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Digital information product development: lessons from a small-sized German enterprise

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Abstract

Purpose – This case study examines the new product development (NPD) process of digital information products (DIPs) and its critical success factors (CSFs) in a small-sized German enterprise.

Design/methodology/approach – A case study was conducted with a small firm focused on the development of DIPs; data were obtained through semi-structured interviews, direct observation and document analysis.

Findings – The firm uses an informal and cross-functional NPD process (idea generation, idea validation, product creation and product launch) in converting an idea into a sellable product. Peculiar aspects of each stage within the process as well as ten CSFs to NPD projects were verified.

Research limitations/implications – Limitations are attributed to its qualitative nature, which does not allow generalizations, though careful attention was given to validity and reliability issues through the use of data source triangulation.

Practical implications – The paper provides a conceptual process that may benefit further initiatives for developing and launching DIPs, as well as a comprehensive list of CSFs for such projects.

Originality/value – This paper is the first one to schematize the NPD process and practices for DIPs, as well as key capabilities. It contributes to the NPD literature in discussing dynamic aspects that are typical to the firm analyzed and to others operating in a digital context. At the same time, it reinforces other traditional aspects that have become overlooked in digital business debates.

Keywords New product development process, Digital products, Digital information products, Capabilities, Critical success factors, Competitive advantage

Paper type Case study

1. Introduction

The global market size for corporate e-learning was valued at US$64.4bn in 2019 and is expected to grow at a compounded annual growth rate of 9.16% by 2025 (Cision PR Newswire, 2020). This scenario may not only be favorable for firms and organizations

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engaged with digital information products (DIPs), but also for entrepreneurs focused on developing and selling DIPs (online courses, eBooks, webinars, etc.).

Alike, the continuous need to market new products as a basis for competitive advantage has resulted in a growing interest in NPD within DIP activities, both in managerial and academic settings. Sustainable competitive advantage depends not only on efficiency, but also on constant renewal of product portfolio and innovation (Pullen, Weerd-Nederhof, Groen, Song, & Fisscher, 2009; Santos-Vijande, López-Sánchez, & Rudd, 2016; Tomkovick & Miller, 2000; Woodcock, Mosey, & Wood, 2000; Nicholas, Ledwith, & Perks, 2011; Healy, O'Dwyer, & Ledwith, 2018; Zhan & Tan, 2020). As a result, NPD activities, once discrete and restricted to specific departments/areas, have progressively become part of an integrated process involving multiple areas and even groups outside the organization (Kim, Kim, Sawng, & Lim, 2018; Zahay, Hajli, & Sihi, 2018; Zhan & Tan, 2020). This is the case for obtaining a clearer understanding of organizational activities and processes, leading to the successful creation and introduction of DIPs, especially since most of the literature focuses on tangible goods. To get an in-depth comprehension of structured and unstructured processes and dynamics of NPD involving DIP, a case study was selected as a research initiative. The firm under study, ABC Online-Marketing GmbH [1] (from now on, ABC), was chosen for its mature know-how in digital product development processes, but also because of access to valuable data and information.

The following research question, then, is specified: how does the development of DIPs occur in that firm, and what are the critical success factors (CSFs) for their development? Accordingly, its purpose is to investigate the NPD process of DIPs and as well as its CSFs.

This singular case study contributes for a greater comprehension of the NPD process of DIPs. Literature on DIPs is mostly focused on product compatibility and standardization, licensing, software versioning and upgrade (Wu & Chen, 2007); few studies have addressed the NPD process of DIPs (Rowley, 2016). Thus, developing and launching DIPs is still a recent phenomenon, particularly when viewed through the lenses of small and medium-sized enterprises (SMEs) (Woodcock *et al.*, 2000; Owens, 2007; Nicholas *et al.*, 2011; Pullen *et al.*, 2009; Healy *et al.*, 2018; De Waal & Knott, 2019). This research, therefore, tries to fill this gap.

When it comes to SMEs, innovation performance relies heavily on a fit between internal organization and the environment (Pullen *et al.*, 2009; Kim *et al.*, 2018), especially by means of structured NPD processes. Hence, it is essential to understand and promote appropriate NPD processes that are predictable and adaptable to future technological developments and changes in the marketplace, i.e. data generation and performance review (Woodcock *et al.*, 2000), especially as this may enable SMEs to compete in a highly sophisticated market. This study also provides key contribution to practitioners by examining CSFs to build a predictable and replicable framework for DIPs.

2. Literature review

2.1 Information products and digital information products

Information is broadly defined as any piece of evidence regarding facts, description, analyses or ideas that are acquired and transferred as knowledge. Over the years, information has acquired flexibility and availability traits because of its digitized format without incurring loss of content and, recently, its increasing importance for decision-making has not only created a market for it, both in printed and digitized formats, but also different ways of generating it, capturing it and distributing it (Meyer & Zack, 1996; Raghunathan & Sarkar, 2016).

Realizing the value of information as products, Rowley (2016) defines it as "any product (either good or service) whose core or primary product is information or knowledge." While information products are experience goods, consumers cannot directly verify quality aspects or other attributes such as performance, interface and features of the product before purchasing it. Only by experiencing the product will consumers become aware of its true fit (Zhang, Craciun, & Shin, 2010).

As a particular example of experience products, DIPs are defined as goods consisting of data, information and knowledge content that can be reproduced and distributed at a close-to-zero marginal cost – though with high sunk costs – normally based on a value chain fully structured with the use of electronic networks (Lopes & Galletta, 2002, p. 1; Liu, Li, & Kou, 2015). Key characteristics of DIPs include information recombination (integration of different types of information in the same system, modularity hypertext functionality), accessibility (electronic proximity of content offered through electronic channels), navigation interaction (how the flow of activities proceeds in an electronic store and when consuming digital products) and speed (the time dimension of the process: fast transactions and the prospect of receiving content instantly) (Koiso-kanttila, 2004; Strader & Shaw, 1999). Moreover, both distribution process and the actual commodity acquired are digital. Based on the preceding Cooper's (2001) contributions and in view of supporting the research, this paper defines "digital information products" as information and knowledge content, which can be sold, transferred and delivered digitally through the internet.

