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HOW CONSUMERS PROGRESS TO MORE ADVANCED LEVELS OF DATA-BASED PRODUCTS AND SERVICES: A SCENARIO-BASED APPROACH

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Abstract Data-based products and services (DBPS) utilise personal data to enhance their capabilities and provide consumers with a more intelligent and personalized experience. As a result, the experience of DBPS is fluid – the amount of data consumers feed into the product determines their experience. However, barriers such as privacy concerns hinder the progression to a more pronounced level at different thresholds. We developed and employed a scenario-based prospective incident technique to analyse how consumers experience DBPS at certain levels and how they advance from one level to another. Results show that consumers are willing to share non-critical personal data in exchange for mainly utilitarian benefits at basic DBPS levels. As DBPS usage progresses, consumers constantly perform cost-benefit assessments. Providers of DBPS can target these assessments by clearly communicating incremental added value to enable a small-step progression at all levels of usage.

Keywords:
data-based
products and
services,
customer
experience,
fluidity,
triggers,
barriers.

1 Introduction

Today's products and services increasingly leverage data to improve the customer experience. This has been realised by advancements in technology for data capture, transmission, storage, processing, and analysis. Hoyer et al. (2020) state that "radically new technologies and associated software and hardware can transform the customer experience" (p. 58). The increasing reliance of products and services on technology and data makes them "fluid" artefacts that can evolve in terms of their capabilities and the value that is co-created by consumers, firms, and other players in the respective digital ecosystems (Raff, Wentzel, & Obwegeser, 2020; Ramaswamy & Ozcan, 2018). As a result, data-based products and services (DBPS) "fluidly" allow the co-creation of different levels of customer value in return for additional individual data. However, taking full advantage of this potential is all but trivial. In its most recent research priorities report, the Marketing Science Institute (2020) highlights that "[t]echnology offers customers an array of new ways to interact with firms, fundamentally altering the purchase experience and raising concerns about data privacy" (p. 5). The more data is required to create value for the customer (e.g., through personalization), the more a firm is dependent on the customer's willingness to share or give access to the required data. If customers are reluctant to do so, it is more difficult to provide them with the full features and capabilities of the product. Therefore, resolving this personalization-privacy paradox (PPP) is especially crucial for DBPS and challenges researchers and practitioners alike (Aguirre, Roggeveen, Grewal, & Wetzels, 2016; Marketing Science Institute, 2020; Puntoni, Reczek, Giesler, & Botti, 2021). This paper is among the first to address the lack of research on "fluid" DBPS (Hoyer et al., 2020) by explicitly exploring what drives and what inhibits consumers to engage with different levels of DBPS capabilities. The results help companies understand and support the customer progression from lower to more advanced levels of DBPS usage.

2 Literature Review

Data is a cornerstone of digital marketing. With continuous advances in technology, data increasingly permeates previously "dumb" physical products and environments, promising to make them "intelligent" or smart. The use of data in products and services can vary, ranging from simple digitization to more sophisticated use of artificial intelligence (AI), as the classification of smart products by Raff et al. (2020)

illustrates. Technologies powered by AI are considered to have the most significant effect on the customer experience (Hoyer et al., 2020), but with associated benefits for the consumer come potential costs that can inhibit the use of respective products and services (Puntoni et al., 2021). Raff et al. (2020) distinguish four archetypes of smart products: digital, connected, responsive, and intelligent products. All archetypes comprise physical (hardware) and virtual (software) elements that together allow for different levels of capabilities (Raff et al., 2020). More advanced archetypes add connectors, sensors, and actuators that are integrated with more complex software to achieve higher-level capabilities, such as sensing the environment and reacting to it.

