldwide surged from 100 million in 1990 to 1.4 billion by 2010. There were 10 million mobile phone users in the world in 1990; today there are more than 5 billion (Morgan Stanley 2009.). Only two decades ago there were as many internet users in the world as people in the city of Madrid; today, there are as many people online as are living in all of Asia (ITU 2013.) So the digital revolution did not happen suddenly like a "big bang." These processes developed over a period of time which was characterized by a continuously high dynamic of innovation with radical new or further developments of knowledge and technologies. Along with this there was a search for compatible forms of organization, patterns of interaction, structures and rules (Koren 2008; Kumar,Singhal 2012; Büschgens 2013.) Only in the accumulation of the many inter-related changes, these processes of finding new structures lead to substantially modernizing traditional inter- and intra-organizational basics. There is no doubt that central to this is the broad acceptance and radical further development of digital information-, communication-, and networking technologies.

In the light of this power of persuasiveness of digital transformation we have to ask the following questions: Is the digitalization hitting society and its businesses like a blow? Does the digital business transformation happen like a radical break in very short intervals, which quickly lead to a new period of technical, institutional, and inter- or intra-organizational continuity? Or is it possible to control the development? How can the processes of such a radical as well as successive change be analyzed? In light of the economic change caused by digital business transformations, we will create a concept to analyze the complex, oftentimes erratic and non-linear processes of substantial change, to generate partial answers to the above asked questions.

Theoretical background

Within the literature of economics and innovation, processes of substantial change since the 80s have been called "periods of mismatch," meaning longer phases of searching for new technologies, of experimenting and interest driven discourse, as well as compatible structures (Freeman, Perez 1988; Dosi et al 1988; Kitscheklt 1991; Rip, Kemp 1998; Kemp et al 2001.)

These kinds of evaluations, which are the basis for our following considerations, still remained fairly vague in answering the questions about the actual forms of such periods of change, as well as about typical patterns or variations (Tongur, Engwall 2014.) The newer transformation research (Herrendorf 2014) is more precise in this matter. For several years it has tried to identify different "transition contexts" (Smith et al 2005) and point out alternative "socio-technical transition pathways" (Geels, Schot 2007; Geels 2007; Geels, Kemp2007.) The underlying concept is that business transformation processes build up a technological pressure, which then becomes a driving force for business model innovations that impacts companies. As a result the reaction towards this pressure is perception, processing and action. Applied to business models this results in organization-oriented approaches (Treacy, Wiesema 1997;Lindner, Cantrell 2000; Tikkanen et al 2005,) strategy-oriented business models (Magretta 2002;Afuah 2004;Gassmann 2013,) and technology-oriented observations (Hedman, Kalling 2002; Afuah, Tucci 2003 Gassmann, Sutter 2013.)

Next to economic innovations, the newer research about institutional change (Thelen 2003;Streeck,Thelen 2005; Mahoney,Thelen 2010; Heinze 2012; Schiller-Merkens 2008) offers an approach to answer the question how substantial change through digital business transformation takes place. They emphasize that the processes of major change mostly do not take place in radical breaks, but happen step-by-step (Bergek et al 2013; Lan 2014.) They happen over longer periods of time and finally take a specific form of change. As a result the existing rules and structures shift successively towards new institutional patterns that cause action (Stein 1995; Harmon 2014.)

Substantial change

Substantial change caused by digital and technological progress can be found in a similar form e.g. in the content industry: film (Stephan 2013,) book retailing (Schrape 2011; Wikstrom, Johansson 2013, Farchy 2013,) magazines, newspapers (Currah 2006, 2009, Schrape 2013,) and music (Waelbroek 2013,) in the introduction of e-commerce (Christou, Simpson 2007; Barton 2014,) or in the digitalization of telecommunication infrastructures (Schneider 2001; Mayntz 2009.) In the past substantial change caused by digital business transformation has never been a short-term process, characterized by disruptive breaks. Even sudden break-downs or radical exchange of technologies or their destruction is not the norm. That is why the destruction of the

F&E factory in 2008 in Rochester by Kodak, should be regarded as an act of mere desperation. Thinking the un-thinkable - "digital replaces analogue" - did not work with the employees. However, the media-oriented destruction of what had been the group's jewel for decades came too late. Finally this symbolic act of tearing down the traditional think-tank showed the employees that for Kodac the traditional analogue business had ended. Still, this awareness was too late; 2012 they had to file for bankruptcy. Four years were too short!