2.2 New product development: from a traditional to a digital perspective

Defined as the complete process of introducing a new product in the market, from the perception of market opportunity to the commercialization of a new product (Cooper, 2001), NPD has been widely researched in both managerial and academic settings, and across various disciplines (Guimarães, Paranjape, & Walton, 2019). NPD is strategic as it uses organizational strengths and strategic capabilities to provide market response in a context of hypercompetitiveness (Holahan, Markham, & Sullivan, 2014): for industry leaders, new products enable the creation of new market opportunities as well as change and reinvention of old markets; for industry followers, new products provide an opportunity to set new standards in cost and quality and improvements, which may result in further competitive advantage (Maidique & Zirger, 1984; O'Dwyer & Gilmore, 2017).

A study conducted by Cooper (2001) shows that top-performing firms gained over 49% of current sales from new products, and that half of successful new products assessed achieved at least a 33% return on investment (ROI) and 35% of market share. More recently, Healy *et al.* (2018) and O'Dwyer & Gilmore (2017) have shown that advantages incorporated into new products are more effectively recognized in the marketplace, thus favoring competitiveness. Also, in the case of SMEs, efforts in improving new product performance are critical for survival and growth; in addition, policies should be directed toward this issue to secure economic sustainability. To Healy *et al.* (2018), most of the literature on drivers and antecedents of product advantage in SMEs relate to rivalry/competitive intensity, technology uncertainty and resources and market. In terms of product advantage, contributions are mainly related to product meaningfulness, innovativeness and superiority. Hence, further investigation on specific NPD processes within SMEs may contribute in this sense.

An established NPD process does not guarantee a high success rate of new products (Cooper, 2001; Healy *et al.*, 2018): in an increasingly complex business environment, speed, flexibility, people development and the integration of capabilities and flexibility among different areas have become imperative (Takeuchi & Nonaka, 1996;

Tomkovick & Miller, 2000). Moreover, this view assumes that new products are innovative and not easily imitated. In some industries, i.e. manufacturing, this may hold true, but in others, i.e. information, it may not be the case.

Information as a product has emerged and advanced in the context of the digital economy with the widespread diffusion of information and marketable content on the internet and by the new relationship rules institutionalized by social networks (Mas & Gomez, 2021). Its foundations were laid with the development of computer processing and data storage, on software, applications and communication technologies, and on fast and reliable internet (Davenport & Kudyba, 2016).

The widespread access to these technologies and digital infrastructure has promoted great capacity for data and information production (Kyriakopoulos & De Ruyter, 2004), but it has also lowered barriers for virtually any entrant and leveled competition among actual and potential information producers, i.e. large companies and SMEs. Firms, then, are required to have flexible structures to adapt to digital business ecosystems (Hanelt *et al.*, 2021). As access to information sources, reproduction and delivery are almost instantaneous in a global business networks and markets and as information products have become commoditized, key capabilities such as NPD have become essential in achieving competitiveness in this industry through differentiation, specifically when linked to unique customer value and speed. DIPs, therefore, must be carefully tailored to meet specific and sophisticated demands amidst an ocean of data and information and a large number of providers worldwide.

To achieve differentiation, DIPs (similarly to tangible and intangible products) have increasingly relied on analytics; they provide both market insights and more assertiveness in decision-making. Analytics add substantial value to intangible assets by making them easier to understand and apply (Davenport & Kudyba, 2016).

After this brief discussion on the evolution of traditional NPD to digital NPD and its importance to competitiveness, the following subsection address NPD processes and CSFs.

2.3 New product development process and critical success factors

Traditional NPD comprises stages such as concept generation, product planning, product engineering and process engineering, but within NPD, there are different perspectives, i.e. marketing and technical, in which different activities may be favored or not.

Crawford and Di Benedetto (2002) present a five-stage-NPD process (opportunity identification and selection, concept generation, concept/project evaluation, development and product launch), along the lines of Urban and Hauser (1993) (opportunity identification, product design, testing, introduction and lifecycle management). Others emphasize more specific stages, contemplating an initial market screening, in-house product testing, customer tests of product and trial production (Cooper & Kleinschmidt, 2007). Over the years, market- and marketing-related activities have been increasingly incorporated into NPD.

Notwithstanding, the nature of DIPs and the competitive issues related to speed, market responsiveness, as well as to the digital – and global – network environment in which they are created and distributed entails a more specific NPD process. Accordingly, Meyer and Zack (1996) contribute with a five-stage development process of new information products: acquisition of data/information, refinement, storage/retrieval, distribution and presentation/use. Unlike traditional processes, these stages are often interactive–iterative.

Acquisition involves sourcing information/data supplies and aspects such as quality, scope, breadth, depth, credibility, accuracy, timeliness, cost, control and exclusivity. Quality issues may be continuously revisited as they affect the downstream integrity of the process

and, ultimately, products. Refinement includes cleaning or standardizing data, but also flexibility in converting it to more useful information units. For storage/retrieval, database or knowledge management software is a prerequisite, as critical inputs are stored. In distribution, the aspects of timing, frequency and medium of delivery are addressed. Finally, presentation addresses the value generated by information products, which depends on their use. Context variables such as ease of access, functionality and aesthetics, for example, are part of the information product itself. Hence, beyond the content behind the product, "the quality of the interface" are competitive dimensions.

Adding up to Meyer and Zack's (1996) proposition, Davenport and Kudyba (2016) revisited the five stages to incorporate two additional ones (conceptualization and market feedback), which are essentially related to market timing and market responsiveness, especially in the case of DIPs.

Product conceptualization is suggested since understanding specific needs in highly competitive markets is crucial for valued data/information products. This stage involves product definition, data screening and model guidelines and are justified by increasingly fragmented and sophisticated market needs. After product conception, data acquisition (through internal systems and from public sources) becomes easier and more aligned to the product proposal. Also, establishing data requirements to the conceptual model is crucial since data provide the bases for the product. However, besides structured data acquisition, companies may also need to acquire unstructured data (seldom qualitative). Refinement, in addition to Meyer and Zack's (1996) proposition, should encompass facilitation of new data sources and the use of advanced analytic methods and automated tools, which are necessary in gathering, combining and processing data speedily to create products more aligned to market requirements and, thus, generating value. As for storage and retrieval, the main issue is data search specificity, especially data gathered in different formats, given the large sizes of databases and the availability of advanced analytical tools. Information products distribution uses the Web as main outlet, since timing and frequency as well as continuous availability and update are key competitive attributes. In presentation, value is associated to the interface and easiness of use. Analytics have become an essential aspect of DIPs; in this way, both visual and written content have given place interaction and more advanced applications, i.e. forecasts, combinations, etc., which enhances value. Finally, market feedback, to Davenport and Kudyba (2016), emphasizes the need for continuous innovation and monitoring of product usage, generating analytics-based data and enabling product development iteration, enabling a more accurate market responsiveness. Recently, social media and collaborative platforms, websites, blogs and Web surveys may supply data and information for such tasks.