Digital products combine basic hardware with basic operating software allowing for storing, processing, analysing, and transmitting data (Raff et al., 2020). *Connected products* can communicate and exchange information with other entities through various network technologies (e.g., Wi-Fi, Bluetooth, or RFID). By interacting and cooperating with other entities and devices, connected products can jointly create value by collaborating in assemblages (Raff et al., 2020). *Responsive products*, which add sensors and actuators, are never truly “finished” because they can acquire new capabilities through digital upgrades. This allows the co-creation of higher-level customer value through interactions (Raff et al., 2020; Ramaswamy & Ozcan, 2018). Examples of such products are rule-based smart-home actions or location-based services (Raff et al., 2020). Responsive products can easily evolve into *intelligent products*, the most advanced smart-product archetype (Raff et al., 2020). These products rely on AI that enables reasoning, decision making, autonomy, and proactivity – e.g., complex context-based services such as NEST Learning Thermostat or driverless vehicles as learning-based and self-organising autonomous systems (Raff et al., 2020).

Hoyer et al. (2020) expect that three specific technology clusters – all of them typically powered by AI – will most dramatically change the customer experience, namely (1) the Internet of Things (IoT); (2) augmented, virtual, and mixed reality (AR, VR, and MR); and (3) virtual assistants, chatbots, and robots. Such new technologies lead to the creation of new touchpoints and the reconfiguration of existing ones, and can create experiential value for consumers (Hoyer et al., 2020). Puntoni et al. (2021) also take an experiential perspective on consumer-facing AI-

enabled products and services but stress that while focusing on the benefits for the consumers, firms also need to pay attention to the costs consumers may encounter. Puntoni et al. (2021) distinguish four AI capabilities – namely listening, predicting, producing, and interacting – and four distinct consumer AI experiences that come along with each of these capabilities – namely data capture, classification, delegation, and social experience (Puntoni et al., 2021). In each of the experiences, consumers may encounter different benefits and costs. For example, consumers may experience data capture – i.e., different ways how AI systems collect data about consumers and their environments (AI listening capability) – as being served or being exploited (Puntoni et al., 2021). The perception of costs may prevent consumers from experiencing the benefits of AI-enabled products and services, resulting in dilemmas like the PPP (Puntoni et al., 2021). To effectively address such challenges, Puntoni et al. (2021) suggest that firms “could provide an initial basic service requiring limited disclosure of personal information and later offer the possibility to access an upgraded version that requires additional individual data” (p. 146). In this way, products, services, and respective touchpoints become increasingly “fluid” in terms of the information or data they require and the subsequent experiences they enable.

Hoyer et al. (2020) call for research on how new technologies transform the customer experience. Specifically for IoT, they suggest that future research should determine thresholds “beyond which consumer[s] perceive an invasion of privacy” (p. 66) and how such thresholds vary across contexts. Understanding such thresholds can be critical to the advancement of customers from a lower to a more sophisticated level of various “fluid” DBPS.

3 Research Methodology

We pursue a qualitative approach to explore how consumers respond to encounters with different levels of DBPS (De Keyser, Verleye, Lemon, Keiningham, & Klaus, 2020). We base our study on the critical incident technique (CIT; Bitner, Booms, & Tetreault, 1990; Gremler, 2004) and the sequential incident technique (SIT; Stauss & Weinlich, 1997). With CIT, consumers are typically asked to recall only critical service encounters. SIT also collects normal, uncritical incidents along a customer process (Jüttner, Schaffner, Windler, & Maklan, 2013). Both CIT and SIT are retrospective research methods (e.g., Gremler, 2004) where respondents tell about critical and uncritical incidents that have occurred in the past (Jüttner et al., 2013).

In our study, however, we inquire into a potential future instance, i.e., how consumers respond to possible incidents related to DBPS.

We developed *three scenarios* (De Keyser et al., 2020) of DBPS usage to operationalise this prospective perspective (see Table 1). Within these scenarios, we reproduced “fluidity” (Puntoni et al., 2021; Raff et al., 2020) by gradually increasing and manipulating the collection and usage of personal data leading to more DPBS capabilities and a more personalized experience. This method allows us to learn about how users would respond to different levels of DBPS usage. We termed our approach scenario-based prospective incident technique.