Digital business transformations are typically characterized by a longer period of discontinuity and readjustment, where an economic sector and its companies through numerous adaptations move towards a new dominant business model design, which itself keeps being put to the test by continuous innovation dynamics (Roseno et al 2013.)

Still the idea of a dichotomous standardization of types – long periods of relative stability and rare periods of abrupt, exogenous shocks and radical breaks – is very popular in institutional concepts and path-dependent concepts (page 2006.) Its quintessence says:"Path-dependent equilibrium is periodically ruptured by radical change, making for sudden bends in the path of history"(Pempel 1998,p.3.) According to this idea there is just continuity below radical breaks; One cannot explain processes of accumulative, step-by-step change like this (Beyer 2006; Walgenbach, Meyer 2008,) and they cannot be found in the reality of substantial change through digital transformation processes. In order to analyze the practice-related side beyond the dichotomous view, it is helpful to look at the articles of Hall, Thelen 2009; Mahoney, Thelen 2010; Thelen, Karcher 2013; Ingham et al 2014.) The only problem though is that, as far as their content is concerned, they are not compatible with the problem of digital business transfer processes. Still, they offer an interesting starting-point when we are looking for modes of gradual but nevertheless transformative change, on which we can base our research. Especially Thelen's idea of gradual transformation (Mahoney, Thelen 2010; Hall, Thelen 2009; Thelen, Karcher 2013) "is a type of change that is slow and transformative at the same time" (Streeck, Thelen 2005,p.15.) It is characterized by a step-by-step, subtle and then increasing transformation, which then leads to substantial changes. In the following I will analyze in how far it is possible to apply "modes of change going beyond the familiar but perhaps ultimately quite rare cases of institutional `breakdown` or wholesale replacement" (Thelen 2003 p.221) to digital business transformation processes.

Forms of digital business transformation

Based on five empirical case studies I will now present relevant modes (forms) of gradual transformation (Thelen 2003; Streeck, Thelen 2005;Mahoney,Thelen 2010; Geels 2014; Hacker,J.S. et al 2013:)

- Layering: Major changes can take place when new elements are added to existing arrangements, and thus by adding new meaning they change its substance successively, e.g. by adding start-ups. This does not question established institutions, but they are extended and slowly transformed with new rules, norms and orientations which after some time become more influential over the old ones. In practice, "layering" e.g. takes places through cross-selling (Rennhak 2012; Nufer, Kelm 2011), where a company's services are complemented by new services. The goal is generating income without significant acquisitions. Here the auto industry was partly successful with its car-sharing-projects, e.g. "car2go" (Daimler) and "drivenow" (BMW.) Via smart phone users can find and reserve the closest vehicle out of a fleet of rental cars. This concept requires a new self-image of car manufacturers. Manufacturers and producers become service agents of mobility.

- Conversion: The goals, functions and reasons of existing companies can also be readjusted to new challenges and the agents' changed interests. In this case change just happens because of the transformation of existing arrangements, and not because new elements are being added to them. In practice, "conversion" comes e.g. through "experience selling." Here the goal is to offer an all-over experience or emotional element, outside of undifferentiated services in saturated markets, e.g. entertainment shopping (Lachmann, Brett 2013.) We can also see changed interests in the auto industry, where cars become part of the internet (e.g. BMW's connected-drive service) and where established factors like horse power and speed loose importance.

- Displacement: The institutional framework of a company can change, because originally minor, subordinate or marginal rules or orientations become more important or even dominant with time. They successively move to the core of the

business and thus lead to a substantial transformation. This is not caused by adding or changing already established institutions, rules or agents, but by an increase in the importance of alternative arrangements. Companies can gain experience by outsourcing experimental areas to spin-offs or start-ups. In case of success, one still has to examine whether these companies by later re-integration of these start-ups can become independent from cooperative partners and thus increase their share of value activities. By optimizing the value-added chain towards once own needs, transaction costs can be lowered (Boavida 2012.) This is currently done by e.g. General Electric (currently 800 employees in the area of digital business transformation) and the Bosch GmbH as electronic suppliers with a new start-up culture within the company. Start-ups within the company are established. They shall help to keep the whole business agile and make it flexible like a start-up.