These considerations regarding NPD of information products clearly differ from traditional NPD processes and their evolution toward a more market-based approach. For DIPs, iteration with multiple stakeholders from identifying a specific market need up to market feedback sets the tone for this particular NPD. In addition, the combination of different data elements for both product development and for presenting (product itself) as a way of creating value and gaining competitive advantage.

Despite differences between NPD processes, numerous studies detail best practices and CSFs in NPD. Maidique and Zirger (1984), for example, identified eight important areas for new product success in high-technology environments: understand customers and the marketplace; proficiency in marketing and commit resources to sales and promotion; a high contribution margin; good planning and execution of the research and development (R&D) process; coordination between creation, development and marketing; early introduction of the product into the market; significant benefits to the markets and technologies of the new

product from the existing strengths of the developing business unit; and a high level of management support along the NPD process.

Urban and Hauser (1993), by their turn, emphasize both market and organizational aspects: responsiveness to consumers' needs, higher value to clients, innovative products, technical superiority, inter-functional communication, top management commitment, disciplined process in new product development, a dynamic development department, reduced time-to-market, global strategy, aversion to unnecessary risks, orientation toward quality and consumer satisfaction.

Montoya-Weiss and Calantone (1994) define 18 variables (CSFs) grouped in four categories: strategic, development process, market environment and organizational. To SMEs, they advocate for the empowerment of cross-functional teams to engage in learning about market needs, acquisition of market data and knowledge and manage further developments. Similarly, Takeuchi and Nonaka (1996) identified six key characteristics of NPD processes in leading companies: built-in instability, self-organizing project teams, overlapping development phases, "multilearning," subtle control and organizational transfer of learning.

To Cooper and Kleinschmidt (2007), adequate resources of people and money, R&D spending (policies), high-quality new product project teams, senior management commitment and involvement, an innovative climate and culture, the use of cross-functional project teams and senior management accountability for new product results are key. They underline the role of diligence, a clear product definition and well-established decision points (continuation or not), although flexibility is critical. Strategy-wise, long-term commitment, clear communication regarding the importance of new products to all parties involved, are also among essential aspects.

Mosey (2005), however, alerts that CSFs or best practices cannot be thoroughly replicated from benchmarks, especially in SMEs as these ideal cases reflect a highly specific context. Thus, a thorough understanding of context and development of capabilities grounded on experience, credibility and partnerships are required. This is also addressed by Kim *et al.* (2018): as sustainable competitiveness and market share maintenance in SMEs heavily depend on R&D and human resources, a human resource strategy focusing both on quantitative and qualitative aspects is stressed.

To Nicholas *et al.* (2011), practitioners attribute different degrees of importance to innovation processes. They found that strategy is the most relevant best practice for NPD; metrics and performance evaluation, on the other hand, were considered of low relevance. In addition, contrary to previous research, they also find differences between key best practices in SMEs and in large companies. In Raymond *et al.* (2018), however, emphasis is placed upon information technology (IT) capabilities in enabling innovation processes.

From the above, it may be concluded that NPD process stages differ among firms depending on the strategy, business environment and products; although broader managerial philosophies, tools and guidelines may be present in various contexts, it is a "tailored" process once each firm's development environment is unique (Sońta-Drączkowska & Mrożewski, 2019).

In addressing the relationship between NPD approaches and contexts, Saarikko, Westergren and Blonquist (2020) suggest five recommendations to companies to develop specific strategies in digital markets, which may also be extrapolated to NPD strategies: start on a small scale and focus on immediate benefits, build cooperative efforts both internally and externally as building a solid brand, commit resources and efforts toward standardization, commit to legal aspects related to data and ethics, and change-based

leadership. Such recommendations may, hence, aid in developing NPD strategies in a digital context.

As information products have evolved in various formats and become progressively accessible, the more challenging it has been to information product firms to generate value to customers. This calls for more dynamic and connected approaches to traditional NPD processes to achieve market responsiveness and speed; however, amidst multiple propositions of CSFs in NPD processes, managers should primarily focus on strategic alignment, context and leadership when dealing with new information product development. The following section presents the methodological procedures, from the theoretical framework used to specific analysis procedures.

3. Methodology

For the purpose of this research, the specific contributions of Meyer and Zack (1996) and Davenport and Kudyba (2016), i.e. stages of digital product development, were used as conceptual framework. In addition, CSFs contributions from Kim *et al.* (2018), Nicholas *et al.* (2011), Raymond *et al.* (2018) and Woodcock *et al.* (2000) were used as they relate to SMEs – but also valid to micro enterprises – and Montoya-Weiss and Calantone (1994), as they present and extensive set of CSF categories.

The strategy chosen for this research is the case study. Case studies usually deploy a combination of data collection methods, e.g. archival searches, interviews, questionnaires and observation, and usually depict an authentic, though summarized record of events, the main players concerned and other influencing variables (Easterby-Smith, Thorpe, & Jackson, 2015). A qualitative approach was chosen since the investigative focus resides on a singular NPD process focusing on interactions, tasks, perceptions, descriptions and relationships. Moreover, this is an exploratory, in-depth, investigation, which is often overlooked by a quantitative approach. In addition, relevant quantitative data on NPD processes and CSFs were not available. ABC was selected for this study because of its mature know-how in digital product development processes as well as to the access to valuable data and information granted to the authors.

To ensure a comprehensive understanding of the phenomenon as well as research validity, data source triangulation was achieved by employing document analysis, participant observation and interviews (Gibson, 2017).