Table 1: Overview of situation and choice incidents by scenario and usage intensity level

Usage intensity	Incident type	Scenario 1: IoT-based smart home solution	Scenario 2: Conversational user interface-based airplane ticketing	Scenario 3: App-based loyalty platform
Level 1: Digital	Situation	Using smart home devices with an app	Chatbot-guided booking	Loyalty app
	Choice	Using a hub to interconnect devices	Creating a personal account	Creating a personal account
Level 2: Rule-based	Situation	Hub-based smart home incl. lights and heating	Rebooking push notifications based on account	Sharing loyalty points with friends
	Choice	Rule-based integration of front door lock into a hub	Adding passport and credit card to an account	Feeding app with personal data (location)
Level 3: Intelligent & Autonomous	Situation	Intelligent hub with personal recommendations (e.g., meals)	Voice-based intelligent assistant	Buying deals with credit card
	Choice	Autonomous decision-making by hub (e.g., purchases)	Self-learning voice assistant	Autonomous deal purchases by an app

All three scenarios were developed with industry partners operating in the airline, the consumer electronics, and the CRM industry. In each scenario, we designed *three levels of usage intensity* in terms of product capabilities and user interaction. The first level covers digital technologies (e.g., usage of an app instead of physical cards for loyalty programs). The second level adds rule-based functions (e.g., front door locked with smartwatch) or social aspects (e.g., exchanging loyalty points with friends). The third level then uses AI and service autonomy, describing systems able to take decisions and make intelligent suggestions on their own. In summary, level 1 describes the basic function of the DBPS and rather passive users, whereas towards level 3, users become co-creators of the DBPS by increasingly sharing more personal data (see Table 1). All levels were supplemented with a visual illustration so that interviewees could better immerse themselves in the described scenarios (see Stauss & Weinlich, 1997). Figure 1 exemplarily shows the examples for the scenario IoT-based smart home solution.

Level 1:
Digital



Level 2:
Rule-based



Level 3:
Intelligent &
Autonomous



Figure 1: Visual illustration for IoT-based smart home solution used during interviews

Each level consisted of *two types of incidents*: First, a descriptive situation incident had to be evaluated (e.g., “imagine you’re using a smart Hoover ...”). With the situation incidents, we aimed to assess attitudinal aspects related to DBPS. Secondly, a choice incident was examined to evaluate which factors drive or inhibit the intention to use DBPS (e.g., “what conditions would lead you to connect your smart devices in a hub?”). The distinction between choice and situation incidents allowed us to understand how consumers feel at different DBPS levels (situation) and how they advance from one level to another (choice).

After two pre-tests in September 2020, the interviews were conducted with Swiss consumers in October and November 2020. The industry partners and the authors jointly recruited the participants. The interviews were conducted online via Zoom and lasted 50 minutes on average. The sample (n=12) was balanced regarding age, gender, and tertiary education (mean age: 37.5 years, 50% female, 50% with tertiary education) and covered varying degrees of technology innovativeness (mean of 3.4 on a 5-point Likert scale with 5 representing the highest degree of innovativeness).¹ In each interview, the participant was guided through two scenarios. Per scenario, the interviewer described each of the six incidents which belonged to the scenario (two incidents per level, see Table 1) and asked corresponding questions. For each level, an illustration of the level was shown to the interviewee via screenshare in Zoom (see Figure 1, as example for scenario 1). To achieve an equal distribution across scenarios and balance out order effects, all six possibilities to combine any two of them were presented to the 12 interviewees. In sum, the 24 scenario evaluations lead to 144 evaluations of situations and choices.

All interviews were fully recorded and partially transcribed by the research team. Interviewers’ standardised questions and conversation fragments unrelated to the scenarios or DBPS in general were omitted. The research team developed an initial code book based on literature (e.g., Hubert et al., 2019). Three authors individually coded one scenario using MAXQDA and added it to the code book. Finally, the individual code books and results were integrated and discussed by the whole research team (Spiggle, 1994).

¹ We measured technology innovativeness with a three-item scale adapted from Tussyadiah et al. (2015), Agarwal and Prasad (1998), and Goldsmith and Hofacker (1991).

4 Results

The findings of our study comprise general results that are agnostic to levels of usage intensity as well as results that are specific to the respective level of usage intensity.

