Information Technology and Marketing – An Important Partnership for Decades

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Purpose: The enabling technologies that emerged from information technology (IT) have had a considerable influence upon the development of marketing tools, and marketing has become digitalized by adopting these technologies over time. The purpose of this paper is to demonstrate the impacts of these enabling technologies on marketing tools in the past and present and to demonstrate their potential future. Furthermore, it provides guidance about the digital transformation occurring in marketing and the need to align of marketing and IT.

Design/methodology/approach: This study demonstrates the impact of enabling technologies on the subsequent marketing tools developed through a content analysis of information systems and marketing conference proceedings. It offers a fresh look at marketing's digital transformation over the last 40 years. Moreover, it initially applies the findings to a general digital transformation model from another field to verify its presence in marketing.

Findings: This paper identifies four eras within the digital marketing evolution and reveals insights into a potential fifth era. This chronological structure verifies the impact of IT on marketing tools and accordingly the digital transformation within marketing. IT has enabled digital marketing tools in all four digital transformation levers, i.e., *automation, customer interaction, connectivity* and *data.*

Originality: This study is the first to apply the digital transformation levers of *automation, customer interaction, connectivity* and *data* to the marketing discipline and contributes new insights by demonstrating the chronological development of a digital transformation in marketing over eras.

Practical implications: The sequencing of enabling technologies and subsequent marketing tools demonstrates the need to align marketing and IT to design new marketing tools that can be applied to customer interactions and be used to foster marketing control.

Keywords: information technology; marketing; alignment; conceptual paper; content analysis; eras in digital marketing; levers of digital transformation; chronological marketing evolution

Paper type: Conceptual Paper

Introduction

Information technology (IT) and marketing are well-known disciplines and have been fields of research for many scholars. As a result of analyzing the current state of the literature, which has focused on dedicated segments and portions of the functions, it has become necessary to adopt a macro perspective and widen the view to observe the overall picture of the relationship between marketing and IT. Historically, in development economics, IT has been thought of as a key factor in marketing functions, and it plays an important role in the evolution of marketing through its increasing influence – or as it is generally called – the digital transformation. In contrast, it has been suggested that marketing is losing its influence within firms and has become marginalized because typical marketing decisions have moved to other departments, such as research and development, finance or strategy (Homburg et al. 2015; Verhoef and Leeflang 2009; Sisodia 2006). Moreover, it is apparent that marketing and sales managers do not always keep up with their digitally empowered customers (Day 2011). However, the use of IT tools and the flexibilities in IT infrastructures are factors contributing to customer interactions and business success in terms of creating and capturing value by managers (Drnevich and Croson 2013; Benitez et al. 2018; Domínguez-Escrig et al. 2018). Furthermore, IT is observed to not only advance marketing tools but also marketing methods by creating new enabling technologies. Hence, we have observed an urgent need to identify the new role of IT in conjunction with the continually changing roles of marketing. This new constellation and

overlapping of roles and tasks between the disciplines is what we call *alignment* between marketing and IT.

So far, little attention has been paid to the roles of marketing and IT in combination. Since both disciplines are part of a company's value creation and support function, the question becomes apparent as to why firms separate marketing and IT from each other. Subsequently, a much debated question is whether IT is perceived as a firm's cost or investment (Verhoef and Leeflang 2009). Following the evolution of marketing and its tools in particular, the need for IT integration turns out to be inherently important. To achieve efficient use of IT and the right fit with it, marketing managers need to know how to make use of IT-enabled marketing tools. Thus, support from and alignment with the IT discipline appears essential for marketing managers. Therefore, future marketing tools could be directly shaped to meet the needs and evolved in a shorter period of time if marketing and IT were to collaborate more closely; we believe there is evidence for the creation of even more efficient IT-enabled marketing tools if these disciplines join forces.

The enabling technologies that emerge from the IT environment substantially impact the development of marketing tools and methods (Feng et al. 2020). Marketing finds itself in the middle of a digital transformation, which IT has caused and accelerated over time. Practical examples of technologies that enabled marketing tools are the following: database management systems enabled customer relationship management (CRM) tools; internet websites enabled online marketplaces; social media applications enabled corporate influencers and so on. However, consumers were using many of these technologies even before they were used as marketing tools. Online forums (Murray and Maceli 2017), mobile apps (Taylor et al. 2015) and social media websites (Bauer et al. 2015) are examples of technologies that marketing currently uses

as tools but that originated as user-to-user communication. Ultimately, new marketing domains such as *digital (content) marketing* (Saura et al. 2017; Kim 2015) and *influencer marketing* (Wiedmann and Mettenheim 2020), arose naturally from these technologies. Hence, IT has essentially revolutionized marketing methods by increasing marketing performance, reach and efficiency.

Researchers have studied digitally empowered marketing over a certain period, focusing on many aspects and details. Intensified competition, opportunities and changing customer purchasing behavior (Ianenko et al. 2019) have increased the need for academic attention. Recently, researchers have shown a growing interest in the alignment of the IT function (Ricciardi et al. 2017; Domínguez-Escrig et al. 2018) and its strategy (Coltman et al. 2015; Gerow et al. 2014; Bharadwaj et al. 2013) within the organization but have rarely focused on marketing functions. Some scholars underline the demand for a more innovative marketing department (Verhoef and Leeflang 2010), reduce innovation barriers (Maldonado-Guzmán et al. 2017) and there is ample research about the relationship between marketing and other major functions besides IT (Dewsnap and Jobber 2000). Further, academia still lacks guidance on how to align IT within the organization (Matt et al. 2015; Coltman et al. 2015), and additionally, the marketing department's capability gap in terms of digitalization needs future research (Day 2011). Moreover, scholars have found that the marketing department has been marginalized and has lost significant influence because typical marketing decisions have moved to other departments (Homburg et al. 2015; Sisodia 2006) and are influenced by the customer. Conclusively, the concept of digitally empowered marketing and the need for alignment between IT and marketing are central to both academia and applied praxis.

This study systematically identifies the sequencing of enabling technologies followed by marketing tools and the establishment of marketing domains by performing a content analysis of conference proceedings over the last 40 years. As a complete list is out of reach, we will focus on the most relevant conferences within both disciplines, which are as follows: The International Conference on Information Systems (ICIS) (AIS 2020a) and the Academy of Marketing Science annual conferences (AMS 2020). These sequences have been clustered in Table 1 and are surrounded by the marketing domains. The results are part of a framework of digital transformation in marketing. Furthermore, this study initially identifies four eras, i.e., the Telecommunication Era, Data-Managed Internet Marketing Era, User-Enabled Mobile Era, and Intelligent Networking Era, in which these sequences have occurred and provides insights about a potential fifth era, which we call the Autonomous IT Era. To show coherence and the evolving need for alignment, a brief overview of the history of the evolution of marketing will first be provided. This study is the first to apply digital transformation levers from other disciplines to the marketing discipline. The levers *automation*, *data* deployment, *connectivity* and improved *customer interaction* create essential clusters within the digital transformation, and we identified IT-enabled marketing tools in all four levers (Berger 2015). We will conclude by examining the implications for academic research and marketing managers in terms of marketing and IT alignment.

