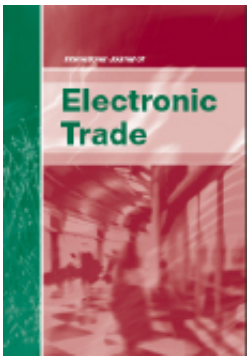

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Digital transformation of B2B commerce – identification of patterns based on successful case studies

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Abstract: The digital transformation of transaction processes is often studied for end-customer commerce. However, studies show that in the B2B environment, many opportunities for digitisation remain unused. Based on a qualitative comparison of 80 real and successful company cases, this study derives eight patterns of how companies can shape digital transformation. These approaches, such as the meaningful expansion of channels, the reduction of transaction costs or the shift of transactions to markets, can serve practitioners as guidance for their own transformation projects. Academics can use this database for further analyses of success patterns.

Keywords: digital transformation; B2B commerce; transaction processes; case studies.

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1 Introduction

The economic potential of digitisation in business-to-business (B2B) transactions is considered to be strong but has not been completely analysed in the scientific and practical discourses on digital transformation (Pagani and Pardo, 2017; Geyer and Niessing, 2020). For example, in public and scientific discourses, various applications of the 'GAFA' players (Google/Alphabet, Amazon, Facebook, Apple) are dominant. Many of the digital innovations focus on marketing-oriented issues (e.g., individualised advertising on Facebook, increasing experience with Amazon). Available applications are widely used to enhance business-to-consumer (B2C) commerce (e.g., Amazon Echo and Apple as a platform for innovative sales applications or Google as an advertising partner in the customer journey) (Horovitz, 2017; Hall, 2020).

Nonetheless, the potential for digital solutions in B2B commerce, understood as the sale of goods and services to professional customers using the internet, is tremendous (Lindh and Nordman, 2018). Depending on the industry, the degree of digitisation in B2B is even less than 40% (Bughin et al., 2017). The overall digital maturity of B2B providers is increasing, but is on average lower than at B2C companies (Catlin et al., 2016; Hall, 2020; Bennan et al., 2020).

However, it has to be noted that the remaining (unrealised) potential for the B2B segment concerning analytics is being pointed out in the telco industry (Chandra et al., 2019).

So far, the major focus of B2B projects in digital transformation, understood as the application of digital technologies to improve design parameters of a company, was on internal processes like production (e.g., smart factory), back-office workflows (e.g., automation of services) and resource planning (e.g., predictive technologies) (Statista, 2017; Lingqvist et al., 2015; Hall, 2020; Bennan et al., 2020). According to statistics, B2B commerce is growing steadily worldwide with a growth rate of about 5% to 13% (global gross merchandise volume in 2013 was 5.826 and 12,216 billion US dollars in 2019) (Statista, 2017; Lingqvist et al., 2015; ecommerceDB, 2020). Traditional small and medium-sized (SME) B2B companies seem still to be a long way from a comprehensive digitisation of their transactions. Nevertheless, they need to adapt to the dynamic conditions of concentrated online and digital markets in order not to risk their

competitive position (Lässig et al., 2016). At the same time, they will not be able to prevail against new digital global players (e.g., Alibaba) (Bennan et al., 2020).

This study collects cases, in which B2B companies succeeded in implementing new digital techniques, processes, services and products in order to increase their economic success. In this article, digital transformation is understood as a comprehensive and sustainable change process of transactions or business models that is enabled by newly available digital technologies (Lankshear and Knobel, 2008; Heinze et al., 2018). Collected cases are examined according to common significances. Significant patterns to be identified are understood as possibly imitative behaviours of companies that can increase the respective business success (Streuer et al., 2016; Geyer and Niessing, 2020). There exist useful frameworks for classifying such approaches, however, they leave room for specifying details concerning financial levers and say little about their practical relevance (since they are 'only' theoretical frameworks). As a summary, the aim of this research is to answer the following question:

- According to commonly used business model frameworks, which configurations dominate for B2B commerce in a digital transformation and how are financial levers exactly realised?

Such an analysis has not been done before grounded on such a large dataset. The contribution from answering this question has two purposes. On the one hand, the found success examples serve as a 'proof of concept' and a way of showing under which circumstances the models can be put into practice (hereby serving as an indication of the practical relevance with respect to feasibility and aptness). On the other hand, the identified examples represent a specification within existing frameworks in the sense that they provide details about how financial levers for cost and revenue can be realised.

