Producer-side Use Cases of Digitized Products: What's Best for Your Company?

Short Paper

Ainara Novales
Erasmus University Rotterdam
3062 PA Rotterdam, Netherlands
novales@rsm.nl

Martin Mocker
Reutlingen University and MIT CISR
72762 Reutlingen, Germany
martin@mocker.nl

Eric van Heck
Erasmus University Rotterdam
3062 PA Rotterdam, Netherlands
evanheck@rsm.nl

Abstract

Digital technologies are moving into physical products. Smart cars, connected lightbulbs and data-generating tennis rackets are examples of previously "pure" physical products that turned into "digitized products". Digitizing products offers many use cases for consumers that will hopefully persuade them to buy these products. Yet, as revenues from selling digitized products will remain small in the near future, digitized product manufacturers have to look for other sources of benefits. Producer-side use cases describe how manufacturers can benefit internally from the digitized products they produce. Our article identifies three categories of such use cases: product-, service-, and process-related ones. We suggest digitized product manufacturers to (1) also consider internal value creation opportunities when developing digitized products, (2) take stock and identify blind spots, and (3) prioritize use cases. Our research can help product manufacturers when building a business case for digitizing their products.

Keywords: IoT, Digitized Products, Smart Products, Connected Products, Servitization

Introduction

According to recent studies, global Internet of Things (IoT) spending will exceed USD 1 Trillion by 2021 and there will be over 25 Billion IoT connections.[1] Advancements in IoT and other information technologies (IT) such as cloud and mobile computing have fostered the digital enrichment—or "digitization"—of products. Digitized products provide a wide range of opportunities for digital innovation and enable a continuous repurposing of the product via new functionality and product capabilities (monitoring, control, optimization, and automation) that traditional, physical products do not exhibit.[2] For instance, the Philips Hue connected lightbulb enables remote control of basic functions (e.g., switching on and off the light) via a smartphone or voice-activated assistants.[3]

[1] See the "Future of IoT" report by EY, available online at https://go.ey.com/2jTJDJh and "The Changing Landscape of Disruptive Technologies" report by KPMG, available online at https://bit.ly/2kpsjMD

[2] For a detailed understanding of the rise of digital technologies in physical products, and the capabilities and opportunities that these digitized products bring, see: Porter and Heppelmann (2014).

[3] To learn more about the Philips Hue and its offerings, visit: https://www2.meethue.com

However, digitized products do not only offer potentials for new use cases for product consumers, but also for producers and third party companies. For instance, "Audi Connect" connected car enables consumers (i.e. drivers) to access new product features, such as infotainment (e.g. myRoadmusic). For Audi itself, product digitization enables new business models e.g., by servitizing the car and offering sharing economy based mobility services (e.g. Audi Pool).[4] Finally, a connected car also allows external third parties (e.g., insurance firms) to develop add-on services such as a pay-as-you-drive insurance by collecting data about the driver's behavior (e.g., acceleration, braking).

As described in the paper 'Do People Really Want Smarter Toothbrushes?', the development of new technologies is enabling the implementation of many new use cases that are outpacing traditional use cases and that make it much harder for producers to design and develop relevant products.[5] No wonder that producers struggle with separating meaningful use cases from mere gadgets. In a previous research study, we identified that one of the biggest challenges that companies face is indeed identifying the "action potentials", i.e. the use cases that are relevant for them.[6]

When thinking about customer-facing products, it's easy to only think about new use cases for the consumer of the product especially in the age of "obsession with customer satisfaction":[7] how can digital technology in the product benefit the consumer? While being customer-focused is an important capability, producers should also consider internal benefits from producer-side use cases: uses of digital technologies in customer-facing products that benefit not the consumers of the product, but the producers themselves. As one interviewee (B) mentioned: "a large part of the business case has to do with savings on the company side, not with revenue from customers." Internal benefits might outweigh selling more products, as digitized offerings promise little revenue so far. According to a recent MIT CISR report,[8] the median revenue share from digital offerings only accounted for 5% of the total revenue of the studied firms.

So far, very few studies have investigated the potentials (i.e. use cases) of digitized products.[9] In fact, IS scholars call for more exploratory research to investigate digitized products and their use cases.[10]

Based on a qualitative analysis of 19 interviews, this paper investigates the following research questions: (1) what are producer-side use cases of digitized products and (2) which use cases should producers focus on. We identify a list of 16 producer-side use cases in three categories (product-, service-, and process-related use cases) and link them to three strategic approaches (operational excellence, customer intimacy and product leadership), and provide guidelines for producers to evaluate their targeted portfolio of use cases.