Marketing evolution

Let us start the evolution with the following simple question: what is the task of marketing and sales? If we had asked the same question 20 to 40 years ago, we probably would have received a different answer from today. Moreover, were we to ask this question 20 years in the future, we might obtain the following counterquestion: why do we need marketing or sales people? Through digitalization and individualization,

customers become increasingly autonomous and can handle most of their sourcing without relying on one point of contact with a salesperson or marketingperson. Moreover, researchers have even found an automation potential of sales tasks of approximately 40 percent (Muro et al. 2019). Subsequently, we need to discover what has changed in marketing in recent years and determine what marketing is all about currently and what it will potentially be in the future.

Hence, in recent decades, the applied managerial discipline and marketing practices have undergone significant changes, from their earlier focus on mass marketing followed by the industrial revolution in Western industrialized countries and moving toward segment marketing (Borch 1957; Mallen 1975). Segment marketing is different from mass marketing in that businesses focus on the wants and needs of the "average" customer, identifying specific segments and using marketing as a planning tool (van Waterschoot and van den Bulte 1992). Thus, scholars have long speculated that the future of managerial marketing should focus on customer-centricity rather than the average customer within a market segment (Sheth et al. 2000), and there are several new approaches to a customer-centric marketing mix that increase customer participation (Sheth and Sisodia 2012; Wu and Li 2018). More current marketing mix approaches focus on web-based aspects, which have emerged as a consequence of various changes stemming from new types of customers, global competition and rapid development in technologies (Vassileva 2017). As in the previous marketing systems, customers are still the center of marketing activities, with the difference being that the market is operated within a cybernetic marketing system in which customer activities and business transactions can be monitored in real time (Dholakia et al. 2011). Observing this evolution, researchers point to content marketing to meet individual customer needs (Järvinen and Karjaluoto 2015; Chaffey and Smith 2013). To

summarize, marketing has changed from mass marketing to personalized marketing and now uses web tools as marketing tools for customer communication.

Due to the increasing demand for digital tools, further insights are required to solve the question of responsibilities. The responsibilities of new roles, e.g., the chief digital officer, who is connected to planning and deployment of digital transformation strategies, is unclear because functional interdisciplinary roles contradict with those of siloed disciplinary executives (Singh and Hess 2017). However, these new roles can lead to new possibilities in the use of digital tools. The possibilities that IT can offer are obviously much larger than marketing can identify, let alone implement. Surprisingly, the extent to which the IT department is already aligned with marketing and sales activities and decisions has not been a field of research so far. In conclusion, this imbalance between quickly increasing IT functionalities and the need to develop digital competency in the marketing department underlines the need for alignment between marketing and IT.

The influence of IT within the marketing discipline

Digitalization has introduced many IT technologies and tools, which fundamentally affected the marketing and sales functions when they were applied. This study analyzes and summarizes examples of these enabling technologies and tools accordingly. Some tools had a major impact on the marketing function and even helped in the creation of new marketing domains, which would have not been established without IT support.

Following the expected sequencing between enabling technologies and marketing tools, we will first provide a chronological overview of these analyzed components and then a structured framework that explains the interrelationship between these components. For the chronological overview, we will provide a table focusing on enabling technologies and convert the table data into chronical eras because marketing

technologies arose from different enabling technologies in parallel. Furthermore, for a structure, we will use the levers *data*, *connectivity*, *automation* and *customer interaction* because these indicate digital transformation. Hence, we will cluster the analyzed components into these four levers.

Method

To demonstrate the correlation and development of enabling technologies and the subsequent marketing tools, we aim for a chronological list. However, the field of enabling technologies and the use of marketing tools is broad. Consequently, a complete list is out of reach, and reviewing every side would be unwieldy. Thus, it is appropriate to focus on the most relevant aspects. As the exact point of time of the development of enabling technologies is not important, but rather the sequencing between both is the subject of this research, we decided to perform a qualitative content analysis of conference proceedings and focus on two relevant conferences. The International Conference on Information Systems (ICIS), which has a history of over 40 years with approximately 270 conference papers published yearly that are primarily delivered by and for academics, can be understood as a relevant IT conference (AIS 2020a).[1] To add marketing's perspective, we chose the Academy of Marketing Science (AMS) annual conference, due to its reputation in the marketing scientific community, a history of over 40 years and a yearly publication volume of between 100 and 330 conference papers (AMS 2020). These two conferences build the basis for the analysis of this study.

[1] In exceptional cases other conferences have been used when the gap between first entry of ICIS deviates significantly from other conferences. Deviations are clearly displayed within Table 1.

The conference proceedings were studied using a qualitative content analysis as follows. We chronologically screened the titles and keywords of the ICIS conference proceeding papers (AIS 2020b) starting from 1980, as this is when the first available source for new technologies and terms corresponding to marketing was found. Furthermore, we added the earliest available reference for each new technology into Table 1. This same procedure was applied to that of the AMS annual conference proceedings starting from 1979, which were published from 2015 onwards (e.g., Gitlow and Wheatley 2016). Then, we screened the titles of the marketing conference papers for terms such as *electronic* and *digital* plus *online* and recorded the corresponding papers in Table 1 as well. Then, we determined whether the papers fit into the context by analyzing all the abstracts and excluding inappropriate topics accordingly, as well as duplicates. For example, papers dealing with the marketing of mobile phones were excluded because mobile phones could be replaced by any other innovative good, so we focus on marketing with and by mobile technologies. Finally, we determined the marketing domains as such if a journal within the Scopus database contains the term in the title (Elsevier 2020; Henseler and Guerreiro 2020). Additionally, we added marketing domains that were published with definitions for marketing types stated by the American Marketing Association (AMA 2020). Conclusively, with this method we categorically identified the IT enabling technologies, followed by the marketing tools and marketing domains.

Results

The results of this study are manifold. First, we identified 28 enabling technologies, 103 marketing tools and 8 overarching marketing domains. Second, the study identifies the chronological eras containing these components. Finally, we provide a structure that explains the interrelationship of these components.

Table 1 shows the marketing tools that emerged from the enabling technologies, clustered by marketing domains, if applicable, and sorted chronologically. One aspect we aimed to identify was the developed marketing domains, which are demonstrated in this table.

[Insert Table 1 near here]

Some tools and technologies from different domains are constructed with dependencies between each other and appear approximately at the same time. However, following the chronological appearance of the technologies and tools, we clustered those into four consecutive eras, as shown in Figure 1. We have named the four identified eras the Telecommunication Era, the Data-Managed Internet Marketing Era, the User-Enabled Mobile Era, and the Intelligent Networking Era and have derived insights about a potential fifth era, which we call the Autonomous IT Era. As shown in Figure 1, we have identified a chronological overlap of the eras and understand the demonstrated periods as approximated time spans.

[Insert Figure 1 near here]

Telecommunication Era

Marketing tools in the early 1980s used telephones as an enabling technology. Telecommunication in private homes started early but slowly (Hopner 1961) and was used for selling and shopping, such as through cold calls and catalog ordering in the ‘80s (George 2015) and enhanced with telemarketing in the 1990s. Furthermore, speech understanding systems (Kawahara et al. 1996) enabled the use of an access-automated call center, where customers could identify and guide themselves to the responsible salesperson (Ehrlich et al. 1997). The call centers (Wang et al. 2015) were further improved by integrating technologies of the later eras (Subramanyam and Krishnan

2001).