4.1 Level-agnostic Results

We discussed different types of data that informants could decide to share or save in a profile throughout all three levels. Depending on the type of data, informants displayed varying willingness to share it. Email addresses and names are information most participants are willing to share or add to a profile. Several informants stated that they maintain several email addresses and may provide one that is only used when “spam” is expected. Informants, however, are less willing to share data like residential addresses, current location data, or health information (e.g., obtained by fitness trackers). However, they are willing to share such information, provided they get an adequate *added value* in return (e.g., getting more relevant information about their area when sharing their location) and can individually customise the type and extent of data shared (e.g., sharing location data for only a specified time frame). Informants were most reluctant to share or give access to conversational data (e.g., previous chat protocols) and payment information (e.g., credit card).

Informants repeatedly made cost-benefit assessments at all three levels. Limited benefits and highly perceived costs prevent the usage of DBPS. On the benefit side, informants often mentioned a lack of confidence in the *reliability of the technology*, partly based on previous experience with the respective technology cluster, e.g.: “[The difficulty is] to find one that works. I already talked with a robot on the phone. It was terrible.”, informant #3. The perceived added value might not be sufficient even if reliability was given. For example, when more sensitive information like passport numbers could be added to a profile to save time with ulterior bookings, most people did not see this benefit as significant enough to share the information (“I don’t book flights so often”, #9). On the cost side, informants often mentioned privacy and security aspects. Informants were worried that companies would use their information for advertisements or sell them for profit, indicating *privacy concerns*. This seems to be an almost natural reaction: if people are requested to provide their email address, they consequently expect that it will be used in some way: “[...] in the future, data increasingly [...] is seen as currency” (#9). In addition, *security concerns* can

outweigh potential utilitarian benefits (e.g., saving time) of providing sensitive personal data such as payment information. Multiple informants stated previous experiences with stolen credit card numbers (“A login can be hacked very easily, that’s too insecure for me.”, #8).

4.2 Level-specific Results

At level 1, most informants displayed a positive attitude towards the described encounters with technology for all scenarios. Mainly *utilitarian benefits* such as saving time, usefulness, convenience, or universal availability and access were mentioned and confirmed by the informants. Similarly, for all scenarios, most informants would decide to create an account or connect multiple smart-home appliances to a hub, again clearly driven by utilitarian benefits such as “one-stop-shopping” to control several devices from one place, saving effort or time, or convenience: “Have everything at hand within two seconds” (#3).

At level 2, all scenarios progressed towards more sophisticated use of technology, promising greater potential benefits for the user. Across all scenarios, at least half of the informants displayed a positive attitude towards the respective solution. Typical *utilitarian benefits* such as saving time, usefulness, and convenience were acknowledged in the IoT and chatbot/virtual assistant scenarios. In addition, half of the informants acknowledged *environmental benefits* in the IoT scenario (“When you are not at home, it does not have to be warm anyway”, #11). In addition, *social benefits* can motivate DBPS usage: sharing or trading loyalty points with others would rather be pursued if one’s peer group participates likewise, indicating the importance of direct and indirect network effects in such settings.

Greater integration of technology in the level-2 incidents triggered critical views on *technology dependence* (“[Because of] laziness or convenience, you will end up enslaved by a machine”, #11) and a *perceived loss of control* in comparison to performing certain tasks physically or oneself (“If I do it myself and I’m feeling unsure, I recheck it [the front door], and then I’m assured.”, #12).

At level 3, the scenarios further progressed towards more intelligence and autonomy of the technology. Most people did not like high degrees of autonomy: None of the

informants decided to let an AI make any purchases for them. Typical reasons were to *keep control and autonomy*. However, some informants stated that they would appreciate recommendations (e.g., helping with shopping lists) but that they want to retain control when it comes to actual decisions with real-life impact (“I would want to do and decide all this myself.”, #11).