2 Related work

Articles that are very closely related to the topic under investigation (and which in fact are used as input for the overarching approach described here, see later) are the St. Gallen study about new business models (Gassmann et al., 2013), the B2B e-commerce business models based on McKinsey (Bughin et al., 2017) and the business model canvas (Osterwalder and Pigneur, 2009). The patterns, these studies identified, serve as related work in this contribution. Even very new publications follow these recognised models in principle (Bascur, 2020; Geyer and Niessing, 2020).

Furthermore, the results here should be understood as supplementing mere frameworks with empirical data as a way of validating them. That means that the empirical data somehow shows how well or easy certain business models can be realised.

Hereby, the now mentioned frameworks serve the following purposes: the St. Gallen study provides a high level classification, whereas the business model canvas displays a business model in all relevant dimensions (very fine-grained). As emphasis is put on e-commerce here, these studies are supplemented by the McKinsey study which highlights the customer/supplier relationships in detail. So by using these three frameworks, all important features shall be captured.

2.1 St. Gallen study

An empirical study by the University of St. Gallen found that 90% of all new business models consist of existing models or of a recombination (of them). The ten business models that predominantly are used are according to this study (Gassmann et al., 2013):

- *E-commerce:* A relatively new business model is the concept of e-commerce, which refers exclusively to electronic sales and trade.
- *Two-sided market:* In a two-sided market, there are two different user groups that are brought together on the platform of a third party.
- *Cross-selling:* Cross-selling refers to a business model in which a company's range of services is supplemented by complementary products and services.
- *Customer loyalty:* The aim of this model is, as the name suggests, customer loyalty. As the basis for this is nowadays usually a bonus program, which records the purchases made by the customer and inserts them into a corresponding bonus payment system.
- *Direct selling:* One model that has been increasingly popular, especially in recent years, is direct selling, in which companies switch off wholesalers and retailers and sell directly to consumers.
- *Experience selling:* This model could also be described simply as brand building. Customers do not just sell a product or service, but brands and experiences.
- *Lock-in:* Similar to the customer loyalty model, this pattern encourages the customer to remain loyal to the company.
- *Mass customisation:* A business model that has become increasingly popular, especially in recent years, is mass customisation.
- *Subscription:* The trend towards subscriptions is to be found in relation to consumer behaviour. Customers are no longer so much interested in owning a product, but rather in the demand for services that they can flexibly adapt to their needs.
- *Digitisation:* The traditional definition of digitisation is that physically distributed goods are increasingly supplemented or even replaced by purely immaterial representations that have advantageous properties.

2.2 Business model canvas

The business model canvas has become a quite common way for documenting and classifying digital business models. Originally, it serves as strategic management instrument for the documentation and further development of existing and for the generation of new business models [Kapteyn, (2012), p.2]. Related to the research question of this contribution, the 'business model canvas', which was developed by over 470 experts from 45 countries, can be used to deduct different patterns in given documentation dimensions. In a nutshell, the framework allows the visualisation of every conceivable business model in different industries. It is a method that supports a company in developing and revising innovative and complex business models. Furthermore, this

instrument advocates a holistic view of a company and thus displaces the product and/or market-focused way of thinking. The business model canvas is based on nine basic building blocks forming the central areas of a company (e.g., values, customers, relations, resources). However, it is not giving recommendations or patterns for the actual content of the dimensions to the described. By analysing the building blocks, many individual ideas can be combined in a business model in a modular manner and put into relation to each other until a marketable model is found [Osterwalder and Pigneur, (2009), p.15ff.]. The business model canvas is therefore usually used as a visual tool.

2.3 B2B e-commerce business models based on McKinsey

According to the management consulting company McKinsey, various digital business model transformation patterns are available for the implementation of a customer-oriented online project. In addition to the computer-supported, bilateral connection of two companies (automated data exchange), three further types of business models can basically be identified in B2B commerce, which differ – particularly in the number of the suppliers and customers (here the number of suppliers is denoted by n and the number of customers is denoted by m) (Bughin et al., 2017):

- bilateral connection (1:1)
- B2B-online-shop (1:m)
- marketplace (n:m)
- procurement platform (n:1).

2.4 Interim conclusions

In addition to the studies or approaches mentioned here, there are a variety of approaches to describe the general trend of digital transformation within companies. With regard to the research question, not only the approaches presented here, but also other studies show two main starting points for this research.