We identified this era as occurring between 1980 and 1995.

Success stories within the Telecommunication Era

To finalize, we provide a few examples of marketing tools applied in the business context. For instance, Novell, the former world's leader in networking, served close to 50 percent of the world's population in 11 markets. They gained this outstanding performance with advanced call centers as the only way to support this rapid growth (Costa 1996; Fleischer 2004). Even more interesting is that the return on investment for call centers has been identified as being greater than 20 percent. Furthermore, the W. Wrigley Jr. Company, the world's most widely known chewing gum producer, was able to reduce their sales costs by 1.4 percentage points by installing call centers (Prabhaker et al. 1997).

Data-Managed Internet Marketing Era

The second era includes technologies that enabled mainly data-based marketing and firm-to-customer connectivity. IT brought enabling technologies that supported the corporation in structuring information, for example, with data management systems (Sarda 1987), enterprise resource planning (ERP) (Veth et al. 1998), neuronal networks (Schocken 1990) and knowledge management systems (Kumar 1990). Furthermore, the marketing reach was increased via e-mail communication (El-Shinnawy and Markus 1992). With the internet as the most visible manifestation of this era, the company increased its ability to communicate with and collect information about and analyze their customers (Rust 2020). Further, marketers could communicate proactively (webpages) and reactively (electronic commerce) without being manually involved in the marketing process. Thus, electronic commerce (e-commerce) with its internet

advertising was established (Ives et al. 1995; Löbbecke and Powell 1997; Sautter and Lindquist 2015). Global sales and marketing were further enabled by using IT systems with a worldwide reach. Subsequently, customers used tools such as online marketplaces, electronic catalogs, online auctions and virtual stores to reach their suppliers (Dellarocas and Klein 1999; Vakrat and Seidmann 1999; Yang 2015; Gonzalez 2015; Diehl and Weinberg 2015). Similar tools followed in the B2B environment (Yoo et al. 2001; Boyd and Spekman 2015). Hence, a firm's sales power could be tremendously increased without expanding the sales and marketing workforce. However, to use the provided IT solution efficiently, training is necessary to address the services sold and the customer messages correctly.

We have identified that this era occurred between 1990 and 2005, which introduced new marketing domains such as online marketing and internet marketing (Zugelder et al. 2015).

Success stories within the Data-Managed Internet Marketing Era

Walmart, one of the largest brick and mortar retailers within the U.S., served 244 million customers online each week in 2014. Customers ordering online can rely on real-time estimated delivery dates. Walmart increased their global e-commerce sales by approximately 12 percent to $13.7 billion in 2016 and has spent billions of dollars on technological investments, making it one of the largest IT spenders in the entire world, competing with Amazon (Ignatius 2017; Mohammed 2015; Yohn 2017).

H&M increased its sales revenues by 24 percent by integrating online and in-store shopping via services that enable shoppers to pick up and return online orders in the store while also offering more flexible payment options, faster delivery and improved search features. Further, H&M increase their revenue via functionalities within digital

tools such as search engines to find outfits worn by celebrities, where H&M links similar clothes in their online shop (Hennes & Mauritz AB 2020; Mulier 2019).

User-Enabled Mobile Era

In contrast to the Data-Managed Internet Marketing Era, where the corporation was using IT to reach and re-educate the customer, in the User-Enabled Mobile Era, it is the customer who gained influence through new IT solutions. In early 2000, webpages transformed from a passive medium to an active medium, where user-generated content (UGC), social media and electronic word of mouth (eWOM) became apparent (Koskinen 2003; Oh et al. 2008; Xu and Zhang 2009; Bussière 2015; Lo and Lin 2010). Customers could interact easily with other customers by using blogs and online communities (Xu and Zhang 2009; Landry et al. 2015). These new possibilities were also used in the corporate context, such as sharing online reviews, ratings, discussing service problems in forums and commenting online (Coussement and Antioco 2015; Murray and Maceli 2017; Chen et al. 2004; Mills et al. 2015; Yang Shuiqing et al. 2019). This has led to a change in sales and marketing responsibilities. Previously, the customer would consult the sales manager regarding the quality and nature of the product/service. Today, customers gather information from other customers via IT tools, such as blogs, social media and reviews to consider their purchase and later share their experiences with other customers using the same tools.

It seems to be inherent that the corporation needs to incorporate those techniques to gain control of sales again. Inevitably, marketing needs to align with IT to close this gap of control. However, surprisingly, firm-generated content, social media ads and purchase features in social media applications followed later, in approximately 2015 (Bacile et al. 2017; Guo et al. 2017; Dyrby et al. 2014). Specifically, firms exploit social media for marketing purposes by using it as an influential tool; they may pay customers to

promote products from user to user or sponsor blog posts of celebrities (Gomez et al. 2018; Ferreira 2017; Segev et al. 2015; Geng et al. 2020). This interactivity and information sharing were positively associated with customer satisfaction (Shao et al. 2020).

Corresponding to this era, firms proactively invite customers to participate in innovation and new product development processes. IT-enabled cocreation allows the consumer to provide ideas, make demands or vote for product features (Grace et al. 2008; Emrich and Rudolph 2015; Hughes et al. 2015). Moreover, marketing departments made use of digital payment methods for collecting funding capital from potential customers by using crowdfunding as a tool (Zvilichovsky et al. 2013; Boeuf and Durivage 2016; Morgan and Obal 2016).

Furthermore, enabling technologies such as web caching and click-path-data support marketing through data mining and online login data by which pricing can be adjusted dynamically and websites can be improved based on click data (Hosanagar et al. 2002; Weinmann et al. 2013; Reid 2000; Yada et al. 2015; Chung 2015). These marketing tools are examples that have been further developed from former eras over time, indicating the overlap of the eras, as shown in Figure 1.

Further developments during this era are the invention of mobile applications and self-service technologies as enablers (Kemper and Wolf 2002; Bodendorf and Saueressig 2000; Treiblmaier and Dickinger 2006). This has led to new marketing channels such as mobile marketing and advertising and new service methods such as freemium content and digital coupons and ultimately to mobile shopping and mobile commerce (Goh et al. 2009; Guo et al. 2010; Nakhata 2015; Liu et al. 2007; Swilley and Cowart 2015; Han et al. 2013). Furthermore, the customer can fulfill services now on his own via self-services, whether mobile (e.g., mobile banking), in shops (e.g., self-

scanning devices, ATMs) or as a remote service (Nel et al. 2015; Anitsal et al. 2015; Espina and Pérez 2015; Paluch 2015).

We have identified that this User-Enabled Mobile Era, which brought new marketing domains, such as mobile marketing, social media marketing and influencer marketing, occurred between 2000 and 2015 (Bauer et al. 2015; Wiedmann and Mettenheim 2020).

Success stories within the User-Enabled Mobile Era

The success stories that involve the use of social media are assorted, for example, when Starbucks used Instagram to promote their Unicorn Frappuccino, their revenue increased by 3 percent globally and *Fortune Magazine* named Starbucks the fifth-most admired brand in the world (Gallaugher and Ransbotham 2010; Krishna 2018; Taecharungroj 2017).