Interviews were conducted among four employees (managers) and the chief executive officer (CEO) of ABC, and the script was designed to capture the process, content and context of the NPD process. Subjects hold diverse experiences in NPD (Table 1). With an average length of 1 h and 15 min, the interviews were recorded with the permission of each participant. An explanatory e-mail about the study and its purpose with a file containing the interview script was sent to the participants beforehand. The script was divided in four

Interviewee	Date
CEO	February 21, 2017
Product manager	February 24, 2017
Sales manager	February 25, 2017
Product designer	February 26, 2017
Head of marketing	February 28, 2017

Table 1.
Interviewees

Source: Research data

parts: profile, NPD strategy, NPD process and CSFs impacting NPD process; the questions were based on the literature review. Interviews were transcribed and subsequently coded and arranged according to the themes of inquiry.

Interviews were supplemented with participant observation. As indicated by Keränen and Prior (2019), participant observation involves a "deep and long-lasting immersion and engagement in the field and *in situ*" and focuses on lived experiences, observed practices, daily events and activities, as well as on human behavior and attitudes within the context of study. Observations took place over several weeks as a way to minimize the observer effect (Saunders, Lewis, & Thornhill, 2016). Each subject involved with the NPD was observed on several occasions in at least three different occasions; one of the authors was present during working hours and participating in small supporting tasks (Table 2). This gave a distinctive opportunity to perceive and analyze interactions. Subsequently, an observation report was substantiated by the subjects to ensure consistency with reality (Easterby-Smith *et al.*, 2015, p. 162).

Finally, a document analysis was conducted – a set of techniques used to catalog, examine, interpret and detect the boundaries of physical sources, most commonly written documents (Saunders *et al.*, 2016) – on a number of the firm's documents: plans, charts, documents and files concerning NPD. Further organizational information was obtained through the firm's website and others related. The documents provided a perspective on job structure and roles performed and a holistic view of NPD.

4. Analysis and discussion

The results are divided into four parts: a brief description of the firm obtained through interviews and document analysis, then a summarization and discussion of the underlying NPD process and its components based on all three data collection strategies (participant observation, interviews and document analysis) and finally, the identified CSFs impacting NPD are discussed, drawn specifically from interview data confronted with observation records.

4.1 The case study firm: ABC Online-Marketing GmbH

ABC is a small-sized company created in 2012 located in Koblenz, Germany, whose core businesses are online courses (DIP format) and online marketing consulting services. At the

Date	Observation period	Subjects involved	Location
February 3, 2017	(9a.m.–noon) and (1p.m.–6p.m.)	CEO	Koblenz main office
February 4, 2017	(9a.m.–noon)	Head of marketing	Koblenz main office
February 6, 2017	(9a.m.–noon) and (6p.m.–9p.m.)	Sales manager	Koblenz sales office
February 9, 2017	(1p.m.–6p.m.) and (6p.m.–9p.m.)	Product manager	Koblenz main office
February 13, 2017	(9a.m.–noon) and (6p.m.–9p.m.)	CEO	Koblenz main office
February 14, 2017	(6p.m.–9p.m.)	Product designer	Koblenz main office
February 16, 2017	(9a.m.–noon)	Product manager	Koblenz main office
February 17, 2017	(9a.m–noon) and (1p.m.–6p.m.)	CEO	Koblenz main office
February 21, 2017	(9a.m.–noon) and (1p.m.–6p.m.)	Head of marketing	Koblenz main office
February 24, 2017	(6p.m.–9p.m.)	Sales manager	Koblenz sales office
February 25, 2017	(9a.m.–noon) and (1p.m.–6p.m.)	Product designer	Koblenz main office
February 27, 2017	(1p.m.–6p.m.) and (6p.m.–9p.m.)	Product manager	Koblenz main office
February 28, 2017	(9a.m.–noon) and (6p.m.–9p.m.)	CEO	Koblenz main office
March 1, 2017	(6p.m.–9p.m.)	Head of marketing	Koblenz main office
March 2, 2017	(9a.m.–noon)	Sales manager	Koblenz sales office

Source: Research data

Table 2.
Observation schedule

time of data collection (February 2017), it was a micro firm employing six people, but since 2016, it had experienced a significant growth as it was able to balance sales, production capacities and new skills. As of January 2021, it employed 20 people demanding a performance management approach.

The idea behind ABC started after AB, the company's CEO, decided to start his own consulting business focusing on coaching services. His main motivation was increasing income and financial independence. He had just earned his master's degree in applied informatics and worked at medium-sized company as a software architect.

Learning about cases of language instructors working through the internet, AB was convinced that coaching could also be performed online and, in this way, he could scale his services. Not long afterward, the 23-year-old entrepreneur started sharing his brief life experience, specifically how he engaged in changing from a low- to a high-achieving student within a short period, among a consistent number of interested students. He further managed to create a website and converted his business model into virtual coaching, becoming one of the first online coaches in Germany to reach six-figure annual sales in 2014. Between 2013 and 2016, as a result of intensive online marketing efforts in social networks, he was able to generate more than 160.000 contacts of students and more than €1.3m in sales as an independent professional.

In 2015, AB's now established consulting firm foresaw a need of digitizing new client acquisition processes for independent management professionals, i.e. coaches, consultants, specialists and advertising agencies. Thus, he started to work with consulting beyond his main activity, and within this period, he provided services to various speakers, trainers and coaches known all over Germany. In mid-2016, he decided to focus on this activity and build a team to support other coaches, consultants and specialists to reach more clients.

Currently, AB's consulting firm employs a team of 20 people and is a market leader and pioneer in new client acquisition and premium positioning in online coaching and consulting in all German-speaking countries.

ABC sells its DIPs exclusively in the German-speaking online marketing market at a premium price. The core product is an extensive online course directed at management coaches, consultants and service providers who want to generate new online leads and sell their service at a premium price. At present, this product accounts for 90% of revenues. ABC was selected as a case study because of its lively NPD process since its inception, to its experience with successful and unsuccessful NPD projects, and to its leadership within the German online marketing niche.

4.2 An overview of the new product development process

As traditional literature on NPD highlights formality in processes as the basis for improvement and more consistent outcomes (Tomkovick & Miller, 2000; Cooper & Kleinschmidt, 2007), recent studies have shown that SMEs specifically do not always display a consistent NPD process due to structural limitations and cost barriers (De Waal & Knott, 2019; Kim *et al.*, 2018; Raymond *et al.*, 2018; Woodcock *et al.*, 2000) and seldom rely on intuition rather than on strategic planning. This case is not an exception.

