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'It's not like we can charge for everything': revenue models to capture value from smart services in Pacific Asia

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ABSTRACT

Western European manufacturers' difficulties in earning revenue from industrial services in Pacific Asia have been linked to cultural values. Yet, ways of creating and capturing value from smart services in the region remain unexplored. Against this backdrop, this research seeks to (1) uncover how cultural values influence smart service revenue models, and (2) derive revenue model configurations enabling value capture. To do so, the authors study six Western European manufacturers commercializing smart services in Pacific Asia. The results indicate that indirect and freemium revenue models may achieve fit with the cultural values identified.

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Revenue models; Pacific Asia; digital servitization; smart services; value capture; value-based pricing

Introduction

Service growth remains a strategic priority for manufacturing companies in the digital age. Since the 1980s, manufacturers have pursued strategic moves to offer more services to secure stable, profitable revenue growth and, potentially, competitive advantage (Cusumano, Kahl, and Suarez 2015; Oliva and Kallenberg 2003; Vandermerwe and Rada 1988). Today, the 'digital wave' based on technologies to collect, transmit and process data supports 'digital servitization', which is the 'deployment of digital technologies to support the transformation from a product-centric to a service-centric business model' (BM) (Tronvoll et al. 2020, 1; Ardolino et al. 2018; Coreynen, Matthysens, and Van Bockhaven 2017). To recoup investments in digitalization, manufacturers need to offer new services (Kohtamäki et al. 2020; Visnjic, Neely, and Jovanovic 2018). Notably, 'smart services' for business-to-business (B2B) markets enable pre-emptive action based on field information using connected devices, software and data analysis (Allmendinger and Lombreglia 2005).

Smart services build the foundation for BM innovation. BMs describe mechanisms to create and capture value (Amit and Zott 2001; Johnson, Christensen, and Kagermann 2008; Teece 2010). Smart services have fuelled BM innovation (Klein, Biehl, and Friedli 2018; Kohtamäki et al. 2019; Porter and Heppelmann 2014, 2015; Wunderlich, Wangenheim, and Bitner 2013), creating new revenue opportunities, notably by leveraging innovative profit formulae such as subscription models (Gebauer et al. 2020; Paschou et al. 2020).

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Still, mechanisms to capture value from smart services merit further study. Revenue models (RM) define the mode of capturing value from BMs (Amit and Zott 2001). Extant RM research focused on information goods and consumer markets, offering little guidance to manufacturers struggling to design profitable smart service RMs (Hasselblatt et al. 2018; Klein, Biehl, and Friedli 2018). This study addresses this knowledge gap.

Pacific Asia, encompassing East and Southeast Asia (Thompson 2004), is relevant to study smart services. In 2020, Pacific Asia accounted for over 40% of global manufacturing value added (UNIDO 2020). Facing global competition, its manufacturing industry undergoes a transformation towards stronger service orientation (Wu, Liu, and Chin 2018) and digitalization (Xu, Chin, and Cao 2020). Yet, extant research has focused on smart services in Europe (Paschou et al. 2020) and the United States (Suppatvech, Godsell, and Day 2019), leaving Pacific Asia largely unexplored (Raja and Frandsen 2017).

Cultural values are likely to influence value capture in Pacific Asia. In China, Western manufacturers tend to offer industrial services free of charge to comply with cultural values favouring long-term relationships and keeping face over short-term returns (Bao and Toivonen 2015; Gebauer et al. 2007). How this unfolds across Pacific Asia in the age of smart services remains unclear.

This research addresses three knowledge gaps. First, how prior findings apply to broader Pacific Asia. Second, how cultural values intervene in the age of smart services. Third, how Western European manufacturers can configure their smart service RMs accordingly. Thus, we seek to answer two research questions (RQ):

RQ1: How do cultural values affect Western European manufacturers' smart service RMs in Pacific Asia?

RQ2: How can smart service RMs be configured accordingly to capture value?

The qualitative study of six Western European manufacturers in Pacific Asia reveals two RMs enabling value capture. Indirect RMs monetize smart services through sales of physical goods or services. Freemium RMs generate recurrent revenues from paid advanced packages. Both RM configurations achieve fit with cultural values by helping to overcome uncertainty aversion and power distance while fostering long-term orientation.