Likewise, during a social media campaign, the International House of Pancakes (IHOP) changed its name to International House of Burgers (IHOb) for a short period in the summer of 2018, and over 30,000 users responded. IHOP's social media relevance improved after the announcement, and the number of burgers sold increased by 400 percent as a result of social media marketing (Odell 2018).

Tesla Motor CEO Elon Musk uses Twitter as the firm’s main marketing channel. Via his regular tweets, he achieved the establishment of Tesla as the car brand most linked to topics such as electric cars and autonomous vehicles on social media, leaving behind the biggest electronic car producer, Renault-Nissan. Compared with the marketing spending necessary for professional corporate social media posts, Elon Musk outperformed his competitors by mainly using Twitter (Furr and Dyer 2020; Hansen 2015; Popkin 2018).

Using the enabling technologies of self-service devices, McDonald's generated close to 5-6 percent more revenue by establishing 8,000 to 9,000 self-service kiosks, where customers can select their food on touch screens. McDonald's recognized that by allowing customers to visualize and touch the desired food, customers tended to select more items than at the usual counter. In parallel, the number of necessary personnel could be reduced (Zhu and Meyer 2017; Gavett 2015; Horovitz 2018).
Hence, creative social media statements and applied self-service support improve sales and marketing activities.

Intelligent Networking Era

In this last era, we have recognized tools that use new connected data and collaboration. At the end of the 2000s, the first machine learning algorithms were established, followed by artificial intelligence (AI) and web analytics in general (Ichise 2008; Keller et al. 2014; Tremblay et al. 2018). These technologies have enabled the marketing departments of firms to start predicting sales performances better, use automated analysis of text content, implement robo-advisory, personalize advertising in online environments and improve dynamic pricing (Boso et al. 2015; Fukawa and Huang 2018; Beser et al. 2019; Fresneda and Gefen 2017; Gironda and Korgaonkar 2016; Belanche et al. 2019). Due to big data technology sources, the tools' efficiency could be further improved (Zhang et al. 2014), and by using customers provided data, such as the customer's location and heart rate gained through the use of wearable technologies, marketing could be further personalized to individual consumers (Paramonov et al. 2013; Yuksel and Milne 2016; Frank et al. 2017). The usable amount of data and technologies that can create data and process data boomed during this era and increased networking.

Further, machines were connected to cloud servers and the internet, which is called the internet of things (IOT), and supplies could be ordered without the necessary interaction of a user (Chmaj and Selvaraj 2015; Anwar 2018). Cloud infrastructures have made data globally available and allow marketing to use mobile CRM and automated sales force tools (Püschel and Neumann 2009; Töllinen et al. 2015; Karjaluoto et al. 2015; Karjaluoto et al. 2014). Databases were improved fundamentally by blockchain technologies that brought cryptocurrencies into webshops in addition to supplying cyber security, which enhanced the overall trade performance (Avital et al. 2016; Mauri et al. 2018; Chang et al. 2019). The field of marketing expanded via IOT, clouds and blockchain to a new area, in which new possibilities for revenue were obtained. In conclusion, this era improved existing tools with new intelligence and developed new tools in the virtual environment.

With further developments in hardware and software, augmented reality (AR) and virtual reality (VR) became possible, and marketing uses those technologies to present products to customers, by offering 3D virtual shopping tours or arranging virtual trade shows (Liu et al. 2007; Blazauskas et al. 2017; Poushneh 2017; Mann et al. 2015; Gabisch 2015). Additionally, virtual reality enables customers to obtain a better understanding of the form and usage of products and helps marketing explain the benefits of even those products that are still in development.

We have identified this era as starting in approximately 2010, and we believe it is still developing, which also means that complete new marketing domains have not yet emerged. We assign the described marketing tools to the domains of marketing analytics and technology marketing, as well as digital marketing.

Success stories within the Intelligent Networking Era

There are various success stories using intelligent tools and networks. For example, Target Corporation, an American retail corporation, provides a mobile application (app) with over 27 million users. The application uses voice recognition, AR, VR and AI and is one of Target's main personalization and customer loyalty tools. The app is also a source for insights into user preferences, behavior trends, and shopping habits. Through Target's digital efforts, the retailer increased its sales revenue and gained new customers (Bowler and Datar 2017; Srinivasan and Chen 2019). Sephora's mobile app also uses AR and AI and provides a feature where customers can virtually try on make-up. Sephora is able to track customers' preferences online and offline and has doubled its mobile sales each year (Bornstein and McGinn 2014). Furthermore, Nike reported a 30 percent rise in revenue in their running division as of 2012, which they ascribe to a new digital tool. This mobile application connects with a sensor installed in running shoes to monitor the user's speed, distance traveled and calories burned. Nike expanded this technology to other activities, such as playing basketball and sleeping (Gupta 2013).

Walmart uses artificial intelligence to automate their inventory with a robot scanning process in combination with electronic shelf labeling. This process automatically identifies out-of-stock refills and poorly selling units; as a result, Walmart can adjust its prices and promotions accordingly. Through this measure, Walmart aims to improve their pricing accuracy and product availability by a potential further twelve percentage points. Furthermore, Walmart plans to offer online ordered pick-ups in designated car parking lots with a maximum waiting time of three minutes (Dowd 2019; Rebholz 2019; Iansiti and Lakhani 2020).

With the use of blockchain, further opportunities are within reach. For example, shipping companies, such as Maersk, have used blockchain technologies, and (online)

retailers such as Walmart and Alibaba track the location of their shipments in real time and record data such as temperature and customs documents. Blockchain will help to track goods more efficiently, reduce fraud and secure sensible data with expected savings of a billion dollars per year (Lal and Johnson 2018).

With the use of big data technologies, corporations can adjust their measures to target smaller segments and even at granular levels. Companies can analyze the data for each invoice and cluster it by product, package, customer group, etc. An average profit-margin lift of three to eight percent by setting prices at much more granular product levels could be achieved. The use of big data analyses combined with adequate resources in sales and marketing could increase profit margins by 20 percent (Baker et al. 2014).

In an attempt to implement UGC, Boeing started its own corporate blog but blocked all kinds of UGC, such as comments and feedback, with the result that customers perceived the blog as purely an advertising measure (Kaplan and Haenlein 2010). On the other hand, Boeing invited airlines to be part of the design process and incorporated airlines' needs accordingly. Furthermore, General Electric established a cocreation process as well as provided customers with access to tools and a library. Therefore, General Electric can outsource research efforts and risks to their customers and generate an environment with benefits for both parties (Prahalad and Ramaswamy 2004). Those examples show a variety of marketing tools using blockchain, virtual environments and cocreation with positive impacts on business performance.

Autonomous IT Era?

We also identified technologies in the conference proceedings that have not yet enabled marketing tools. These technologies might change consumers' habits and enable new marketing tools in the future. Furthermore, we studied the current trends in managerial

magazines to speculate about a potential fifth era.