Many approaches show abstract dimensions or categories in which changes can be made. Although they offer (mainly visual) assistance, they do not provide any content-related guidance on how established companies can shape digital change.

Approaches that show changed content and new digital ways of thinking usually have a wide focus (e.g., Berman, 2012; Li et al., 2017). They often subsume digitisation ideas for any type of transaction process. The few studies that have specifically analysed the transformation of B2B transactions (e.g., McIvor and Humphreys, 2004) focus on quite specific industries (like consumer electronics or e-health) or predefined coordination mechanisms (e.g., Ordaninia and Polb, 2001; Lin et al., 2007) limiting their domain-independent added value. Textbooks on this topic often describe only conceivable patterns without evidence of successful case studies from the real world (e.g., Kaufman and Horton, 2014; Baker, 2014).

Moreover, many studies which combine a narrowed view on B2B commerce and give specific pattern or guidance within business dimensions are sometimes outdated (e.g., Andal-Ancion et al., 2003; Ordaninia and Polb, 2001).

3 Methodology

Concerning the methodology performed, a combined approach was chosen. A multi-case design (Herriott and Firestone, 1983) was supplemented with an integrative review (Kornmeier, 2007). This collection of cases in literature aims not only at a simple analysis of texts, but also serves as a method in the communication process. The approach of a literature search seems to be reasonable for the question, because a comprehensive systematisation especially for B2B and not only an overview for business models in these transaction processes shall be given. The concrete methodology followed Sulaiman et al. (2016) with the following steps.

3.1 Search and selection

In order to ensure a scientific basis and to not use any self-marketing or consulting publications, only documents from scientific databases (e.g., EBSCO, IEEE and Elsevier) have been used to identify cases. The two central limiting parameters ('digital transformation' and 'B2B' transactions; including synonyms) designed the search string. After reviewing more than 3,000 documented cases, only those were considered that fulfil an explicit proof of business success (for example, with key figures) as well as supplementary quality standards (for example, completeness, correctness, still existing business models). Only cases published between 2014 and 2019 were included in the analysis. This restriction was important, because only current solutions for digital transformation should be included as findings in the patterns. If the publications followed further quality requirements according to Webster and Watson (2002) and Bandara et al. (2015), their content was examined. The search process was conducted in several iterations.

3.2 Coding

For the 80 cases so far, a total of 300 attributes for each was coded to determine the transformation approaches. In addition to metadata (e.g., name, company size) and the actual business model/model change (parts of the business model canvas), the orientation within recognised classifications (e.g., the St. Gallen business model navigator) and some other attributes (e.g., success measures) were extracted from the cases. Some example attributes should be outlined:

- Four very basic attributes (name, sector clusters, company size and sales area) coming from the metadata.
- In addition, the category 'added value for the company' was considered with the following four attributes: reduction of transaction costs, increased productivity, revenue growth or development of additional markets.
- Furthermore, 10 out of 55 business models from the St. Gallen business model navigator could be taken as attributes: e-commerce, two-sided market, cross-selling, customer loyalty, direct selling, experience selling, lock-in, mass customisation, subscription or digitisation.

- With respect to the B2B e-commerce business models based on McKinsey, it was analysed to which category of an e-commerce setting (if applicable) the business model could be attributed. Following a typical matrix setup with the four dimensions being number of suppliers vs. number of customers, four categories were derived: procurement platform, marketplace, bilateral connection and B2B-online-shop.
- From the business model canvas, eight of the nine building blocks were chosen for complementing the attributes: customer segments, value propositions, channels, customer relationship, revenue streams, key resources, key activities and cost structure. In each of these attributes, the respective characteristic was chosen (for example, for customer segments, there is the choice between mass market, niche market, segmented, diversified or multi-sided markets).

3.3 Analysis

A qualitative analysis was carried out by deducing general theses in the dataset (Lee, 2002). The qualitative content analysis overall followed the recommended approach of Mayring (2014) as well as the methodological recommendations of Woolfswinkel et al. (2011), the cases were coded with a deductive and then an inductive method with the aim of identifying common patterns based on the coded attributes.

3.4 Documentation

Patterns identified so far have been described in a standard template for best practices documentation (including for example, key changes, risks, opportunities, performance measures and sample companies).

4 Results

The number of remaining cases that were analysed amounts to a total of 80. For the aforementioned attributes, the respective distribution was derived from which we get an indication what values of the single attributes are typically successful and which are not.