Digitized products and their producer vs. consumer-side use cases

Digitized products, also referred to as smart-connected products, IoT-enabled products, or cyber-physical systems, are products that contain both digital and physical components.[11] The physical components comprise the tangible hardware components, such as engines or sensors, whereas the digital components

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[4] For a more in depth description of these offerings, see Mocker and Fonstad (2017).

[5] See Hui (2014).

[6] Novales et al. (2016) and Roecker et al. (2017) discuss challenges regarding product digitization.

[7] See for instance: Bezos' Interview at the Economic Club of Washington on September 13, 2018, available at https://www.youtube.com/watch?v=xv_vkA0jsyo.

[8] See Mocker et al. (2019) for further findings on the use of digital technologies for enhancing customer offerings.

[9] Extant studies focus on service innovation, e.g. Herterich et al. (2016) and Lehrer et al. (2018), but neglect other types of innovations. Also in practitioner literature, we did not find papers that look at use cases of digitized products holistically. Several papers study specific use cases, e.g. Ives et al. (2016) looks at enhancing customer service.

[10] To learn more about theorizing in digital innovation and product digitization, as well as the call for more exploratory research, see Nambisan et al. (2017).

[11] Based on an extensive literature review, Novales et al. (2016) provide an overview of the different terms in use and identify five conceptual elements that form the building blocks of digitized products.

represent the software embedded into the product.[12] For instance, the Philips Hue connected lightbulb contains connectors and actuators as well as software algorithms and communication protocols that enable remote access and control of the product via digital means.

Firms are still in the early stages of developing and generating value from digitized products. According to a 2016 MIT report,[13] although more than half of the firms interviewed believe in the value these products can generate, very few are actively using IoT (only 13%), a key technology for many digitized products. Firms still struggle with designing their digitized products and deciding how to generate value from them.[14]

Besides benefiting from selling digitized products to customers, another way to create value is to focus on the internal benefits derived from enriching physical products with digital technologies. Our research looks at these producer-side use cases of digitized products, which we define based on three attributes. First, the use case has to be enabled by the digital materiality of the product. Second, use cases should be considered as action potentials that can create benefits (e.g. collecting data to provide predictive maintenance); note that use cases lead to benefits, they are not benefits themselves (e.g. saving costs is a benefit, but is not a use case). Third, the use cases should generate internal benefits for the producer (e.g., by lowering product development costs) rather than for the consumer. Some producer-side use cases that can potentially increase a producer's competitiveness (e.g., the ability to add a feature like using the smartphone to replace the car key), also enable consumer-side use cases that benefit the consumer (e.g. being able to invite guests to drive the car without exchanging a key, which might increase convenience). Note that the potentials differ for the producer and consumer (ability to add a new feature vs. ability to invite guests).

Three types of producer-side use cases of digitized products

The producer-side use cases we identified from the interviews fall into three categories (see Table 1): product-, service-, and operations-related use cases. First, the digitization of products affords producers the potential to improve the product itself (e.g., by adding, complementing, extending, changing or integrating product features). Second, digitized products enable producers to servitize the product or product features, adding external-facing service offerings. Third, digitized products allow producers to improve (e.g., inform, enrich and adjust) their internal operational processes (customer/after-sales service, maintenance, sales, and product development processes) with data related to product use and performance.

Table 1. Producer-side use cases of digitized products

Use case	Sample Quote	Firms
Product-related use cases		
1. Updating existing product features (over the air)	*"Everything must be connected, even up to the point that you are able to update your product, (…) you are able to do wireless software updates on your product."* Firm L	G; L; N; J
2. Modularizing the product architecture by reusing digital components across products	*"The reuse of technology is something that haunts us, because the IT vision is similar for all business units, the primary function is where there is a difference. (…) [Product A] protects, [product B] regulates the speed of a pump, [product C] monitors and visualizes data… But everything related to the IT world is fully crosswise."* Firm M	M; P
3. Improving product design based on product use data	*"We collect information (…) to provide a better solution, by getting some knowledge about how our products are being used. Then we are also capable of providing an even better product."* Firm G	B; G
4. Extending product functionality by adding new (previously impossible) features	*"The new model will be automatically able to detect parking and driving damages. (..) You receive a push notification on your smartphone saying your car just had an accident (…) You see the damage and with your smartphone you can immediately push a button and contact us."* Firm E	E; N; O

[12] Yoo (2013) and Yoo et al. (2012) provide further detail on the characteristics and attributes of digitized products.