In the manufacturing sector, marketplaces currently focus primarily on the direct purchase of standardized products. However, the development of additive manufacturing changes this logic, giving firms the opportunity to trade 3D-printing capacities instead of goods. This exchange allows firms to enhance their profits and lower risks by marketing their printing capacities. Such sharing of production capacities instantiates an open production system (Stein et al. 2019). These 3D printing production systems gain untapped business opportunities by applying blockchain technologies. Blockchain can help businesses overcome intellectual property and data security barriers. Further, new business models such as secure design marketplaces and shared factories will be possible. Businesses could also offer additional services around 3D printing and offer less costly and more customized products across different stages of adoption (Klöckner et al. 2020; Chaudhuri et al. 2019). Sustainability will drive additive manufacturing even further because it reduces emissions during transportation and warehousing, packaging and waste. Furthermore, a recycling industry around additives will increase the sustainability of 3D printing and increase the acceptance of this technology among consumers and society. Hence, marketing will need to allocate a completely new digital market where customers do not buy physical goods but design instructions for 3D printers instead (Garmulewicz et al. 2018).

Additionally, neuronal networks will become more enhanced through augmented intelligence and classification technology, whereas devices can react in shorter periods to circumstances and expand the range of applications where classification technology can be used. However, during this era, devices will not compete with human thinking (Byrum 2019). Augmented intelligence can complement multipurpose hardware and adapt to a given task. This means that machines can react to

the parameters of sensors, e.g., of a wearable device, and anticipate a reaction automatically. This will enable a closer human-computer interaction and aim for real-world processes in IT (Krenzer et al. 2019). Furthermore, automated planning and intelligent (semi)automated construction of processes will become possible in the form of human-automation hybrid work (Asatiani et al. 2019; Schön 2019). These technological developments will enable marketing to gain more information through, e.g., the parameters of wearable devices and apply marketing methods based on augmented intelligence to individual customers.

Moreover, 6G data connectivity will enable further opportunities such as smart implants and autonomous systems. Temporary hotspots served by drone-carried base stations or tethered balloons will improve mobility (Saad et al. 2019). This will support the use of mobile streaming and decrease the use of stationed screens such as TVs. On the one hand, this will affect TV advertising and decrease its importance, but on the other hand, screen presence and the emotions of the customer can be tracked precisely, e.g., by face recognition technologies in mobile devices (Guo et al. 2019).

Furthermore, systems that use predictive models to make automated decisions will increase and become more precise by using more variables (Fernandez et al. 2019). They can, for example, be used to predict credit scores (Zhou 2017). Prediction will enable marketing to analyze what will appeal to customers, improve operations and provide support in making products better. Furthermore, it can be used to improve search engine advertisements and provide customers with product suggestions when typing related words (Agrawal et al. 2020). Thus, this prediction ability will enhance marketing tools by foreseeing customer demands and preferences.

The use of RFID systems during supermarket shopping will bring new insights in terms of shelf stock and logistics but will also open the possibility of simplifying the

customer checkout process in physical supermarkets (Wu et al. 2019). For example, automated gates will identify the contents of full shopping baskets by having customers just walk past; thus, customers can pay for all the items in their carts without scanning them separately.

The method of transportation will change significantly, either to autonomous vehicles, which have the potential to transform urban landscapes, existing transport systems and networks, or to lower car ownership by increasing car sharing (Legacy et al. 2019). In both cases, the number of customer-owned transportation vehicles will decrease significantly. Sharing cars and tracking customers by using new transportation methods will enable marketing to gain new marketing tools that are not limited to location- and time-adjusted advertisements but will also enable a firm to drive the customer with an autonomous car to a specific shop. In conclusion, we expect more marketing tools related to system intelligence, which can be used for (automated) customer interaction.

Structured framework of the analyzed components

To place the enabling technologies and marketing tools in the context of the digital transformation, a structured framework that explains the relations between the analyzed components is required. Thus, we have transferred Table 1 into Figure 2 and have included additional information, as explained in the following text.

The digital transformation incorporates the following four major levers: new *data, connectivity, automation* and digital *customer interaction*. Each lever is supported by propositions and enablers (Berger 2015). In this study, we apply the enabling technologies hereto and marketing tools and methods as propositions. The lever of data contains the availability and processing of existing and new data. Automation includes computer-aided support and self-service functionalities as well as the combination of

data with algorithms. The connectivity lever contains the underlying functionalities of networking and data synchronization. The digitalized customer interaction lever covers the direct and indirect marketing applied to customers. It is driven by developments within the other levers, which may be understood as prerequisites. The marketing digital transformation blends perfectly into these stated four levers.

We classified the identified enabling technologies and marketing tools into these levers accordingly, as demonstrated in Figure 2. This visualization supports the statement that the influence of IT within marketing is manifold and contributes to several aspects of marketing. As demonstrated by Figure 2, we find in each of the four levers essential enabling technologies and marketing tools. This figure directly shows that marketing tools are not only concerned with customer interaction but also with customer management and investigation, as in the *data* lever. It refers to the use of data to inform and optimize the ways through which marketing managers interact with customers (Kumar et al. 2013). Furthermore, the figure demonstrates that an underlying *connectivity* is essential to reach out to customers. In the lever of *automation,* we find tools that can take over marketing actions and support in visualization. We found that digital transformation is inherent not only in firms but also in essential functions such as marketing. The profound influence of IT-enabling technologies led to marketing domains, which surround several marketing tools. The marketing domains are visualized as the outer circular lines in Figure 2. They demonstrate that marketing domains can include more than one digital transformation lever, e.g., relationship marketing or online marketing. In this study, we confirm three major aspects. First, digital transformation prevails in marketing according to the stated levers, i.e., *data, connectivity, automation* and digital *customer interaction*; second, marketing tools

follow in sequence the enabling IT technologies; and third, marketing domains arise consequently and independently from the digital transformation levers.

[Insert Figure 2 near here]

By widen the view, as suggested in the beginning, the picture picture of how digital transformation affects marketing becomes comprehensible. However, the totality of what it means is more than the aggregate of its presumable contexts. Marketing tools make use of different technologies, even in combination with different technologies and occasionally in different ways than they were intentionally designed. IT and marketing together must understand the dynamics of the different meanings and uses for the designed tools and technologies. Krippendorff (1989) discovered that design is the key to giving things a sense, but in reality, things can be used for different purposes and will substitute for other things, which brings no significant difference. Hence, e-mails, telefaxes and telephones are, for example, substitutes for written letters and have reduced postal service activity. Moreover, social media are substitutes for the need for e-mails and phone calls. If the old technologies cannot compete against new technologies, the marketing tools using the old technologies will consequently lose their effectiveness. For example, social media marketing is currently much more efficient than newsletters, although the amount and the degree of details are higher in e-mails. However, understanding the advantages of the individual platforms that customers are using and perceiving as useful is essential to applying social media marketing campaigns efficiently (Kumar et al. 2013; Lacka and Yip 2018). Marketing and IT need to understand that they are dependent on each other. Therefore, marketing and IT have to interact like an aligned design team if they want to stay in control of customer interactions.

Conclusion

Even though marketing is a well-known discipline and has been explored for decades, this paper is the first to demonstrate the digital transformation by applying the four levers of new *data, connectivity, automation* and digital *customer interaction* (Berger 2015) to enabling technologies and in sequence following marketing tools. Furthermore, this paper contributes new insights by demonstrating the chronological development of the digital transformation in marketing. We underline this by identifying four existing eras, which are named the Telecommunication Era, the Data-Managed Internet Marketing Era, the User-Enabled Mobile Era, and the Intelligent Networking Era, and providing insights into a potential fifth era, which we call the Autonomous IT Era. Strong marketing research can be used as a basis for several aspects within this topic; however, the combination of those topics leads to a new complex perspective.