- Drift: Established institutions and businesses can loose relevance over time, erode or shrivel, because political, economic or social transformations within the ecosystem are not noticed in time. They do not re-adjust at all or not enough to the changed conditions. As a result they successively loose importance because of a lack of adaptability (Hacker et al 2013.) Its characteristic is a disruptive technology, a boost of innovation which changes all rules and seeming certainties (Jung 2014.) Amazon changed the book-trade completely, Apple changed the music industry, Skype changed the telecommunication business. Google became an energy service provider through its daughter Nest, and right now fiddles about the area of medical technology (contact lenses for diabetics which measure the blood sugar level through the tears and send the result to the smart phone) and the auto industry (the self-propelled car.) The start-up Airbnb, founded in 2008, arranges accommodation in 192 countries and according to market experts' estimates snatched away over a million over-night stays from New Yorker hotels. This case shows how hard it is for analogue leaders to resist digital intruders.
- Exhaustion: While in the case of drift the institution, i.e. the company or group formally continues, even though it looses importance, this form is characterized by successive decrease and final break-down. The digital structural change erases

businesses and shatters seeming certainties. Only in this light can we explain Kodac's digital debacle and final bankruptcy. It was too late when they finally recognized that digital photography beats analogue photography. Facing the digital superiority of big American companies this digital debacle threatens several European companies. Instead of Industry 4.0 the threat is Industry 0.0. The trade already recognized this uncomfortable truth. Those who want to sell books or music, also have to offer products in the virtual world, otherwise they end like the record label EMI (bankruptcy) or the Weltbild-Verlag (publishing house, takeover.) The digital revolution has its own laws. One is: Cannibalize your own business, before others devour it. Recognizing this is so much harder, when the analogue business model is really profitable. About 11 years ago the music industry had to learn this, when iTunes was introduced. By now the music industry's newest digital trend is streaming, and Spotify is the start-up of the hour. Music is no longer purchased or downloaded, it is just listened to, without pay by all who do not mind a little bit of advertisement and for 10 Euros per month for a premium subscription. It is not obvious yet whether streaming will replace downloading and Spotify will replace iTunes. But there are many indications for this; the Spotify´s revenue boosted up 31% from 2012 to 2013 while iThunes lost 2,1%.But in absolute figures iThune is far bigger than Spotify (3,93 billion $ versus 1,1 billion $ in 2013).

- Expansion: This is a type that the above mentioned authors do not know. But it seems to be a logic addition to the other five modes. Expansion is actively integrating and developing new technological possibilities and new agents and areas and interests (Hülsheger et al 2014.) Bosch GmbH e.g. bought the thermostat producer Nefit, a subsidiary in the Netherlands, which has a similar product like the energy provider Nest, which Google bought for 3.2 billion dollars. The Next Kraftwerke (power plants), a start-up founded in 2009 in Cologne, demonstrates this type. It penetrated the classic business of power plant operators. By now Next has a virtual network of 1500 biogas-, solar, and wind power systems – without owning a single one of them. This example shows how data economy can break a business model that seems to be unshakable.

This list of different transformation forms has a touch of arbitrariness. Mahoney, Thelen (2010) e.g. leave out the mode "exhaustion" without any explanation. In the same way Streeck (2009) uses the developed categories rather deliberately. "We suggested a few more types of slow change, in particular ´displacment`,`drift`, and exhaustion`. Time will tell which of these will survive, and whether they were more than elaborations on the two original Thelen models"(Streeck 2009, p.15). What remains is an empirical plausibility that there actually is a third category somewhere between continuity and break.

The core phase of a transformation period, where new digital possibilities become relevant and where the essential socio-economic and institutional changes take place, is mainly shaped by the first three modes of change:

1. through the successive redefinition of organizational orientations for action, collective rules (Holz 2014) and guiding orientations (conversion,) 2. through significant shifts in the agent configurations, competitive and cooperative partners, power and influence constellations (Liebhart, Mödritscher 2014, which so far characterized the companies of a sector (displacement) and/or 3. the readjustment of existing structures and organization in the sense their extension with new elements (layering.)

Eventually these transformations are always accompanied with the decline of existing structural elements and companies that are unable to adapt (Hubounig 2014), which became obsolete during the transformation and disappear (exhaustion.) The individual forms of digital business transformation represent different possibilities, how processes of substantial change can become practical (Fig. 1.) Still, they are not adequate to characterize a whole transformation period of replacement.