The NPD process at ABC is loosely, but consistently, guided by its general business goals. Both interviews and participant observation revealed a somewhat established NPD strategy, though not clearly formalized, but variously understood among the team. Strategy is described as "aggressive," "growth-oriented," "market-pulled" and "differentiated compared to competitors." The team perceives NPD as key for growth and profitability and is committed to it.

Observation records showed NPD as an *ad hoc*, unstructured and highly informal process, though the firm has put efforts to formalize it as the following interview excerpt states.

> I'd say while we do not formally follow a documented NPD process, we follow a clearly understood path of the tasks to be completed in product development. [. . .] probably six months ago, it would have been very informal, and we're building up to a stage now where it's somewhere in the middle. [. . .] I still think there's lots of things to do before we can call the process formal, but surely, we've progressed in the last couple of months (CEO).

The company is transitioning from an unstructured to a structured process motivated by savings in resources and time. However, the current NPD process is aligned to a needed market responsiveness, as this was observed as a pressuring issue in NPD processes:

> We're gradually improving our process. We try not to be too rigid in our approach, so we do provide some level of flexibility, so that we can sort of capitalize on an opportunity that might come along. I would describe our process as responsive, meaning that it is responsive to the resources we have for our NPD.

Overall, NPD at ABC encompasses four distinct stages: idea generation, idea validation, product creation and product launch. The need for standardization is continuously examined as means for increasing efficiency, which is a sensitive and strategic issue for the firm.

4.2.1 Idea generation. Developing DIPs requires a focus on earlier stages of NPD, as products/solutions should be finely aligned with specific market demands. At ABC, NPD begins with fuzzy product ideas from multiple sources, within and outside the firm. The CEO and the product manager are active in originating ideas as the company also interacts with customers and does market screening continuously. This continuous feedback, as predicted by Mosey (2005), Raymond *et al.* (2018) and Zahay *et al.* (2018), fuels creativity for product generation, adaptation and upgrading, and contributes to further differentiation.

Idea generation often occurs during informal gatherings (regular coffee meetings and lunch breaks). An excessively formal process may suffocate creativity; therefore, formal market research is rarely undertaken. Market information is obtained via networking, conversations with customers, internet research and conferences in a non-systematic way. This seems to meet the company's needs for market responsiveness. Observation and interviews evidenced a need for continuous screening of new ideas and for improving products' results as key for the firm to remain "entrepreneurial." No difficulties regarding this phase were identified.

4.2.2 Idea validation. Despite the low development costs of DIPs, ABC does not launch them before validation. Validation is basically verifying pre-existing offers among national and international competitors in the market. The CEO describes this approach to idea validation:

> You're in all likelihood not the first person selling your particular product online. Therefore, our first step to validate a product idea is to look to our competition to better understand demand and potential product appeal.

He further explains:

> Most people think competition is bad [. . .]. Smart entrepreneurs, however, know that competition is a good thing – especially if you find a product like yours before you spend time and money to create it. Why? Because someone else has already spent the time and money to validate that idea for you! Plus, you have an advantage coming in later – not only knowing that there's a market for that product – but also knowing what can be done better.

This process is also essentially informal, as verified in the interview with multiple subjects and also observed:

> I'm afraid we're not very formal in that regard. Of course, we do some split-testing now and then, but at the end it often comes down to gut feeling (Product manager).

Gut feeling, however, seems to work well as employees from various functions (as well as customer representatives) are involved in the validation process providing different perspectives. This process is also continuous and woven into the daily firm routine, as all involved scrutinize potential products from different perspectives.

Contrasting with traditional NPD testing stages (Cooper & Kleinschmidt, 2007), ABC presents a basic, though, effective validation phase, favoring speed-to-market and cost minimization; this may already be obvious as this is a small firm (Wong & Aspinwall, 2004; Cerchione, Esposito, & Spadaro, 2016), but specific considerations on this phase are not clear in the literature. This case shows that the firm tends to rely on its network for product validation.

4.2.3 Product creation. In this phase, the cross-functional NPD team (marketing, accounts, production, technical and development) initiates the development of the final product, providing an accurate understanding of the product itself and allowing the team to further rearrange it in face of any challenges or issues.

After validation, content acquisition and adjustment tasks are performed (identification of desired elements – text and images – and their acquisition or retrieval in a database). Individual parts and contents are prototyped in presentation slides and, eventually, a "membership area" is created in the firm's website where the product is accessible to customers.

Creation involves parallel execution and intense and continuous information exchange between all NPD members, who perform several tasks; scarce resources require the firm to incorporate all existent internal skills. Perspectives of all involved are considered, regardless of hierarchy, as a way of avoiding the costs of product failure. Similar to previous stages, this basic process is quite informal, although there have also been efforts to formalize it.

No product testing nor any other activity prior to product launch was observed. Notwithstanding, product quality is key for product success:

> [. . .] if one is capable of delivering good quality at an affordable price, the product is a "sure sell", and thus, no market research is needed (CEO).

The company has developed a highly efficient and intuitive method of converting ideas into new products; thus, product creation is a relatively fast stage where a screening for available competitive offers allows identification of deficiencies and improvement opportunities, and then, the use of the company's expertise to create a superior version with content and aesthetics – a key issue in distribution of DIPs as described by Meyer and Zack (1996).

Over the years, ABC has developed the capability of creating new products by understanding the features to be incorporated from competitors and avoiding plagiarism: digital information is easily copied, but also changed and reused in differently. Hence, ABC is able to customize and recombine information to generate new products without great effort.

The interactive–iterative characteristics of product creation may relate to the capabilities and resource-based perspectives in SMEs' NPD processes (Mosey, 2005; Raymond *et al.*, 2018; Kim *et al.*, 2018), especially when it involves groups outside the firm. As a fast NPD process is required, human as well as technical capabilities are crucial to attain competitive edge through speed-to-market and product reliability.

4.2.4 Product launch. As the most intense in the overall process, ABC uses a well-planned product launch strategy consisting of three substages: pre-launch, launch, and post-launch series.

The product launch strategy is heavily based on e-mail marketing (prospects are exclusively contacted via e-mail during product launch). For this, ABC uses a customer relationship management (CRM) software that enables automatic e-mails to prospects and interaction tracking. The system can process more than 5,000 e-mails at a time, which is indispensable in escalating relationships and sales.