[13] For the full report, see Jernigan et al. (2016).

[14] For more information about manufacturers' struggle in defining the elements and use cases of digitized products, see: Porter and Heppelmann (2014) and Roecker et al. (2017).

5. Integrating additional product functionality with complementing products	*"We have a clear direction working together with leading AI and PA providers (…) All of them will be integrated in our products, having really data unique experiences."* Firm L	L; N; B
6. Facilitating an ecosystem built on top of dig. product	*"Each ecosystem partner can engage directly with each other but our platform is the enabler in the ecosystem"* Firm P	B; P
Service-related use cases		
7. Offering advice/consulting services based on product use data	*"We can provide consulting services. We can look at the Fleet data and tell our customers, we saw that you have a machine that (…) you are not really using. But there is another machine that is totally running passed its limit, (…) why don't you exchange those two machines? (…) Our customers really react in a positive way, because they feel that we are actually trying to help them with their daily business"* Firm B	B; C; G
8. Adding services that extend product functionality	*"We are still selling the physical products, but the main focus is on selling a monthly subscription to the customer or monitoring their equipment or detecting leakage somewhere."* Firm K	B; K; O
9. Offering pay-per-use contracting	"*I'm not selling the asset, but I can offer the customer the output of the asset as a service, because I can connect it to the platform and know how much he produces."* Firm A	A; I; K; O
Operations-related use cases		
10. Enriching the customer service/after-sales process with product use/performance data	*"If something goes wrong and the customer calls our after-sales service department, we ask for permission to look into the device and (…) our team can actually look what's wrong. You don't have to explain it on the phone or over email (…), we have a very good idea (…). We collect additional data to support our after-sales needs."* Firm I	B; E; G; I; K; P
11. Informing the maintenance service process with product use and performance data and error codes	*"If we have the telematics unit in as many machines as possible, our service can actually remotely look at them and when there is a problem with the machine, we already know what is going on. We know the serial number, the part number of that machine, where it is and we know the error code. If a service technician leaves to fix that machine he already knows all these things and he can bring the right spare part."* Firm B	B; F; I; H; K;
12. Offering remote diagnosis and maintenance services	*"In the past, it was a huge pain for us to first of all find out that there is a problem (…) and you had to go there to find out what is wrong with it. Now you can do it remotely. (…) Let's say our service technicians are taking a look at the fleet machines in the system (…) They could call a customer and tell him, I looked at your machines, there is one that way overdue a service checkup, it has 300,000 hours excel. (…). Would you be ok if we send somebody?"* Firm B	B; G; L
13. Offering predictive maintenance service	*"With connected products, we can move from regularly scheduled maintenance to just in time [predictive] maintenance based on the actual condition of the product."* Firm H	A; F; H
14. Enriching the sales process with product use data	*"Just give me all the customers next week where the machine hits a 1000 hour interval and then I just improve my marketing and sales process so I only call you when you really need something and I don't call you to say hey do you need something?"* Firm C	B; C
15. Enhancing the product development process with prototyping, usage and performance data	*"The whole point of making something digital is so you can have an ongoing conversation with the customer about the product. You no longer [need] focus groups to understand what features people like or don't like, because you're getting real-time information on exactly what features people are using and not using."* Firm P	D; F; G; I; O; P
16. Facilitating co-innovation by sharing data with external partners	*"We partner with customers that are eager to take some risks, eager to collaborate. They share with us their data, we share with them our data, we share our common pain points and we co-innovate because it's good for them and it's good for us."* Firm F	B; F

Table 1. Producer-side use cases of digitized products

As stated above, **product-related producer-side use cases** aim at enhancing the product offering itself. These producer-side use cases either relate to the product's design or its functionality. First, the digitization of products enables producers to enhance the design or architecture of the product. These use cases include remotely updating existing product features via product connectivity (e.g., Bluetooth, ZigBee), modularizing the product architecture by reusing common digital components across different products or improving the product design by collecting and analyzing product use and performance data. E.g., based on collected data, firms can see whether some product parts are under- or over-engineered and adjust the product design. Second, digitized products also allow producers to extend product functionality by adding features that are in some cases even impossible without digitization and by integrating additional product functionality with third party provided components and products. For instance, firm E mentioned the potential of adding a new feature to a connected car in which customers can get real-time notifications in case of damage to their car in their absence (e.g., parking lot). Firms also mentioned the potential of facilitating an ecosystem that builds on top of the digitized product (i.e. using the product as a foundation for a multi-sided platform that connects different products and solutions, akin to the iOS App Store).