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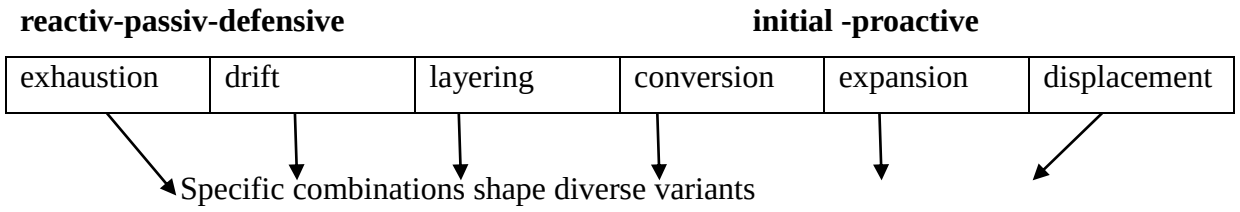

Fig.1: Forms of digital Business Transformation

Types of digital Business Transformation

It is very unlikely that a transformation period can be characterized by only one individual mode. The institutional and business conditions are too complex, the involved agents with their strategic goals are too heterogeneous, and the course of change itself is too erratic (Seelos 2014). It is way more probable that these periods are characterized by specific combinations of change (Katz, Koutroumpis 2013). The modular concept of constructing complex systems aims for a stable platform (Mahmoud-Jouine, Lenfle 2010), which can be build by putting together different, interchangeable modules. In this way different possibilities of substantial change can be checked for plausibility, which do not happen in radical breaks (Sanchez, Mahoney 1996; Pekkarinen, Ulkuniemi 2008). As e.g. periods of business transformation which are characterized by emerging and challenging alternatives (expansion and displacement), as well as by substantial reconfiguration (layering), as well as by specific modifications of the existing structures and patterns (conversion.) At the same time we find a continuing loss of importance or decline of companies and business sectors who are unable to adapt (drift and exhaustion.)

A regular mix of different transformation mechanisms is typical for digital business transformation. This is how different variations (types) become visible (Fig. 2.)

Typs of digital Business Transformation

Incremental change =dynamic reproduction and selective modernisation	**Architectural change** =long-range reconfiguration and substantial realignment	**Substitute change** =erosion and radical break through

- Moderate conversion and layering
- Niche expansion
- Substantial layering and conversion
- Niche expansion and displacement
- Drift and exhaustion

Reform oriented ——————————————→ radical

Range of change

Fig.2:Variants of digital Business Transformation

Mahoney and Thelen (2010) are also trying to identify different types of change. But the forms they describe are at the same time types of substantial change. They do not try to combine different modes. Though, digital business transformation processes cannot be characterized by one dominant mechanism like displacement, layering, or conversion. They are, on the contrary, characterized by different modes which can operate in a complementary way but also in a conflicting way, and are preferred by different agents. It is here that we find another weakness in Mahoney's and Thelen's model (2010.) They only concentrate on identifying change agents, but loose sight of other agents that block processes, prevent them or canalize them. In the process of business model innovations caused by digital business transformation the relevant agents are the employees, partner businesses, as well as market regulation agents as e.g. the government.

We have to distinguish between company internal and external agents (Schroegel 2001.) The internal agents reflect the hierarchy of decision making power within the company. The external agents have a broader spectrum of relevance for the business model than the internal agents. They include customers, the government's market regulators, value-constellation partners (e.g. orchestrator, Stern 2010,) distributer, and competitor (Vanhaverbeke, Cloodt 2006.) The digitization's transformation within a company is not only influenced by a radical questioning of established institutions and agents. Developing or expanding basic institutional and organizational alternatives to the traditional business model is also very important (Holz 2014.) Moreover one also has to pay attention to the established companies' attempts to shock-absorb the breaks caused by new technologies with moderate institutional and organizational changes. Here we think of attempts to level existing institutional conditions or to expand traditional business sectors with new business models (Liebhart, Mödritscher 2014.)

Depending on what particular digital technology and which business sector we are looking at, the conditions that impact a certain transformation period vary considerably. In the following we will distinguish three typical variations.

Incremental change: This type is characterized by the impact of basic technologies that have a relatively small penetration depth (Lee, Berente 2013.) The new technological possibilities have a similar impact to incremental innovations, which sometimes sustainably improve existing processes and products, with no need of larger reconstructions. The technologically caused pressure of adaption or change is rather moderate. This is true e.g. for the use and integration of digital technologies into production structures (smart factory) and cooperative relations with printing houses in the area of the print media "newspaper." In such a case one can analyze the introduction of new technologies as a process of step-by-step implementation and extensive integration in existing intra-organizational structures, which in their core are not subject to change. These implementation processes are mainly carried out by established agents and, for the most part, take place within the existing structures (moderate conversion and layering.) These processes are not trivial, they take much time, require a fair amount of organization and often times large investments. Still, the result is not radical changes, but rather performance improvements. "These processes take place within stable rule-sets and proceed in predictable directions (trajectories). Over time, accumulated incremental innovations in stable regimes can boost performance "(Geels,Kaemp 2007,p.406.)