This study has confirmed the occurrence of digital transformation in marketing and that marketing tools are dependent on IT developments. We have achieved this by presenting the historical development of enabling technologies and demonstrating how marketing tools followed them in sequence by giving examples. Further, we have identified the eras, which are named the Telecommunication Era, the Data-Managed Internet Marketing Era, the User-Enabled Mobile Era, and the Intelligent Networking Era and described their impact on marketing accomplishments. To prove the inherent digital transformation in marketing, we initially introduced a general model from another field to the marketing discipline (e.g., Berger 2015) and applied the four major levers, i.e., *new data, connectivity, automation* and digital *customer interaction* to the identified technologies and marketing tools as enablers and prepositions. As a result, we conclude that marketing and IT should work together to design new marketing tools, which can be applied to facilitate customer interactions and foster marketing control. By

this measure, both parties will ensure that marketing will have the capabilities to use the tools efficiently. During the design phase of developing the marketing tools, we note that technologies and tools are more than just artifacts and can be used for different purposes that might substitute for existing tools (Krippendorff 1989). This study has raised important questions and provided guidance about the nature of the digital transformation in marketing and the need for alignment with IT.

Outlook and limitations

Regarding the outlook of marketing and IT alignment, we would like to emphasize certain aspects that surround the present study. The creation and use of (digital) marketing tools originated from the desire to acquire and retain consumers. In conclusion, it will be important to understand their effect and efficiency from a customer point of view (Lacka and Yip 2018). Hence, it is important to include the customer in the marketing tool design process. Furthermore, throughout the customer purchasing process, there might be several touchpoints between marketing and the customer via marketing tools (Edelman and Singer 2015; Lemon and Verhoef 2016). Due to the digital transformation, we expect customer touchpoints that are not or are hardly under the control of marketing. There is a compelling need for marketing to gain control, and we believe a key element is its alignment with IT.

Moreover, digital technologies enabled not only marketing tools but also completely new businesses such as online platforms, which provide services such as transactions, bookings and arrangements. Companies and start-ups have arisen that do not provide dedicated services or products for the customers themselves but refer them to other companies or individuals, examples of which are holiday booking platforms or any type of portal where customers can compare and buy services or products up to dating platforms. We have not considered these types of businesses because we have

focused on marketing tools. However, those platforms play a significant role in the marketing of companies that actually provide the referred product or service.

The current COVID-19 pandemic is one example of why enabling technologies have gained importance for corporations. Many firms have begun outsourcing functions to data centers, and work from home has become an important instrument to keep the functions of corporations running (eWeek Editors 2020). Accordingly, customers' behaviors and responsiveness have changed unpredictably. In our study, we focused within the established eras on the timespan and sequencing, but there are clearly more variables such as culture, society and events, which have impacts on the importance of digital tools. Furthermore, those variables have also hindered the evolution of some tools. In this study, we have ignored such constraints for clarity.

Managerial implications

The findings of this study have a number of practical implications. First, continuously improved marketing tools are one essential key factor for customer acquisition and retention. However, enabling technologies and smart tools alone are not sufficient for a sustainable customer acquisition approach. Second, companies need new organizational designs and a common understanding of aligned and separated responsibilities, which could lead to new setups in working relationships (Edelman and Singer 2015; Matt et al. 2015; Bharadwaj et al. 2013). Third, marketing managers should carefully analyze their digital capabilities and innovativeness in addition to the applied digital marketing tools (Karjaluoto et al. 2014; Feng et al. 2020). Continued efforts are necessary to make data more accessible and match marketing managers' needs. Data and automation are two key levers of digital transformation, which will produce organizational benefits and facilitate customer interaction.

Following the marketing evolution, it is not surprising that a gap between necessary knowledge and required knowledge in the digitalization of marketing tools exists. A key policy priority should therefore be to plan for the long-term care of digital tools in marketing. In return, another important practical implication is that IT managers should analyze the usability and purpose of enabling technologies. Both departments need to carefully consider the customer perspective when thinking about the right marketing tool and should even integrate the customer into the design process.

Guidelines for future research

This study has raised many questions in need of further investigation. The increasing amount of data concerning customers behavior and the personalization of products and services are barely part of the models so far. Researchers should reveal the advantages of new technologies that gather data and the increasing amount of provided data. However, the major driver for future research is the control of customer and marketing touchpoints. Researchers should consider the meaning of the touchpoints and compare those with the intended use (Schmitt 1999; Hassenzahl 2018). In addition, a guideline on what touchpoints are within marketing control and how marketing could gain control of more touchpoints should be a field of future research.

Additionally, another important aspect is to analyze to what extent marketing capabilities are able to respond to changing technologies (Day 2011). Marketing managers as users and designers of tools need knowledge about functionalities and require the coordination of such tools to assess whether the designed tools work (Henseler and Guerreiro 2020). They should acquire the required capabilities to use the tools efficiently (Dave Chaffey and Mark E Patron 2012). It will be essential to investigate what knowledge and talents are required and what knowledge gap between

IT and marketing is reasonable. Furthermore, researchers should aim to conclude these aspects regarding the degree to which marketing and IT should be aligned.

Tables and figures

Table 1. Enabling technologies, emerging marketing tools and the corresponding marketing domains

Figure 1. Eras in enabling technologies and emerging marketing tools

Figure 2. Digital transformation in marketing

Table 1. Enabling technologies, emerging marketing tools and the corresponding marketing domains

Enabling Technology	**Year**	**Reference**	**Marketing tool**	**Year**	**Reference**	**Marketing domain**
Telecommunications	1961	(Hopner 1961)	Telecommunications shopping	1983	(George 2015)	
			Telemarketing	1993	(Luke 2015)	
Speech understanding system	1996	(Kawahara et al. 1996)	Access-automated call center	1997	(Ehrlich et al. 1997)	
			IT enabled call center (ICIS) Call center (AMS)	2001 2008	(Subramanyam and Krishnan 2001), (Wang et al. 2015)	
Data Management Systems	1987	(Sarda 1987)	Sales control systems	1994	(Bingham and Quigley 2015)	(Customer) Relationship Marketing "International Journal of Customer **Relationship Marketing** and Management" "Journal of **Relationship Marketing**"
ERP	1998	(Veth et al. 1998)	Data base marketing	1998	(Chopoorian et al. 2015)	
			E-CRM	2001	(Galbreath and Hoffman 2015)	
			CRM	2002	(Kim et al. 2002)	
			B2B customer database management	2006	(Zahay 2015)	
Cloud Infrastructures	2009	(Püschel and Neumann 2009)	Mobile CRM	2013	(Töllinen et al. 2015)	
			Mobile sales force automation	2013	(Karjaluoto et al. 2015)	
Knowledge-based Systems	1990	(Kumar 1990)	Knowledge-based system pricing	1993	(Mentzer et al. 2015)	
			Competitive intelligence systems	1995	(Cartwright et al. 2015)	
Neural Networks	1990	(Schocken 1990)	Strategic intelligence systems	1995	(Festervand et al. 2015)	
			Web-based knowledge management	2003	(Liu and Luo 2015)	
			IT in decision making	2004	(Rieger et al. 2015)	
			Online dynamic pricing	2006	(Chung 2015)	
E-Mail	1992	(El-Shinnawy and Markus 1992)	E-Mail as a method of communication	1997	(Heiser and Frontczak 2015)	
			E-Mail survey	1998	(Flaherty et al. 2015)	
			E-Mail-marketing	2005	(Ceyp 2015)	
Internet	1993	(Kambil et al. 1993)	Electronic commerce (ICIS)	1995	(Ives et al. 1995)	**Online Marketing** 2002
			Internet advertising (web-based)	1997	(Löbbecke and Powell 1997)	