The focus of the identified **service-related use cases** also relies on enriching the firm's offering, but in this case by either servitizing some product features or the entire product. We identified increasing levels of servitization along the three use cases in this category (see Table 1). On the most basic level, the digitization of products enables producers to add services that are relatively loosely based on the product offering, such as consulting services (e.g., by monitoring product use data, producers can provide suggestions for efficiency improvements). Other use cases present the potential of turning integral product functionality into services (e.g., by adding a subscription service for equipment condition monitoring). Finally, interviewees also indicated the potential of fully servitizing the product by offering pay-per-use contracting in which the customer no longer buys the asset, but only pays for its use or an outcome.

While product- and service-related use cases focus on enriching the offering or generating new revenue streams, **operations-related use cases** aim at improving producers' internal processes regarding how the offerings are developed, sold, and serviced. From the interviews, we identified use cases relating to customer/after-sales service, maintenance, sales, and product development processes. First, digitized products enable producers to enrich their customer/after-sales service with product use and performance data. As mentioned by Firm I, with digitized products, producers can access devices remotely and identify problems without the need to discuss with customers, thus streamlining the process. Besides, firms can monitor the performance of the product and contact those customers who need new parts or services in a more targeted way. Second, digitized products allow producers to inform maintenance processes, by reporting information about product status (e.g., error codes) once an issue occurred, by offering the ability to fix issues remotely, or by enabling predictive maintenance. Third, digitized products enable producers to enrich their sales process. As firm C mentioned, based on the data collected by digitized products, firms can improve their marketing and sales processes and target their customers better focusing on their individual needs. Fourth, digitized products afford producers the potential to improve the product development process by collecting and analyzing data from prototyping, product use and performance. For instance, product digitization can provide producers with a better understanding of the customer and, thus, eliminate the need for focus groups in the product development process (Firm P). Besides, it can also facilitate co-innovation with partners through sharing product use and performance data among all partners.

Whereas most interviewees perceived use cases for improving operations (13 firms), fewer referred to improving products (9 firms) and services (7 firms). This reflects physical producers' familiarity with process digitization, which is closely linked to cost savings and operations improvement.[15] As interviewee C said, *"the whole value [for the producer] as a supplier is to improve process efficiency and eliminate waste, and so there can be very big gains here."*

Out of the 16 firms, 13 perceived more than one use case. However, fewer mentioned use cases in two (7 firms) or three (3 firms) categories (product-, service-, operations-related use cases). In other words, half of interviewees focused on either product, service-, or operations-related use cases. This suggests that not all producers perceive the same use cases, but that there are certain conditions in which some use cases are perceived as more instrumental than others are.

[15] Ross (2017) and Yoo et al. (2010) provide further insights into manufacturers' familiarity with process digitization.

Which producer-side use cases matter most to you?

While there will be no recipes to tell companies which producer-side use cases they should focus on, a company's business strategy should be an important guideline to consider. In this section, we try to answer our second research question by mapping our list of producer-side use cases to the three value disciplines of operational excellence, customer intimacy, and product leadership proposed by Treacy and Wiersema (see Table 2).[16] The mapping is categorized in three levels; high (+++), medium (++), and low (+), depending on the potential impact that each use case has on each value discipline. While some use cases seem to be exclusively linked to one value discipline, most use cases are linked to two or more value disciplines, as they have the potential to contribute to generating customer value in more than one discipline.

Table 2. Mapping of producer-side use cases and value disciplines

	Producer-side use cases of digitized products	**Ops. Exc.**	**Cust. Int.**	**Prod. Lead.**
Product-related use cases	1. Updating existing product features over the air	++	+	+++
	2. Reusing digital components across products	++		
	3. Improving the product design with prod. use data	++	+	+++
	4. Extending product functionality		++	+++
	5. Integrating add. product funct. with compl. products		++	+++
	6. Facilitating an ecosystem built on top of dig. product		++	+++
Service-related use cases	7. Offering consulting services based on prod. use data		+++	+
	8. Adding services that extend product functionality		++	+++
	9. Offering pay-per-use contracting		+++	
Ops-related use cases	10. Enriching the customer service/after-sales process	+++	+++	
	11. Enriching the maintenance service process	+++		
	12. Offering remote diagnosis and maintenance services	+++		
	13. Offering predictive maintenance service	+++		
	14. Enriching the sales process with product use data	+++	+++	++
	15. Enriching the product development process with prototyping, product use and product performance data	+++		++
	16. Facilitating co-innovation sharing data with partners	+	++	++

Table 2. Mapping of producer-side use cases and value disciplines

Whereas companies that focus on the **operational excellence** value discipline aim at excelling in their internal processes by providing products, services and solutions at superior prices and minimal costs, companies pursuing **customer intimacy** have their focus on tailoring their products, services and solutions to specific customer segments and niches in order to fulfil specific customer needs. Finally, companies aiming at **product leadership** are centered on continuously enhancing their offerings by providing leading-edge products, services and solutions that outcompete their rivals.