- *Metadata:* The first finding concerns the company size: summed up, there are no micro-enterprises. 53 out of 80 cases have more than 249 employees. One explanation is that companies need a critical size for substantial investments in digitisation on order to be a contender in this field. Next, the distribution among industries exhibits a main emphasis on ‘metals and electronics’ (32 out of 80) and the second largest emphasis is on ‘consumer goods and FMCG’ (19 out of 80). The remaining 29 cases cover the industries agriculture, construction, e-commerce and health and pharmaceuticals. The majority (53) operates nationally, only a minor part (27) sells internationally.
- *Added value for the company:* Additionally, when considering the added value for the company, revenue growth was the most common characteristic (47) and the second most important (38) was reduction of transaction costs.

- *St. Gallen business model navigator:* When classifying according to the St. Gallen business model navigator, it can be discerned that there is a clear concentration on the business model e-commerce (68 cases out of 80) which underlines its strength in digitisation schemes.
- *B2B e-commerce business models based on McKinsey:* Concerning the B2B e-commerce business models based on McKinsey, the B2B-online-shop was the most common business model with 47 cases. There was even a combination of a B2B-online-shop with a B2C-online-shop which added another 11 cases.
- *Business model canvas:* And from the business model canvas, we highlight for each field the dominant entry or setting. Customer segments are somewhat splitted between 39% mass market and 61% niche market which is in accord with statements found in the literature. The value proposition is dominated by convenience/usability with 46% which takes advantage of the customers need for easy shopping. Somewhat unsurprising, 'web sale/shipping' dominates channels with 70%. Similarly for customer relationship, where 'self-service' dominates with 47 out of 80 cases. When it comes to revenue streams, asset sales clearly dominate with 99%, therefore, 94% of key resources are physical. Key activities are, self-explanatory, in all 80 cases the online solution. And finally, concerning the cost structure, the majority, 75%, is cost-driven (vs. value driven).

5 Discussion

Based on the analysis sketched before, eight patterns in the digital transformation of B2B commerce could be identified. They will be introduced in general as well as using an example for each:

- *Marketplaces organised by large-sized companies:* Four companies (Amazon Business, Alibaba, Klöckner and Mapudo) predominantly organise transactions on digital B2B marketplaces. It can be concluded from the dataset, that the creation and sustainable operation of such platforms with a critical mass goes hand in hand with large investments only large companies can afford. Typically, they realise more revenue from their B2B business and it has to be noted that they went in the opposite direction of the case above (from B2C to B2B). However it has to be noted, that these players clearly differentiate according to geographies (Taluswood Films, 2012).
- *Digital channels reduce transaction costs:* The most frequent focus of B2B transactions of standard products is reducing transaction costs through digital channels (e.g., electronic data interchange – EDI). Tendencies can be observed, which go away from classical interface standardisation (e.g., EDIFACT). Hirschmann Automotive for example speeded up the order process by offering free virtual samples. If engineers and developers are convinced, they have access to all internal planning processes (advanced interface) to optimise their own scheduling. This identified advantage seems especially apt for products with simple price calculation mechanisms which typically concern standard items.

- *B2B companies conquer the B2C markets:* Established B2B companies are increasingly acquiring private end-customers. Most of these companies come from the fast-moving consumer goods industry as in this area the newly created technological capabilities easily allow the transfer to another customer segment. By omitting wholesalers and retailers through digital channels, these companies realise lower prices and gain a better customer understanding. For example, Flexfire LED, a manufacturer of indoor and outdoor lighting, nowadays generates 20% of sales in the end-consumer sector. However, established B2B customers might regard the additional sale to B2C customers as a threat to their own business.
- *B2B companies transfer physical to digital goods:* Many companies enrich their traditional product portfolio by connectivity und smartness. The actual added value is more perceived by its new digital possibilities. Smart farming, as offered for example by Claas, means that farmers profit from agricultural management systems including integrated harvester and connected stock cabins. This entails also the development and offering of respective software solution. It should be clear that the development of systems which provide a substantial added value is rather capital intensive and accompanied by respective investment risks.
- *From offline service to online service or multi-channel offers:* A lot of companies still rely on offline services (e.g., personal on-site advice) although they aim to reduce transaction costs. Personal support is needed to handle complex products or orders of considerable investment, but it is now often part of a cross-channel solutions. For example, the tool manufacturer Hilti placed a new contact possibility for personal help (e.g., video chat) on its B2B-online-shop page. So called 'Hilti Center' offer stationary help for online customers. However, it should be noted that typically respective costs can increase, especially for the sale of complex products. These risks are perhaps outweighed by the opportunity for more sales as the offered personal support might detect such opportunities.
- *Modern mass customisation:* Especially manufacturers were successful in adapting products to the individual needs of customers at the price of mass production. At Zeppelin Cat, excavators can be pre-configured and ordered including a real-time support by digital consultants. Goin, as another example, sells furniture for restaurants using an online configurator. It offers a 3D room planning showing the furnishing concept including service routes for the operating staff. However, it should be considered that simple reconfigurations might lead to higher production costs. Hence, such an offering should be designed carefully.
- *Added value through experience selling:* Some B2B providers offer their customers a new shopping experience. In addition to the pure sale, companies tend to new forms of product and service impressions with emotional attraction or technical richness. The e-bikes manufacturer Riese and Müller, for example, launched a dealer portal displaying about 1.2 million configuration options with real-time pricing. While increasing the orders, the number of support requests was reduced due to media items (e.g., video guidelines) available for all configurations. This point is intimately related to the point above and takes it further, however it should be noted that here typically a transfer from B2C to B2B has been done.