Enabling Technology	Year	Reference	Marketing tool	Year	Reference	Marketing domain
			Electronic marketing	1997	(Hair 2015)	(Zugelder et al. 2015) **Internet Marketing** "International Journal of Internet Marketing and Advertising"
			Internet shopping	1997	(Morgan and Attaway 2015)	
			Web site adds	1998	(Sautter and Lindquist 2015)	
			Automatic replenishment	1999	(Daugherty et al. 2015)	
			Marketplaces B2B marketplaces	1999 2001	(Dellarocas and Klein 1999) (Yoo et al. 2001)	
			Online auction (ICIS) Internet auction (AMS)	1999 2005	(Vakrat and Seidmann 1999) (Yang 2015)	
			Internet related acquisitions	2001	(Ranganathan and Dadalt 2001)	
			Online companies	2000	(Kaynama 2015)	
			Internet-based customer service systems	2001	(Brohman et al. 2015)	
			Internet usage within B2B exchange partnerships	2001	(Boyd and Spekman 2015)	
			E-commerce	2001	(Sudbeck 2015)	
			Electronic catalog	2002	(Gonzalez 2015)	
			Virtual stores (on the internet)	2005	(Diehl and Weinberg 2015)	
			Search engine advertisement	2011	(Sun and Spears 2015)	
Web Caching Click-path-data	2002 2013	(Hosanagar et al. 2002) (Weinmann et al. 2013)	Data mining	2000	(Reid 2000)	"Journal of Direct, Data and **Digital Marketing Practice**"
			Pricing based on web caching	2002	(Hosanagar et al. 2002)	
			WEB log data	2006	(Yada et al. 2015)	
Self-service Technologies	2000	(Bodendorf and Saueressig 2000)	Technology-based self-service	2002	(Anitsal et al. 2015)	
			Self-service scanning terminal	2007	(Espina and Pérez 2015)	
Mobile Applications	2002	(Kemper and Wolf 2002)	Mobile commerce	2004	(Yang et al. 2015)	**Mobile Marketing** MSI 2013
			Remote service	2010	(Paluch 2015)	
			Mobile advertising	2009	(Goh et al. 2009)	
			Mobile marketing	2010	(Guo et al. 2010)	
			Mobile applications	2011	(Taylor et al. 2015)	

Enabling Technology	Year	Reference	Marketing tool	Year	Reference	Marketing domain
			Digital coupons (sms)	2011	(Nakhata 2015)	
			Freemium (ICIS) Freemium (AMS)	2012 2016	(Liu et al. 2012) (Cziehso and Schaefers 2017)	
			Mobile shopping	2013	(Swilley and Cowart 2015)	
			Mobile commerce on tablet	2013	(Han et al. 2013)	
Mobile Self-service Technologies	2006	(Treiblmaier and Dickinger 2006)	Mobile banking	2011	(Nel et al. 2015)	
User Generated Content (UGC)	2003 (ICME) 2008 (ICIS)	(Koskinen 2003) (Oh et al. 2008)	Online reviews	2004	(Dellarocas et al. 2004)	**Online Marketing** 2002 (Zugelder et al. 2015) **Internet Marketing** "International Journal of Internet Marketing and Advertising"
			Online community	2006	(Landry et al. 2015)	
			Online product review	2012	(Coussement and Antioco 2015)	
			Online product rating assessment	2014	(Wang et al. 2016)	
			Online discussion forums	2016	(Murray and Maceli 2017)	
			Online recommendations and feedback	2004	(Chen et al. 2004)	
			eWOM (AMS) Electronic word of mouth (ICIS)	2000 2010	(Bussière 2015) (Lo and Lin 2010)	
			Online user comments	2011	(Mills et al. 2015)	
			Interactive websites	2012	(Liu 2015)	
			Firm-generated content	2014	(Swain and Cao 2014)	
			Reputation management	2016	(Chen et al. 2016)	
Blogs	2006	(Xu and Chau 2006)	Blog users/Bloggers	2012	(Segev et al. 2015)	
			Sponsored blog post	2015	(Williams and Hodges 2016)	
			Vlogs	2017	(Munnukka and Maity 2018)	
Machine Learning Dynamic Time Warping	2008 2014	(Ichise 2008) (Keller et al. 2014)	Prediction of sales performance	2011	(Boso et al. 2015)	"Journal of Direct, Data and **Digital Marketing Practice**"
Artificial Intelligence	2018	(Tremblay et al. 2018)	Robotic shopping assistant	2018	(Fukawa and Huang 2018)	
			Robo-advisor	2018	(Tremblay et al. 2018)	

Enabling Technology	Year	Reference	Marketing tool	Year	Reference	Marketing domain
			Dynamic pricing based on artificial intelligence	2019	(Beser et al. 2019)	
			Artificial intelligence in marketing	2018	(Pitt et al. 2018)	
Big Data	2014	(Hristova 2014)	Adaptive Big Data analytics	2014	(Zhang et al. 2014)	
Social Media	2009	(Xu and Zhang 2009)	Social media influencers	2010	(Lindsay et al. 2015)	**Social Media Marketing** 2012 (Bauer et al. 2015) "Journal of Digital and Social Media Marketing"
			Social networking	2010	(Ulusu et al. 2015)	
			Social media applications for marketing	2011	(Tuten et al. 2015)	
			Social media analytics	2013	(Kurniawati et al. 2013)	
			Enterprise social media Corporate social media sides	2014 2016	(Dyrby et al. 2014) (Bacile et al. 2017)	
			Managing social consumer voice	2015	(Melancon and Dalakas 2016)	
			Purchase feature in social media	2017	(Guo et al. 2017)	
			Influential tool	2017	(Gomez et al. 2018)	**Influencer Marketing** 2019 (Wiedmann and Mettenheim 2020)
			Influencer	2016	(Ferreira 2017)	
Wearable Technology	2015	(Deng and Christodoulidou 2015) (Robson et al. 2016)	Digital (consumer) self-tracking	2015	(Yuksel and Milne 2016)	Journal of "Applied **Marketing Analytics**"
			Trace data of user	2017	(Frank et al. 2017)	
Web Analytics	2013	(Paramonov et al. 2013)	Web analytics	2012	(Järvinen et al. 2015)	
			Text content analysis	2014	(Hood 2016)	
			Text analysis of online reviews	2016	(Fresneda and Gefen 2017)	
			Personalized advertising	2015	(Gironda and Korgaonkar 2016)	
Internet of Things	2015	(Chmaj and Selvaraj 2015)	Internet of things (IoTs) and marketing	2018	(Anwar 2018)	"International Journal of