We contribute to two literature streams. We extend the RM literature by offering a holistic RM construct for B2B smart services, suggesting cultural values as antecedents. Furthermore, we advance service research by exploring smart services in Pacific Asia. Indirect and freemium RMs align cultural values, value creation and capture.

Literature review

Smart service RMs

Smart services

Facing an ever-growing pressure on margins, manufacturing companies take strategic action to grow their service business, called 'servitization' (Baines et al. 2009; Vandermerwe and Rada 1988). Servitizing manufacturers aim at creating additional customer value (Raddats et al. 2019) to deepen customer relationships and, ultimately,

generate new and stable sources of income (Oliva and Kallenberg 2003; Rust and Huang 2014). As industrial goods are increasingly equipped with systems collecting and transferring data (Lerch and Gotsch 2015), smart services harnessing digital technologies such as the internet of things (IoT), cloud computing and predictive analytics emerge (Ardolino et al. 2018; Coreynen, Matthyssens, and Van Bockhaven 2017).

We propose two necessary and sufficient conditions for an industrial service to be 'smart'. First, any smart service requires a 'smart product', physical industrial good generating data (Allmendinger and Lombreglia 2005; Klein, Biehl, and Friedli 2018; Porter and Heppelmann 2014; Wunderlich, Wangenheim, and Bitner 2013). This differentiates smart services from 'pure' information goods (Jones and Mendelson 2011) such as electronic handbooks, which can create value absent any smart product.

Second, smart services need data generated by smart products (Töytäri et al. 2018). This differentiates 'smart' from physical industrial services. For instance, spare parts may be shipped and installed without processing product-generated data.

Smart services substitute or complement physical services (Marinova et al. 2017). Remote interactive repair services substitute service missions by remote assistance, where frontline employees (FLE) and customers interact in real-time using communication technology (Wunderlich, Wangenheim, and Bitner 2013). Conversely, predictive maintenance services anticipate equipment breakdowns using data analytics and are typically complemented by physical service missions to replace components about to fail.

Smart services target two profit levers. First, complementarities with physical services enable cost savings in service delivery (Paiola and Gebauer 2020). Second, smart services create revenue opportunities. One way is to enhance the perceived value of physical goods to drive equipment sales; another is to tap into new revenue streams from digital service delivery (Gebauer et al. 2020).

To realize these revenue opportunities, a fit between value creation and value capture is essential. Value creation is an 'actor's attempt to increase value', while value capture is the 'process of securing financial or nonfinancial return from value creation' (Chesbrough, Lettl, and Ritter 2018, 933). High-performing BMs ensure coherence between value creation and value capture (Tidhar and Eisenhardt 2020), which coevolve throughout BM innovation and delivery (Sjödén et al. 2020).

Failing to achieve such a fit is a pitfall for smart service BMs. Smart services frequently require upfront investments in digital technologies to capture, analyse and visualize data (Kohtamäki et al. 2020). Collecting sufficient data to recognize patterns in asset behaviour is often lengthy, such that smart services unfold their full value only after an extended period of usage (Klein, Biehl, and Friedli 2018). However, if their customer-perceived value is lower than the price commanded, revenue opportunities will not materialize (Gebauer et al. 2020). Therefore, smart service value capture mechanisms typically need iterative improvements to better fit value creation (Töytäri et al. 2018).

Revenue models

RM defines how value is captured from BMs. The RM is a distinct element of a BM (DaSilva and Trkman 2014; George and Bock 2011; Giesen et al. 2007; Knyphausen-Aufseß et al. 2011; Sainio and Marjakoski 2009; Tidhar and Eisenhardt 2020). While a BM defines the total value created by a product or service, the share of value ultimately captured depends on the corresponding RM (Amit and Zott 2001; Zott and Amit 2010).

Table 1. Selected RM constructs.