As reinforced by the product manager, a relationship based on trust is vital for a successful product launch. Since DIPs are experience goods, buyers cannot verify the product directly before purchasing it. Therefore, trust and credibility are decisive for customers. According to interviews, although a high-quality DIP should be satisfactory for the firm's success, this product must also be presented fashionably so that it conveys credibility to the customer. Each step of the product launch strategy aims at gaining customer trust, a critical intangible asset in a market with few opportunities for differentiation. In such context, not only NPD *per se*, but also IT capabilities in product distribution were mentioned as critical, in accordance to Raymond *et al.*, 2018.

Overall, using as theoretical framework the contributions of Meyer and Zack (1996) and Davenport and Kudyba (2016), the stages of NPD and their main aspects analyzed (Table 3). As ABC's displays four NPD stages, they end up encompassing or considering all seven suggested in the framework.

According to Table 3, the very first issue analyzed is organizational strategy, which is not discussed in the theoretical framework. The case study shows that strategy is highly valued. Though not formalized, it is more or less perceived as "aggressive," "growth-oriented," "market-pulled" and "differentiated compared to competitors." Nevertheless, strategy serves as central guidance for daily routines and projects, aiding both quality and resulting reputation issues. The organizational strategy issue also clarified different positionings; while the framework suggests crafting products based on detailed data and specific market needs, ABC draws on pre-existing DIPs as an indicator of real demand and improves them by successfully adding high-valued attributes.

The first stage of NPD at ABC, idea generation, encompasses product conceptualization and data acquisition within the framework. The main difference here is that ABC uses a highly idiosyncratic fuzzy approach for new ideas, involving an ample participation of people from different areas and also from network members. The framework suggests a rigid definition of the product based on formal guidelines so that data can be coherently aligned for further analytics, but in the case of ABC, this unstructured stage at ABC yields quicker insights for product definition, especially because products may suffer alterations to better accommodate customer requirements.

As formal market research may be too costly for small companies, while a structured process involving multiple efforts inside and outside the organization, the unstructured, but strategy-driven "patchwork" approach to idea generation and product conceptualization in this case provides multiple perspectives and a thorough analysis of the product within a short timeframe, thus saving time and resources. As a result, as interactions are more intense, collective learning occurs more rapidly. Previous ideas are often retrieved to enrich or to set comparative standards to new projects. Customization and recombination of information for new products grant more mobility to this process as opposed to larger organizations, which in turn, contributes to a faster product conceptualization.

Refinement, the second stage proposed by the framework, was found to be equivalent to idea validation at ABC. ABC's strategy of validation through verification of pre-existing

Theoretical framework Meyer and Zach (1996), Davenport and Kudyba (2016)		Case study (ABC Online-Marketing GmbH)	
NPD stages proposed	Main aspects	NPD stages identified in the case study	Main aspects
Product conceptualization	(1) Product definition, data screening and product model guidelines formalized and justified in light of increasingly fragmented and sophisticated needs	Idea generation	(1) Fuzzy product ideas from various sources, within and outside the firm
Acquisition	(1) Establishing data requirements for the product (2) Combining different sources (internal and external) and types (structured and unstructured) of data (3) Continuous analysis of quality, scope, breadth, depth, credibility, accuracy, timeliness, cost, control and exclusivity		(1) Continuous market scanning for ideas (2) Participative process with people from all areas in informal gatherings, including top management (3) Market information obtained via networking, interaction with customers, internet research and meetings. No formal market research is conducted
Refinement	(1) Data treatment and usage of advanced analytic methods, e.g. automated tools, for gathering, combining and processing data speedily to create products aligned to market requirements, generating value for customers	Idea validation	(1) Validation through verification of pre-existing offers in the market (2) Content acquisition and adjustments (3) Reliance on the company's network (4) Participative process and consensus-based decisions (5) Culture of product scrutinization
Storage retrieval	(1) Knowledge management software, data search specificity and usage of analytical tools; retrieving and usage of data in different formats	Product Creation	(1) Intense and continuous information exchange between all NPD members (2) Screening for available competitive offers, verifying deficiencies and improvement opportunities, and use the firm's expertise to create a superior version with content and aesthetics (3) Customization and recombination of information for new products (4) Ethical precautions
Distribution	(1) Timing and frequency, medium of delivery. Web as main channel	Product launch	(1) Three substages: pre-launch, launch and post-launch series
Presentation	(1) Value generated by information products (DIPs included) depending on easiness of use and interactive resources		(2) Use of CRM software: Automatic e-mails and tracking of interaction
Market feedback	(1) The need for continuous innovation and monitoring of product usage, generating analytics-based data and enabling product development iteration		(3) Instant distribution through the Web (4) Aesthetics highly valued as it signals reliability (5) Customer feedback (6) Access to continuous product update within contract duration

Source: Research data

Table 3. Theoretical framework and case analysis

offers in the market, product scrutinization culture as well as participative process and consensus-based decisions, however, contrasts with a more structured data analysis for product refinement suggested by Meyer and Zack (1996) and Davenport and Kudyba (2016). ABC, then, tends to work with more unstructured data for validation, although both approaches aim at continuous iteration for product improvement and value generation. Similar to the previous stage, idea validation is a highly dynamic process that contributes to

market responsiveness and time to market, which are essential strategic competencies for a niche-oriented company. Customer relationship and fast market response are key competitive aspects in value generation for such companies compared to larger ones. However, as information products are easily scalable and adapted, this may provide solid grounds for growth.

Storage and retrieval in the framework and product creation at ABC were identified as highly similar. ABC's comparative analysis with existing products in the market and further improvements aiming at value enhancing and search for economies of scope from previous demand more specific tasks, including a special concern toward ethics and property rights; this approach should aid smaller companies to set the grounds for growth. The use of knowledge management software and the dynamics of information production, recombination and customization are equally considered, though the framework suggests the use of analytics. At ABC, however, the use of unstructured and qualitative information is more prevalent.

Finally, distribution, presentation and market feedback in the framework were encompassed by a three-phase product launch at ABC. This last stage at ABC displays very much what is mentioned by the framework in its last three stages, with special mention to customer/market feedback as means of improving products continuously. In the case of ABC, product aesthetics are carefully thought out even in earlier stages. Product launch is a critical step in understanding how customers relate to the product; the substages used by ABC call for a more detailed process and data generating approach to aid decision-making and set benchmarks, a cost-effective initiative for smaller firms that enable it to manage risk more efficiently in the development of other products. In the end, these main aspects differ from the traditional literature as they are particular to niche strategies, something that larger organizations may not afford.