Informants remain critical of systems that learn via data they receive from consumer interactions (e.g., bots that learn from chat protocols). Either because the idea of an AI knowing too much about them was eerie (“I find it rather alienating that [a bot] recognises me and links me to an account.”, #9) or because they felt observed by the company behind the technologies (“If they know what you enjoy, what you prefer to eat, how your voice sounds, that’s total surveillance.”, #1). Multiple informants stated uneasiness associated with the possibilities of intelligent systems (“It’s alarming that machines are capable of doing so much already”, #11).

Associated benefits with autonomous systems are typical *utilitarian* aspects and increased *sustainability*, for example, by providing ways to reduce food waste (“[...] a notification that something is expiring, and I should eat it [before it expires]”, #10). A new motivation to use technologies at level 3 was curiosity and desire to try out new things (“I would give it a try to see if it really works, with those suggestions and everything.”, #7).

5 Conclusion & Implications

Our study focused on customer interactions with different DBPS usage levels and, thus, reacted to research calls regarding customer experience associated with “fluid” smart products (Hoyer et al., 2020; Puntoni et al., 2021). The results revealed that consumers weigh potential costs against potential benefits when deciding whether to engage with DBPS. Such cost-benefit assessments occur at all investigated levels of “fluid” DPBS but can lead to different outcomes. Even at the most basic level, consumers raised concerns about privacy and security and saw a lack of confidence in the reliability of the technology. This is in line with the most relevant perceived disadvantage of smart products in Switzerland: they collect personal data (Zimmermann, Görden, de Bellis, & Hofstetter, 2022). However, level 1 required only limited data from the consumers. Sharing or giving access to limited personal data keeps potential costs at a minimum. Thus, most utilitarian benefits outweigh

the potential costs. As the scenarios moved towards leveraging more personal data to generate a more personalized customer experience, potential costs associated with privacy or security concerns, and with unreliable technology gained more weight. These higher potential costs must be balanced by sufficiently high benefits so that consumers decide to advance to higher levels of “fluid” DBPS. Besides utilitarian aspects, such benefits can be of social (e.g., sharing an experience with the peer group), hedonic (e.g., receiving inspiration and trying out new things), and environmental (e.g., saving energy) nature, as indicated by our results.

The implications of our study are twofold: first, from a methodological perspective, we proposed the scenario-based prospective incident technique that allows the analysis of different levels of usage of DBPS and the customer progression between those. This is crucial for marketers and customers alike. Especially in European countries, companies encounter a high level of scepticism towards DBPS. This has a negative impact on market diffusion, on users’ digital literacy and thus, on exploiting the full digitalisation potential. Secondly, from a managerial perspective, our results help companies understand and support the customers in their progression from lower to more advanced levels of DBPS usage. First and foremost, the individual perception of relevant benefits is the main motivator for DBPS adoption. It is thus paramount for companies to prominently communicate their DBPS benefits at all levels. Short texts close to input fields for user data may explain, briefly and focused, how the provided user information is stored and used and what customers get in return. To lower potential costs, companies could rely on certificates as indicators for data security and privacy. Big and established companies should ensure that DBPS are clearly linked to the company so that the (corporate) brand can promote trust in the technology. In addition, long and possibly complicated data protection declarations could be complemented by easy-to-understand visual pictograms. Since our results revealed that consumers are generally very willing to engage with basic-level DBPS, companies should offer basic versions requiring only little personal data that can evolve to a more advanced level later. Progression to more advanced usage levels should be possible in small steps, reducing the impact of new risks and requiring only a few cognitive resources from customers to update their cost-benefit assessment. Customers should be able to share their experiences and progression with peers so that groups can advance together.

Many avenues remain to be explored in future research. First, we did not consider product prices in our scenario descriptions. Prices should be integrated into the cost-benefit assessment in further studies. However, multiple informants stated that their adoption would also depend on market prices, which indicates that price considerations have not been completely ignored. Secondly, further studies should investigate how customer experience at different DBPS usage levels and the progression between those differ among various customer segments. It is likely that individual characteristics significantly determine the cost-benefit assessment and the experience at different levels. Finally, future research may deepen the interplay between different DBPS from an ecosystem perspective. Progression to a more pronounced level in one DBPS may propel progression in other DBPS as well.

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