Authors	RM dimensions	Market	Offering	RM configuration antecedents
Bonnemeier, Burianek, and Reichwald (2010)	Performance parameter; value proposition; price setting parameter	B2B	Industrial solutions	N/S
Casadesus-Masanell and Zhu (2010)	Charge; bundling with advertisement	B2C	N/S	RM of market entrant; product quality
Casadesus-Masanell and Zhu (2013)	Charge; price; monetization intensity	B2C	N/S	RM of market entrant; product quality
Chen, Fan, and Mingzhi (2016)	Transaction fees; bundling with advertisement	C2C	Information goods	RM of market entrant; product quality; advertisement aversion
Eckhardt (2016)	Charge; provider's commercial orientation	B2C	Information goods	Product quality
Knyphausen-Aufseß et al. (2011)	Revenue type; transaction dependence; revenue origin; pricing mechanism; revenue distribution	N/S	N/S	Portfolio, lock-in effects, network effects, price sensitivity, cost structure, customer perception, jurisdiction, financial resources
Sainio and Marjakoski (2009)	Revenue origin; licencing rights; usage; time; purpose-of-use; profit-sharing	B2B, B2C	Information goods	Product standardization; channel choice
Tidhar and Eisenhardt (2020)	Charge; revenue origin	B2C	Information goods	Quality signals; user resources; product complexity
Current study	Revenue distribution, offer bundling, pricing mechanism	B2B	Smart services	Cultural values

B2B: Business-to-business; B2C: Business-to-consumer; C2C: Consumer-to-consumer; N/S: Not specified.

Three RM-related knowledge gaps motivate this research. The RM constructs reviewed in Table 1 are insufficiently (1) holistic, (2) specified for B2B smart services, and (3) considering contextual factors.

First, holistic RM constructs are scant. While enumerations of RM configurations such as pay-per-X (e.g. Rapaccini 2015) abound (Tidhar and Eisenhardt 2020), a holistic RM construct is missing. Existing constructs omit relevant dimensions such as bundling (e.g. Tidhar and Eisenhardt 2020) or do not operationalize core dimensions such as the pricing mechanism (e.g. Knyphausen-Aufseß et al. 2011).

Second, the RM construct has to be specified for B2B smart services. Table 1 shows that prior research has focused on information goods and consumer markets. B2C markets feature simpler products and RMs (Tidhar and Eisenhardt 2020). Industrial RMs are typically more intricate, involving more actors and complex contractual agreements (Kim, Cohen, and Netessine 2007). To our knowledge, a B2B smart service RM construct is still missing.

In consequence, we conceptualize smart service RMs as a three-dimensional construct (Table 2). Consistent with previous research (Sainio and Marjakoski 2009; Tidhar and Eisenhardt 2020), we conceive an RM as a set of monetization parameters configured to capture revenue.

The third knowledge gap in RM literature is the role of contextual factors. Various antecedents to RM configuration were examined, notably RMs of market entrants and substitutes (Casadesus-Masanell and Zhu 2010, 2013). However, the contingent role of geographical (Tidhar and Eisenhardt 2020) or cultural factors is less clear. The next section argues why this matters in Pacific Asia.

Table 2. Smart service RM construct.

RM dimension	RM parameter	Configuration options	Example
Revenue Distribution (RD)	Revenue origin	<ul style="list-style-type: none"> ● Direct customers ● Third party 	Third-party RM (Tidhar and Eisenhardt 2020)
	Revenue object	<ul style="list-style-type: none"> ● Direct service fee ● Indirect monetization 	Razor-and blade RM (Gallaugher and Wang 2002)
Offer Bundling (OB)	Bundling approach	<ul style="list-style-type: none"> ● Pure bundling ● Mixed bundling ● No bundling (Adams and Yellen 1976) 	N/A
	Product bundle	<ul style="list-style-type: none"> ● Any package of two or more separate products (Stremetsch and Tellis 2002) 	N/A
Pricing Mechanism (PM)	Charge	<ul style="list-style-type: none"> ● 0 ● >0 	Freemium RM: one bundle free; others invoiced (Tidhar and Eisenhardt 2020)
	Invoicing mode	<ul style="list-style-type: none"> ● Set-up fees ● Recurring fees 	Subscription RM: recurring fees (Chen, Fan, and Mingzhi 2016)
Price metric	Price metric	<ul style="list-style-type: none"> ● Input ● Output (Bonnemeier, Burianek, and Reichwald 2010) 	Pay-per-use (Ardolino et al. 2018)
	Pricing logic	<ul style="list-style-type: none"> ● Customer value ● Competition ● Costs (Ingenbleek et al. 2003) 	Value-based pricing (VBP): based on customer-perceived net benefits of an offering (Ingenbleek, Frambach, and Verhallen 2010).
Price level	Price level	<ul style="list-style-type: none"> ● Share of value captured by the seller (Nagle and Müller 2018) 	N/A

N/A: Not applicable.