This analysis has shown that ABC follows most of what is described in the framework, though it displays a more simplified process and reliance on unstructured data and dynamics with ample participation of its network for NPD. The reason for this may be attributed to the fact that, as a small enterprise, ABC cannot afford a structure for analytics and specialization, as suggested by Davenport and Kudyba (2016). In addition, since its competitive edge is based on market responsiveness to a very specific niche and its strategy is often focused on improving existing products, unstructured, though highly coordinated processes are essential. In addition, it was verified a strong influence of organizational strategy and culture in making all the unstructured processes coherent. Organizational culture was also recognized as key in assuring market responsiveness.

After assessing the NPD process at ABC, this next subsection discusses the CSFs of its NPD process with the aid of Nicholas *et al.* (2011), Kim *et al.* (2018), Raymond *et al.* (2018) and Saarikko, Westergren and Blomquist (2020).

4.3 Critical success factors of the new product development process

Regarding NPD CSFs, Montoya-Weiss and Calantone (1994) highlight 18 variables under four categories: strategic, development process, market environment and organizational factors; however, market environment factors were not identified as critical in NPD projects at ABC. Accordingly, Cooper (1999) suggests that product benefits and superiority (strategic, development and underlying organizational factors) are two of the main reasons why customers purchase a new product and new product success is obtained.

In the ABC case, a "high-quality appeal" is consistently associated with their name and image in product development.

> It motivates me to make sure we make a product that has a value for our name and for our brand and keep coming up with products that people enjoy [. . .]. [. . .] I get a kick when I see (customers') reactions and get their feedback and how the markets have been dragged into the gutter by poor products over the decades and how we can get over that (Product designer).

Subjects were confident that the company's inflexible (although mostly informal) quality policy led to product advantage. The final product goes through a three-person checking system to assure that quality is not only acceptable, but appealing to customers. ABC, thus, intentionally aims at positioning itself at a higher-end market, which allows it to charge a premium price and make the NPD process profitable but also rewarding to staff. While charging a premium price is not compatible with spurious quality, genuine high-quality has become an integral part of the product development strategy at ABC. It was extensively observed in loco that not only the CEO is involved in the process, but he also intervenes in design and writing minutiae; this symbolic approach toward quality fosters a quality-driven institutional culture; however, intense discussions over details may hold up the NPD process.

Regarding the theory used for CSFs, these aspects are aligned with the aspects of informality and interaction among organizational members, specifically in SMEs (Kim *et al.*, 2018; Meyer & Zack, 1996; Nicholas *et al.*, 2011; Raymond *et al.*, 2018; Woodcock *et al.*, 2000). In addition, following Montoya-Weiss and Calantone (1994) as a theoretical framework regarding CSF categories, the following were identified at ABC:

(1) Strategic factors: market orientation and entrepreneurial spirit (strategy);

(2) Development process factors: speed-to-market supported by interactive and iterative product creation, top management support, expertise in marketing activities aided by CRM and infrastructure; and

(3) Organizational factors: leadership, innovative climate and culture, high-quality cross-functional NPD team and networking.

Each identified category is discussed in the following subsections.

4.3.1 Strategic factors: market orientation and entrepreneurial spirit. Market orientation at ABC was evidenced throughout the whole NPD process. ABC showed a notable ability to understand its market dynamics, effectiveness in attaining a fit between market needs and firm's resources, undertaking competitive analysis, taking advantage of its market experience (five years) and exhibiting a thorough understanding of customer needs and user circumstances. Though a small firm, it is considered a leader in its niche because of this. Though it does not carry out market research nor deploys market tests, this does not mean that it is less market-oriented.

As observed, the entrepreneurial spirit as at ABC is widely shared, and the continuous development of ideas and products is embedded in its culture, deliberately linked to growth objectives. This, in combination with a fast NPD process, it gives the firm a competitive advantage. Moreover, this dynamic process allows the firm to reach greater market access while improving the likelihood that the new product will be the "standard preference." Strategic factors at ABC are, thus, closely related to those cited by Cooper and Kleinschmidt (2007) – strategy and its effective communication throughout the organization.

While the involvement and backing of top management have been identified as an NPD success factor in empirical studies (Montoya-Weiss & Calantone, 1994; Cooper & Kleinschmidt, 2007), owner/manager skills and support seem more essential in small firms, as a simpler organizational structure naturally requires it. In the case of ABC, senior management (CEO) demonstrated solid commitment to the NPD process and its results:

> We have to be proactive in new product development, without it we would be dead and in short time [. . .] new product development is one of the most important aspects of our business as it offers the greatest potential for growth (CEO).

Displaying a fairly democratic and "hands-on" style, the CEO controls the direction of the NPD effort, indicating which products the firm should market and how the brand should be managed. Such task is presumably based on individual market experience combined with intuition. Ultimately, the CEO is seen as the "face" of the firm, connecting personally with customers, creating partnerships and networking proactively. This, in turn, impacts respect and admire from employees.

4.3.2 Development process factors: expertise in marketing activities and infrastructure. As proficiency in NPD activities is fundamental for successful new product performance (Maidique & Zirger, 1984), the results showed that the ABC's proficiency on marketing activities influences significantly the success rate of new products. Solid competencies in evaluating consumers' needs and competitors, in determining market characteristics and trends, and in executing product launches were verified. Along with findings in the traditional NPD literature, this research revealed that proficiency in launching activities is also key for new product success when it comes to DIP.

It was also verified that (technology) infrastructure is an important CSF. In particular, broadband internet connection with its decentralized organizational structure, open standards and the possibility of many-to-many communication is of significant relevance for the firm's operations. Furthermore, electronic services such as electronic payment processing, CRM systems and data processing, e-mail communication and tracking of user data are critical for the NPD project success. Although these services, in the true sense, do not create their own value, they are nevertheless a prerequisite for all other activities (capabilities).