So which producer-side use cases should companies pursue? The choice will be specific to every company. A company focusing on **product leadership** might want to prioritize product- and service-related use cases. Use cases such as 1, 3, 4, 5, 6 and 8 have the highest potential to contribute to the company's strategic goals. At the same time, most of these use cases will also have a moderate impact on achieving **customer intimacy,** by helping the firm to generate customer insights based on the data collected by the digitized products (use cases 4, 5, 6 and 8), or on **operational excellence**, by improving the internal processes efficiency and cutting on costs (use cases 1 and 3). Besides these use cases, companies aiming at **product**

[16] For more detailed information on the characteristics, attributes and benefits of the three value disciplines, see: Treacy and Wiersema (1993).

leadership might also moderately benefit from use cases such as 14, 15 and 16, as these provide competitive advantage to the firm regarding speed and market reaction.

While there are some overlaps, **customer intimacy** will be enhanced most by all those use cases that help to learn more about the customer by collecting data to then optimize its processes and offerings towards its customer segment. Therefore, use cases 7, 9, 10 and 14 have the potential to have the highest impact on value generation for those firms that aim at customer intimacy, while use cases 4, 5, 6, 8 and 16 might moderately contribute to achieving their strategic goals.

Finally, companies with an **operational excellence** strategy will probably benefit most from process-related use cases (10, 11, 12, 13, 14 and 15) and moderately from use cases 1, 2 and 3.

Preliminary guidelines for practitioners

This paper identified a diverse set of producer-side use cases for digitized products. Based on this, we derive three preliminary, and thus still broad, guidelines for practitioners:

(1) When developing digitized products, also consider internal value creation opportunities: Our interviewees highlighted many different ways how producers can benefit from digitized products beyond selling more products that have digital features that customers find attractive. Thus, when building digitized products, companies should consider these producer-side use cases as they might provide a source of value generation.

(2) Take stock and identify blind spots: Our list in Table 1 helps companies assess which producer-side use cases they are already implementing and which ones they have not yet considered, thus helping them avoid blind spots. There can be good reasons for not implementing certain use cases. For example, some use cases might not fit the company's priorities, which brings us to the next guideline.

(3) Prioritize use cases: We're not suggesting that every company should pursue all producer-side use cases. Having a long list of potential use cases helps identify blind spots, but it also provides a prioritization challenge: which use cases to focus on first. No company we interviewed had implemented all use cases. As we suggest below, we will study how companies prioritize their use cases.

- A top-down way for prioritization is considering strategic fit: In this paper, we mapped the use cases to value disciplines. Similarly, companies might want to look at their choices of implemented use cases: do they match the company's strategic goals? If not, why not? Note that a mismatch might not be bad—as long as there are good reasons. Maybe a company is using digitized products to introduce a strategic shift? For example, several previously product-focused manufacturers were aiming to move to solution-based business models requiring a shift to more customer intimacy.
- A more bottom-up way for prioritization is to look at the company's existing competencies: if a company does not have the required capabilities to successfully implement and generate value from a certain use case, it might have to de-prioritize that use case to first build the required capabilities. We are currently studying which capabilities are required to generate value from certain use cases.

Concluding remarks

Based on 19 interviews with 16 firms, this research study identified 16 producer-side use cases of digitized products across three categories – product-, service- and operations-related. We suggest that in this early stage of digitized products and their use cases, rather than only thinking about consumer-side benefits, firms can profit—maybe even more— from reaping internal benefits from digitized products. We map the producer-side use cases to the three value disciplines of operational excellence, customer intimacy and product leadership, and provide some preliminary guidelines to help firms build a prioritized portfolio of use cases when digitizing their products.