Architectural change: This type is typical for the diffusion of new penetrating technologies in adaptable companies (Herderson Clark 1990.) The new digital possibilities have an enormous trade specific potential for development and use, which can only be put into practice through substantial organizational and structural transformations in the respective businesses.

In its initial phase the transformation process is often characterized by impulses coming from the business's or company's drivers, which are given by new agents. But also the established agents adapt. They quickly accept the new possibilities even though they do not belong to the early pioneers that develop and use the new technologies. They actively make use of them, re-orient their activities respectively and align the company's organization to the new conditions. This presents a reconstruction potential with the further existing core elements of the established constellation. The transformation process under these conditions is mainly characterized by substantial and orderly layering and conversion. The technological profile, the inter-

organizational relations and institutional conditions are adjusted, followed by a structured redesign over the establishment of formal structures, processes, and goals (Gassmann 2013.) Over time the technological profile changes significantly mainly through expansion and recombination. The established technologies are not replaced but combined and extended with new digital technologies. The agents‘ spectrum is extended with new agents, which become important impulse givers not only in the initial phase but also during the institutionalization of the new technologies. New forms of inter-organizational cooperation tried out (e.g. outside-in/inside-out collaboration,) stabilize over time integrate the newcomer into the new structure for the most part. Established products and/or markets are not simply replaced, but with time substituted with new forms and segments (Barben 2007.) Especially in the light of the established agents' adaptive orientations "drift" and "exhaustion" remain marginal phenomena of the transformation process. A radical displacement is rather atypical for the form of substantial re-orientation. The new constellations challenge the core of established businesses, but without destroying or completely replacing the main agents, intra- and inter-organizational structures.

Substitute change: This form is typical for economic sectors which are unable to adapt, and where change resistant agents and organizational structures are confronted by persuasive digital technologies. Here the new technologies typically come from outside or from the margins of the businesses. They can easily be integrated, used and further developed. But the new possibilities are confronted with agents or organizational structures that are unable or unwilling to adapt. These companies often hesitate because not every technology automatically adds value to the business. And there is the problem. "The history of innovation is littered with companies that had a disruptive technology within their grasp but failed to commercialize it successfully because they did not couple it with a disruptive model (Wessel, Christensen 2012, p3). It is also possible that the existing technological profile was very susceptible to basic innovations and then fails because of protective mechanisms against substantial changes. The change resistant agents and the institutional conditions under which they operate thus quickly loose control over the transformation processes. That is why the adoption, use, and commercialization of the new technologies are left to newcomers. They essentially impact the further process of change. These new agents with their own interests and orientations, that form new structures and rules, drive the expansion beyond its initial phase (Flowers 2008.) They consciously aim for an extensive

displacement and become a rivaling and substitutive competitor. The established agents have a delayed reaction with forms of system-compatible adjustment. The consequence of this non-action is a situation that can no longer be controlled (drift.) Only later they try to find their new profile through moderate layering and conversion. Because of their adaptation deficit the existing agents significantly loose importance. The old structure's constituted elements erode with time and become obsolete (exhaustion.)

Conclusion

In the process of digital business transformation the old business model's main coordinates shift significantly, and a new basic structure is formed. The "internet of things" is already very real in many areas and enables completely new products, thanks to new software. We distinguished between ideal combinations that impact the transformation process in different ways and shape the company's development. They result from an accumulation of numerous and successive events and only stabilize over time. In the case of layering and conversion the initial impulses come from the company's or sector's margins. The digital transformation process mainly takes place through the established agents' strategic realignment. Existing structures are expanded and readjusted. This is the reform-oriented form of transformation. Expansion and displacement characterize the established agents' weakness to adapt to and act on basic new technologies. This way new agents gain significant importance. Throughout the whole process they are the main carriers and driving force. As a result the old structures destabilize with time and are replaced. This is the radical form, which leads to an extensive erosion and substitution of existing structures. In both forms we also find drift and exhaustion to a certain extent. For the radical form they are constitutive .Existing structures become obsolete and are replaced with new things. Only this way "exhaustion," i.e. obsolescence and dissolution make sense as a mode of change. The reform-oriented alternative is also accompanied with the decline of individual agents and structures which do not withstand the pressure of change. However, this is just an accompanying facet of architectural transformations. It means that digital business transformations usually take place in a long process of substantial change, where all of the here presented combinations can be found to a varying extent. In view of the technological dynamic caused by digital business transformation, phases of continuity with only slight modifications and fine tuning belong more and more to the past.

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