Intertwining service and culture in Pacific Asia

Servitization in Pacific Asia

This article intertwines two service research streams. Research at the nexus of service and culture found individual service expectations and behaviours to differ with cultural backgrounds, notably between Asian and Western individuals (Donthu and Yoo 1998; Furrer, Liu, and Sudharshan 2000; Laroche et al. 2004; Liu, Shaw-Ching, and Sudharshan 2001; Mattila 1999). Servitization research focusses on the strategic implications of service growth in manufacturing, albeit with a focus on Western countries (Paschou et al. 2020; Raddats et al. 2019; Rabetino et al. 2018; Suppatvech, Godsell, and Day 2019). Recent servitization literature reviews call for studies outside the West (Paschou et al. 2020; Rabetino et al. 2018).

Pacific Asia is promising to study servitization. Overall, research is scant (Wang, Kosaka, and Xing 2016). Prior studies are limited to single countries, especially China (Bao and Toivonen 2015; Gebauer and Fischer 2009; Gebauer and Von Zedtwitz 2007; Raja and Frandsen 2017) and Japan (Kim and Toya 2019; Yorozu and Shi 2014). Future research has yet to examine servitization in other Pacific Asian countries (Lin and Chen 2018). Moreover, pockets of smart service revenue growth abound. Pacific Asia is considered the most competitive region worldwide, with Singapore ranking first (Schwab 2019). China, Japan and South Korea (Korea hereafter) are home to manufacturing giants such as Huawei, Mitsubishi and Samsung (Ulrich 2019), providing fertile ground for smart service BM innovation.

Cultural values

Cultural values affect RM configuration. In China, buyers of industrial services were found to be highly price sensitive (Gebauer and Fischer 2009), while local agents provided spare parts at a fraction of the price of Western European manufacturers (Bao and Toivonen 2015). However, since cultural values differ even within Pacific Asia (Alston 1989; Rowley, Ishikawa, and Oh 2019; Ulrich 2019), their similarities and differences in a service context require further investigation (Kim and Mclean 2007).

This research adopts Hofstede's concept of culture. Hofstede and Bond (1988, 6) defined culture as 'the collective programming of the mind that distinguishes the members of one category of people from those of another'. Hofstede introduced six universal dimensions of culture: uncertainty avoidance (UAV), power distance (PD), long-term orientation (LTO), individualism-collectivism, masculinity-femininity, and indulgence-restraint (Hofstede, Hofstede, and Minkov 2010). Three of them have been linked to service revenue in Pacific Asia (see Table 3) and are explored in this study: UAV, PD and LTO.

Gebauer et al. (2007) associated high levels of PD, UAV and LTO with low industrial service revenue in China. However, only physical services provided in China were considered in this study preceding the digital era and, therefore, the emergence of smart services. Thus, it remains unknown whether their findings apply to (1) other Pacific Asian countries and (2) smart services.

Overall, three knowledge gaps motivate this research. First, the paucity of research on servitization in Pacific Asia in general, and on smart services in particular. Second, little is known about how cultural values affect the smart service RM configuration. Third, RMs need to be operationalized for smart services. Six Western European manufacturers are studied to address these gaps.

Table 3. Negative link between cultural values and service revenue.

Cultural value	Definition ¹	Tendency in Pacific Asia ^{1,2}	Link to industrial service revenue ³	Rationale ³
UAV	'the extent to which the members of a culture feel threatened by ambiguous or unknown situations' (p. 191)	High: Japan, South Korea Middle: China Low: Singapore	Negative	Risk aversion of customers impedes availability-based price metrics
PD	'the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally' (p. 61)	High: East Asia and Singapore	Negative	Service FLEs and managers not empowered to sell services proactively
LTO	Degree to which cultures foster 'virtues oriented toward future rewards – in particular, perseverance and thrift' (p. 239)	High: China, Hong Kong, Japan, South Korea, Singapore, Taiwan	Negative	Service offered for free to foster long-term personal relationships

Sources: ¹Hofstede, Hofstede, and Minkov (2010).

²Hofstede and Bond (1988).

³Gebauer et al. (2007).

Theory

This research is guided by contingency theory, which suggests that managerial systems should take into account the idiosyncratic conditions under which a company operates (Kast and Rosenzweig 1972; Lawrence and Lorsch 1967). Because the socio-cultural and market environment strongly influence organizations (Shetty and Carlisle 1972), they are important contingency factors considered in this study.