4.2.3 Organizational factors: leadership, innovative climate and culture, a high-quality cross-functional new product development team and networking. It was also observed a positive relationship between climate and culture for NPD; the CEO actively supports NPD with resources and NPD team members are engaged in the decision-making process accordingly. There is a very informal company culture typical of SMEs (Wong & Aspinwall, 2004), and such culture fosters a high degree of trust, which in turn encourages leaders to consider mistakes, risk-taking and commitment toward the organization (Cerchione *et al.*, 2016). Furthermore, enthusiasm for developing and selling quality information products supports the firm's success.

Interviews and observation revealed that innovative climate and culture are associated with the working environment. While also engaged in fostering an approachable working environment, the company stimulates personnel to perform and enjoy being at work; this, in turn, shapes a desirable organizational culture. Trust between the CEO and team members is demonstrated by the full access granted to office employees even in their spare time; such symbolic practice indicates a well-functioning working atmosphere. The atmosphere influenced by open communication and effective information distribution results in productivity. Furthermore, elements of leadership, i.e. example and engagement (participation), may influence rigor and perception in teams in tasks such as opportunity search and screening. This, in turn, may improve timing and market responsiveness with products increasingly aligned to needs and, ultimately, affect reputation, a cherished resource mentioned by the CEO. The firm's spirit to solve emerging problems along with a general "can-do" attitude provides it with the right flexibility for a growing organization.

In terms of NPD team performance, it was mentioned several times throughout the interviews that the NPD team itself is a CSF of NPD projects. Indeed, the firm showed various aspects of a high-quality NPD team described in NPD literature:

(1) Product manager is fully dedicated to a single NPD project (as opposed to trying to lead many projects, or having various assignments), devoting adequate effort to the project;

(2) The team interacts and communicates expansively and frequently, also attending frequent project update meetings, weekly progress reviews and problem solution sessions. This ensures that the entire team is committed to agility; and

(3) The firm embraces a collective approach to NPD: there is a sense of effectiveness in the team, institutional support (especially resources) and the existence of cross-functional teams – including members from different departments – all accountable for the results. It was observed that the whole team shares information and makes consensual decisions about product, processes and production. The knowledge attained with a diverse team composition promotes effective collaboration.

Once the functional areas are close to one another, NPD team members enjoy face-to-face interaction continually. In this case, all employees, excluding the sales manager, operate in the same office. This leads to actual cross-functional teams displaying positive internal cooperation and communication, a factor frequently cited as key to both increased speed-to-market and higher success rates in NPD (Cooper, 1999, 2001).

The rather short lines of communication, unstructured decision-making and interfaces between departments give the case study firm an advantage for rapid NPD.

Since the online marketing niche is relatively new in Germany with fast-changing market opportunities, it is critical for the firm to keep in touch with current market movements. Thus, in this case, networking is also regarded as key to NPD success:

> The guy from another firm has actually developed or launched a similar product that we are planning to create. So, I would be stupid not to ask [. . .] We give them what we know, they come around and give us what they know. It's a win-win situation (CEO).

Data collected through observation showed intense dialogues between the CEO and other online marketers involving recent developments, opportunities and market changes. Several times, as observed, meetings were held with marketers, best practices discussed and new ideas selected for implementation in the current NPD process. Such consistent knowledge exchange supports the firm's competitive advantage through NPD projects. In general, all CSFs mentioned were associated to the CSFs identified in literature, with the exception of "infrastructure."

5. Conclusion

As the purpose of this research was to assess the NPD process of DIPs and its CSFs using a singular company as a case study, the conclusions are succinctly elaborated in the following paragraphs.

First, regarding the current NPD process at ABC, it involves fewer stages than traditional processes suggested in the literature for information products as well as unstructured efforts in comparison to theory, which emphasize larger organizations. However, three critical organizational elements were identified within this process that ensure consistency in terms of value delivery, especially for a small firm: strategy, culture

and leadership efforts. This unstructured process was verified as vital in terms of market response and market trust. Furthermore, such responsiveness is highly effective in building and maintaining networks. The company also takes advantage of its network, which involve mainly customers and competitors, and whose constant feedback helps fuel creativity and a "continuous improvement spirit." Networks and network centrality then were shown to influence performance in NPD, especially considering peculiarities of information products markets. On the other hand, it was verified that though highly structured processes may enhance productivity in larger organizations, it weakens market responsiveness.

Previous studies have not discussed much about these three topics (strategy, leadership and culture) in the context development of information products; leadership, for example, as means for creating and maintaining a culture of high performance in NPD is slightly verified in the NPD literature. Moreover, as this is the case of a small firm, additional studies should contribute in providing proper grounds for them to compete among large players.

In addition to these findings, it was verified that a prerequisite for success in selling DIP is a relationship commitment with the potential buyer. Since DIPs are experience goods and the internet is seemingly a chaotic marketplace, uncertainty is high among customers. Thus, iterative learning with customers is key as products are dynamically improved. Iteration is essential in a highly competitive environment as market learning and speed are essential in bridging market needs to new products and their configurations. Responsiveness, therefore, is essential in developing networks, which helps establish a competitive position among others in the industry.

Regarding CSFs, ten of them were identified and further categorized in three groups: strategic/market (product advantage, market orientation and infrastructure), development process (top management support/skills, proficiency in marketing activities, flexibility and speed-to-market) and organizational (leadership, high-quality cross-functional team, innovative climate/culture and intense networking). This finding shows clear alignment with theory, as CSFs apply to both large companies and SMEs. However, differently from those described in SMEs, some degree of formalization/standardization was found to be essential in increasing NPD productivity. Thus, a balance between unstructured processes and formalization is fundamental to attain speed-to-market capability.

For practitioners, this study suggests the importance of strategy, leadership and culture for the development performance of information products in SMEs. While this may guide unstructured tasks and enhance team collaboration, it may also help overcoming cost barriers of having a highly structured area and staff to perform analytics-based tasks, i.e. model generation for product concepts, etc. Instead, those three aspects should influence how staff may find valuable opportunities through unstructured market data and information while also taking advantage of networks.

Limitations of this research are mainly due to its qualitative nature, which does not allow generalizations, though careful attention was given to validity and reliability issues through the use of data source triangulation. For further research, investigating the NPD process of DIP in other markets and NPD processes in larger firms in similar industries using a longitudinal approach is suggested.

Note

1. This is a fictitious name attributed to the case study firm for anonymity reasons.

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