Enabling Technology	**Year**	**Reference**	**Marketing tool**	**Year**	**Reference**	**Marketing domain**
Augmented Reality Virtual Reality	2007 2017	(Liu et al. 2007) (Blazauskas et al. 2017)	Augmented reality with customers	2016	(Poushneh 2017)	**Technology Marketing**"
			3D virtual shopping environments	2013	(Mann et al. 2015)	
			B2B virtual trade shows	2010	(Gabisch 2015)	
Blockchain	2016	(Avital et al. 2016)	Cryptocurrencies	2018	(Mauri et al. 2018)	
IT Enabled Cocreation	2008	(Grace et al. 2008)	Cocreation	2007	(Campbell et al. 2015)	
			Innovation processes on the internet (cocreation)	2009	(Emrich and Rudolph 2015)	
			Expanding cocreation	2012	(Kull 2015)	
			Cocreating with self-service technology	2012	(Hughes et al. 2015)	
			Crowdsourcing	2012	(Simula et al. 2015)	
Crowd Funding	2013	(Zvilichovsky et al. 2013)	Crowdfunding	2014	(Boeuf and Durivage 2016)	
			Customer participation in new product development	2015	(Morgan and Obal 2016)	

Figure 1. Eras in enabling technologies and emerging marketing tools

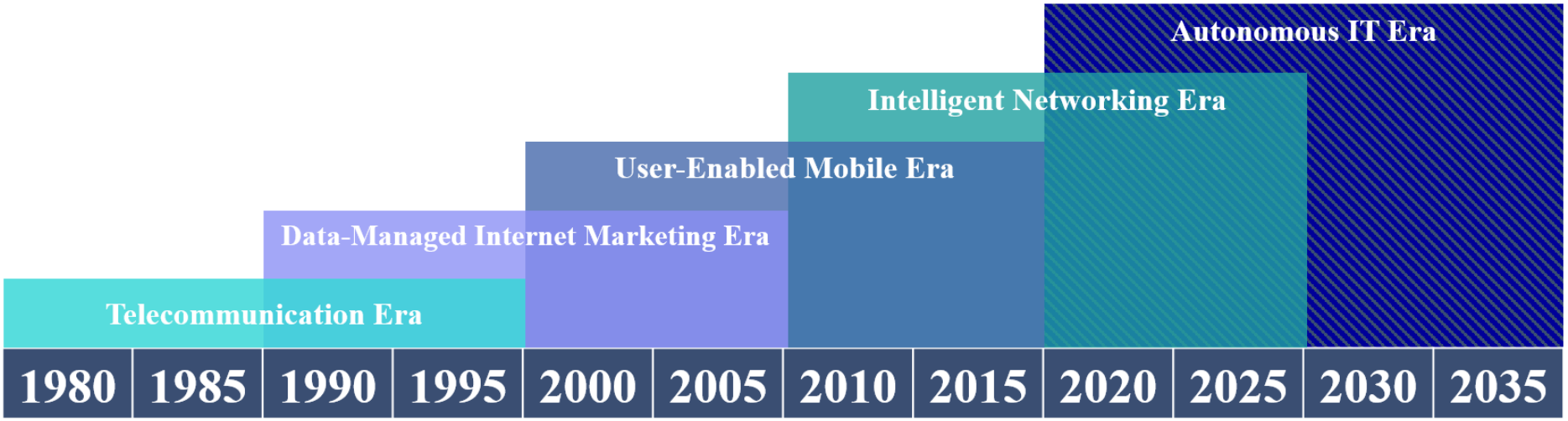
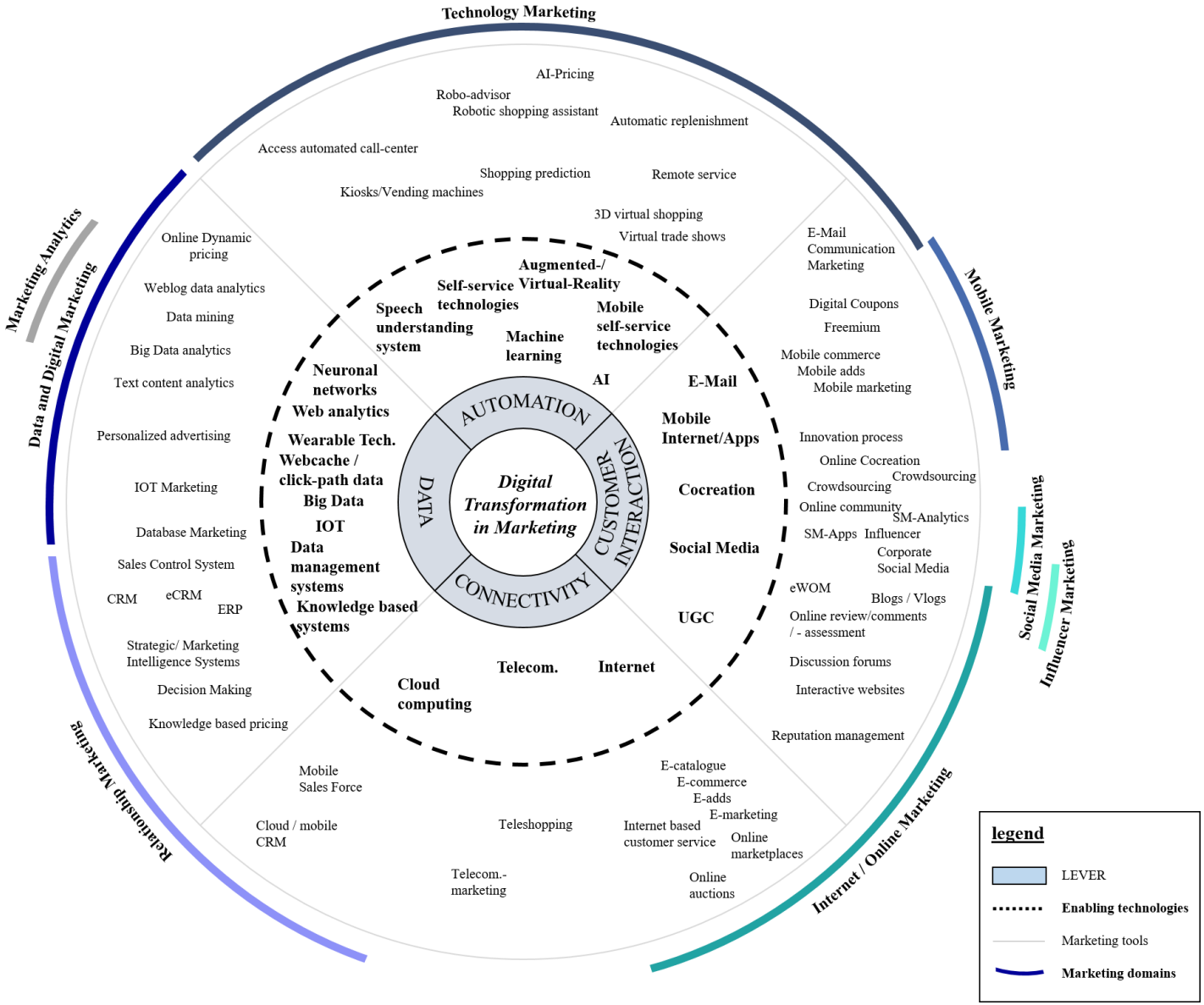


Figure 2. Digital transformation in marketing



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