We investigate the contingency factors of RM configuration. Contingency factors pertaining to an organization's environment affect the feasibility and likelihood of success of different BM configurations (Pateli and Giaglis 2005). Thus, BMs require revision for certain geographic markets (Aspara, Hietanen, and Tikkanen 2010). However, despite its importance, cross-cultural research on the role of culture for BM adaptation is scarce (Saebi, Lien, and Foss 2017). We respond to this call by exploring the role of cultural values for smart service RM configuration.

Methodology

This exploratory research was conducted as a qualitative multiple-case study. Smart service RMs in Pacific Asia are a novel and contemporary phenomenon subject to contextual conditions. This called for an in-depth investigation using exploratory case study research (Yin 2018). We opted for a multiple case study design because the replication logic enhances confidence in the relationship between the study's main constructs (Eisenhardt 1989). Additionally, multiple cases are likely to yield more robust theory than single-case research (Eisenhardt and Graebner 2007).

Case overview

Cases were selected based on theoretical sampling (Glaser and Strauss 1967). Six Western European manufacturers were chosen based on four criteria: (1) strategic shift towards

service BMs, (2) topicality of smart services, (3) strong footprint in Pacific Asia and (4) access to key informants. To avoid industry bias and increase the robustness of our findings, we selected manufacturers of diverse industrial goods (see Table 4). The smart services' maturity varied between cases: some have been in the market for several years, others were at an early innovation phase.

Data collection

Data were collected through in-depth interviews and participant observation. Interviews were used to understand how actors rooted in the focal region see and make sense of the world (MacCracken 1997). To ensure consistency of our findings, data were triangulated (Jick 1979) using participant observation. This allowed us to record human action in its natural environment (Arnould and Wallendorf 1994).

We interviewed 19 people in total, using semi-structured interview guidelines. Table 5 shows that sixteen participants worked for the case companies. Three participants worked for real estate developers PropertyAlpha and PropertyBeta (pseudonyms), Singaporean customers of E&E&Co. Interviews lasted between 60 and 90 minutes and were conducted face-to-face or by phone. All interviews, except for two, were audio recorded and transcribed.

Data were triangulated using elements of market-oriented ethnography (Arnould and Wallendorf 1994). The first author joined Min (pseudonym), a service technician of TexCo, on customer visits to nine weaving mills in Jiangsu province, Mainland China. The first author engaged in participant observation by conversing with Min, observing weaving mill operations, drinking tea with administrative staff and sharing meals with mill owners. Field work produced a rich dataset of field notes, photographs and videos (see Figure 1).

Data analysis

Data were analysed in three steps using ATLAS.ti software. The first step centred on in-depth analysis of raw data. We read the interview transcripts and notes several times, marking quotes relevant to the RQs. To let first-order codes emerge in the participants' language, we applied inductive coding (Glaser and Strauss 1967) to the data. In-vivo coding was used where participants' language was particularly vivid (Corbin and Strauss 2008), leading to codes such as 'Want to be the first with caution'. As data analysis

Table 4. Case companies.

Pseudonym	Products	Smart service	Global TO (2018)	Employees worldwide	HQ
EngineCorp	Diesel and gas engines	Remote monitoring	GBP 3.5bn	10,500	DE
HeavyCorp	Construction and agriculture machinery	Digital asset management	EUR 10.6bn	46,000	CH
E&E&Co.	Elevators, escalators	Digital asset management	CHF 10.9bn	64,500	CH
MachineInc	Machine tools, laser processing	Remote monitoring	EUR 3.6bn	13,500	DE
TexCo	Dobbies, weaving machines and preparation systems	Remote monitoring and support	CHF 1.3bn	5,500	CH
WirePro	Wire processing machines	Remote monitoring	CHF 480 m	2,000	CH

CH: Switzerland, DE: Germany, HQ: Headquarters, TO: Turnover.

Table 5. Interview participants.