Our study has several limitations. First, we selected the interviewed companies following a convenience sampling and only conducted one interview for most firms. However, given the early stage of IoT/analytics inclusion into previously pure physical products, we were able to investigate sixteen large manufacturers that have implemented and introduced digitized products in the market and we were able to get rich insights from managers that are closely working in the digitization of products at their companies. Second, it is important to also note that given the early stage of these technologies, most interviewees claimed to be in an initial phase regarding product digitization at their companies. Therefore, more research is needed in

order to investigate which use cases will succeed and which ones will not, as well as the capabilities that are needed for generating value from each use case. Third, we used the value-disciplines of Treacy and Wiersema, but did not ask our interviewees to map the use cases to them. Thus, it might be that the investigated firms see differences in the mapping or that they follow other criteria for the prioritization of use cases. In this sense, more research is required to empirically investigate how companies prioritize the use cases they want to focus on.

We are currently conducting an in-depth case study with a global producer of digitized products that has implemented various producer-side use cases in order to learn how firms prioritize their use cases and to identify those capabilities required to generate value from certain use cases. This study will help us to provide more detailed guidelines for producers of digitized products.

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Appendix: About the research

For our research, we conducted exploratory interviews with 19 employees responsible for implementing digitized products in 16 manufacturing firms. Table 3 presents an overview of the firms we interviewed. We selected global producers of digitized products, all of them large producers (≥10.000 employees) of previously physical products that have recently digitized some of their products. The firms and interviewees were selected based on secondary data (e.g. firm reports, IoT conference speaker lists, articles in managerial magazines such as HBR/SMR), from which global firms with renowned digitized products were chosen. Given the novelty of this type of products and firms' scarce experience with product digitization, this approach allowed us to select those firms that seem to be most advanced. Saturation regarding the identified producer-side use cases was achieved after interviewing twelve of the sixteen firms.

Given the exploratory nature of our study, we conducted semi-structured interviews combining open-ended and structured questions. Interviews were mostly conducted on the phone due to distance reasons (B, E, O, P were face-to-face), and lasted between 30 and 90 min.

For data analysis, two researchers conducted a qualitative content analysis based on the coding approach proposed by Gioia et al. for inductive qualitative analysis.[17] In the first step, we identified first order concepts (akin to Strauss and Corbin's notion of open coding) in a within-case analysis and we selected text instances referring to potential use cases. After distinguishing between relevant and non-relevant codes, we identified 37 first order concepts (e.g. enhanced customer service for damage/accidents that improves contact to customers) regarding use cases across the nineteen interviews. We then looked for similarities and differences among the concepts (akin to Strauss and Corbin's notion of axial coding), as part of a cross-case analysis. This process was conducted iteratively, going back to quotes during discussions and assessing quote context, in order to address inter-rater conflict. Based on this process, we grouped the 37 first order concepts into 16 second order themes representing the 16 use cases identified in our research. In the last step, we grouped the identified use cases into three aggregated dimensions representing different categories of producer-side use cases of digitized products: product-, service-, and operations-related use cases.

Table 3. Overview of interviewed companies

Firm	Industry	# Employees	Interviewee(s) Role (anonymized)	Duration
A	Manufacturing	> 40.000	Head of Sales IIoT Platform	30 min
B	Professional Equip.	> 10.000	Manager Digital Products	90 min
C	Heavy Equipment	> 90.000	Head of Business Model Transformation	30 min
D	Automotive	> 70.000	Director Electronics IT	60 min
E	Automotive	> 280.000	Product Manager Digital Product	60 min
F	Aerospace, Defense	> 130.000	Digital Transformation Manager	30 min
G	Skylight	> 10.000	1) Head Dig. Prod. Mgmt/ 2) Dev. Engineer	30 - 30 min
H	Conglomerate	> 300.000	SVP Industrial IoT	30 min
I	Gardening/Construction	> 10.000	Dir. Global Prod. Mgmt. Smart Systems	45 min
J	Building Automation	> 25.000	Director Innovation Management	45 min
K	Manufacturing	> 25.000	Head of IoT Platform	30 min
L	Electronics	> 25.000	SVP & GM Connected Product	45 min
M	Energy Management	> 140.000	1) Smart Sys. Manager/ 2) Prod. Manager	30 - 30min
N	Toys	> 15.000	Business Process Manager Digital Prod.	30 min
O	Automotive	> 85.000	Exec. Director Dev. Connected Car Services	35 min
P	Healthcare	> 70.000	1) Head Ecosystems/ 2) Head IoT Platform	30 - 30 min

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[17] For qualitative content analysis, see Gioia et al. (2012) and Strauss and Corbin (1998).