- *SMEs acquire new customers:* It has become clear that especially SMEs often take the chance of their flexibility to adapt to new market conditions and are thus able to gain new customers in existing segments. Lex and Hesse, a wholesaler of spare parts for busses and rail vehicles employing about 30 people, has for example been able to generate a 500% increase in turnover by the introduction of a new B2B shop. It focuses on very specific requirements such as automated transfer of orders. In particular, a more international outreach can be a significant advantage.

In the scientific discussion, the question arises whether these findings can be put in a somewhat structured overall framework. At first, a classification according to the top levers of a usual balanced scorecard seems appropriate, where we either look at cost reductions or increase in revenues. The cost reductions are achieved via reduced transaction costs which are made possible by the digital infrastructure. The increase in revenues is achieved by multiple means for which the most apt sub-framework here seems to be the famous Ansoff Matrix (in a generalised way) which distinguishes according to old/new markets and old/new products in its dimensions:

- *New products* (also enhanced ones): Highly customised products (6), new digital goods (4), added value through experience selling (7).
- *New markets* (or customer groups): New international customers (8), online service or multi-channel offers (targeting digital affine customers)(5), forays into B2C markets (3).

The statement that ‘marketplaces are organised by large-sized companies’ (1) is then just an observation about the maturing of the e-commerce industry. Hence, summarising more clearly, the technological benefits could either be used to enhance product offerings or to address more markets/customers. So the question remains what substantial opportunities in this respect have not yet been fully exploited.

6 Summary

The analysis shows that successful digital transformations in B2B commerce in principle follow generic patterns. They can serve as a set of templates for the creation of digital innovations especially in traditional companies. At the same time, they can now be used to further investigate detailed obstacles and beneficial factors. The patterns derived can serve as a basis for discussions with researchers from multiple fields. The various identified example cases are suitable for concrete discourses with practitioners. Especially against the background that in the context of digital transformation, often only general trends, rough ideas and exaggerated scenarios are described (Mertens and Barbian, 2016), an extended analysis of this dataset might give specific answers for the future of B2B transactions. Although some of the identified patterns are known in established literature, the dataset has the potential to provide answers and applicable solutions for the digital transformation of B2B commerce. The attributes documented for each successful case show specifics for the different types of transactions and business models (e.g., complex vs. standard products, focus on new vs. old customer groups, own vs. third-party development, etc.).

After the qualitative analysis, the authors will extend the dataset in current research by adding further cases. The aim is to substantiate the patterns with quantitative proofs and further analyses (exact dependencies of the attributes) early next year. In ongoing case studies, the authors are also about to examine the applicability of previously documented patterns in German SMEs. In particular the detailed digitisation of sales seems to be promising (Sana Commerce, 2018).

The identified examples might be of high interest to companies as they serve as either successful examples which could be imitated or as current business practices that point towards room for enhancement and differentiation.

Limitations of this study clearly lie in the 'descriptive character' of the approach. To further sharpen the observations, it may be worthwhile to track the development of the identified company examples and analyse whether they continue to be successful (maybe dependent on certain adjustments that they introduce). This could be done in a future research. However, the discussed cases clearly give a strong indication for feasibility and meaningfulness of undergone efforts.

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