#	Pseudo-nym	Role	Function	Company	Territories in which participant does business										
					CN	HK	ID	JP	KR	MY	PH	SG	TH	TW	VN
1	Yong	P	Senior Manager Textile After Sales Department	TexCo	.	.	.			.				.	.
2	Tom	P	Regional Head of Service Sales Eastern Europe & Asia	Machinelnc	.			.	.						
3	John	P	Business Development Smart Services Laser	Machinelnc	.			.	.						.
4	Ajai	P	Head of Customer Service	HeavyCorp			.			.	.	.	.		.
5	Peter	P	Sales Manager	HeavyCorp			.			.	.	.	.		.
6	Marc	P	Head of Customer Service Maritime Cranes	HeavyCorp			.			.	.	.	.		.
7	Cheng	C	Senior Manager, Retail Operation Engineering	PropertyAlpha								.			
8	Raja	C	Lead Retail Experience	PropertyBeta								.			
9	Mohd	C	Facility Operations Manager	PropertyBeta								.			
10	Liam	P	Head Sales & Service, Area Sales Manager SEA (Southeast Asia)	WirePro			.			.	.	.		.	.
11	Bob	P	Director Digital Business & Customer Experience	E&E&Co.			.	.		.	.	.	.	.	.
12	Linda	P	Head of Digitalization, Asia Pacific	E&E&Co.			.	.		.	.	.	.	.	.
13	Lei	P	Head of Digitalization, Group Manager, Sales Service (Asia)	E&E&Co.			.	.		.	.	.	.	.	.
14	Kate	P	Manager, Sales Service (Asia) Power Generation	EngineCorp	.		.	.	.	.	.	.	.	.	.
15	Zhuo	P	Manager, Sales Service (Asia) Marine	EngineCorp	.		.	.	.	.	.	.	.	.	.
16	Fang	P	Service Manager Domestic	WirePro	.										
17	Ji-ho	P	Group Manager Service Laser Technology	Machinelnc					.						
18	Seo-jun	P	Head Application & Marketing	Machinelnc					.						
19	Wei	P	Service Manager	WirePro	.										

C: Customer, P: Provider, CN: Mainland China, HK: Hong Kong, ID: Indonesia, JP: Japan, KR: Korea, MY: Malaysia, PH: Philippines, SG: Singapore, TH: Thailand, TW: Taiwan, VN: Vietnam.

progressed, codes were iteratively added, deleted and refined. In the second step, thematic patterns were distilled from the data. Analysis of links and patterns between first-order codes yielded second-order themes refined based on prior literature. The third step generated a set of aggregated dimensions. The formation of dimensions was based on the second-order themes and guided by constructs established in prior literature. We identified five aggregated dimensions grounded in empirical data and theory (see Figure 2).

Findings

The aggregated dimensions that emerged from the data build the foundation of a conceptual framework that structures the findings of this study. The framework in Figure 3 is a linear model guided by the contingency view (Otley 1980), linking contingent variables (cultural values), organizational levers (smart service RM) and a performance outcome (value capture).



Figure 1. Weaving mills visited.

Cultural values affecting smart service RMs

The data provide support for the relevance of UAV, PD and LTO in Pacific Asia. Specifics follow.

Uncertainty aversion

Customers in Pacific Asia seemed averse to the technological and financial downside uncertainty caused by smart services. Customers in Japan, Korea and China reacted differently to the technological immaturity of smart services:

Both China and Japan use chopsticks. The reason to have different chopsticks is because when we are eating fish, we are different. Japanese pick the bones out of the meat, then they eat the meat. The Chinese grab everything, put it into the mouth and then start to spit the bones out. That is reflecting how we are dealing with matters. Japanese are trying to clarify all the potential issues before they get things started. So they take much longer time to verify the process, to verify the potential risks. Chinese are just trying to solve the matters during the process. In this sense, the Chinese customers have larger tolerance. Koreans have silver chopsticks. You know why? Because that's a symbol. In the older times, if you had some poison in your food, then the chopsticks changed the colours. It is very, very difficult to get customers' trust. Even if you are Korean, it's very difficult to get the customers' trust. (Wei)

Technological downside uncertainty surfaced to a lesser extent in Singapore. Novelty was embraced, given uncertainty-reducing quality signals. Smart service providers signalled quality by providing reference customers and tangibles such as technological equipment:

We are not risk takers. (Zhuo)

Singapore is known as early adopter. They wanna be the first, but they also wanna be the first with caution. So if they think they are going to get killed, they'd never want to be the first. Right, if they think the technology is really not proven. But if they have a lot of trust and they have good references and there is people [that] have a proven track record, then they wanna be the first. So this is why we have had customers from here go to Europe, Germany and

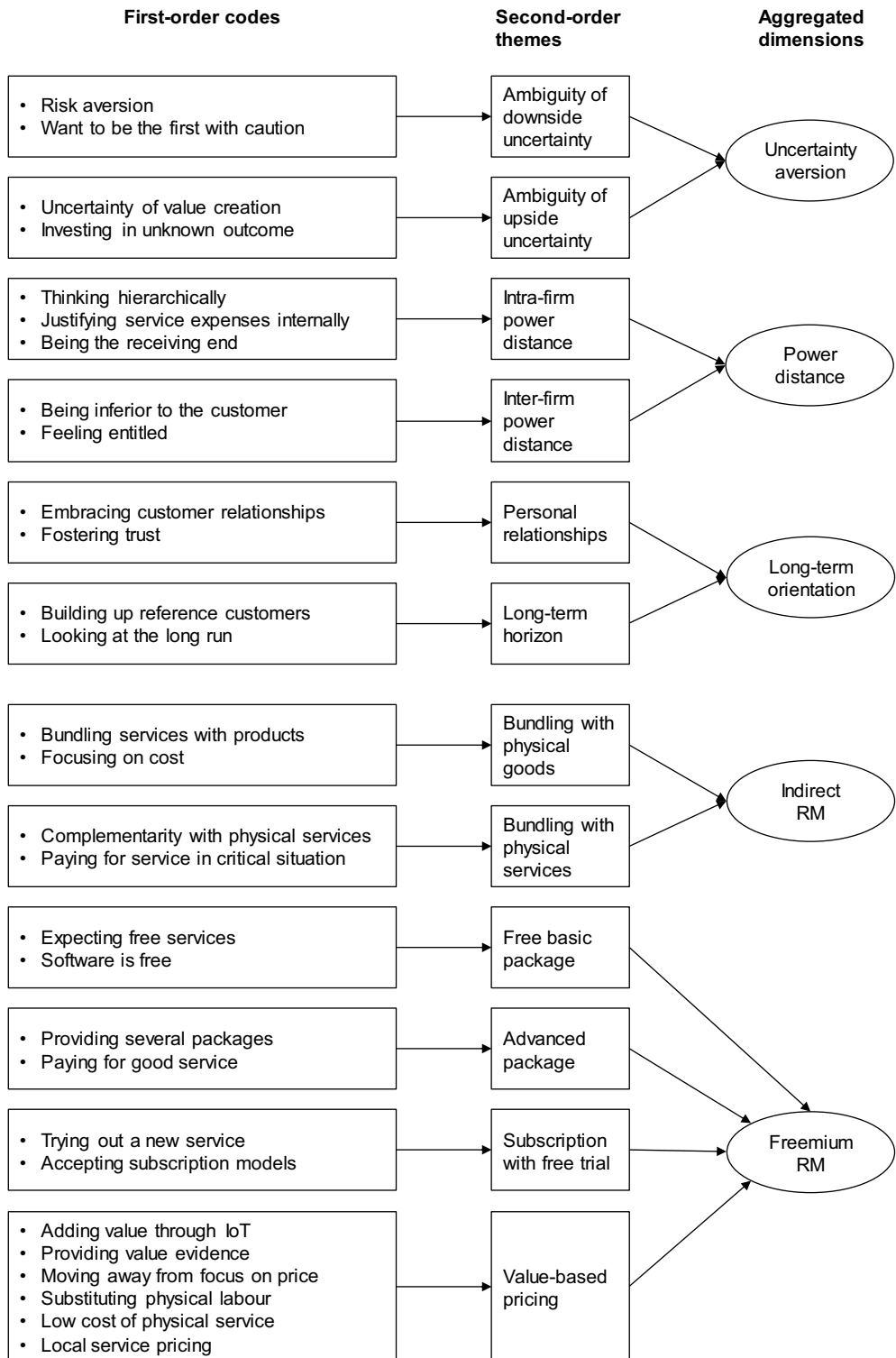


Figure 2. Data structure.

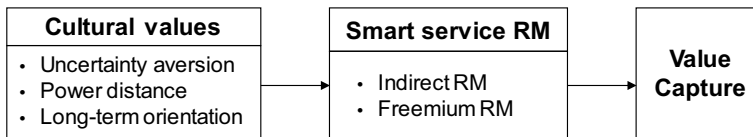


Figure 3. Conceptual framework.

Switzerland to see our technology, get comfort . . . but then they wanna be the first to do it here. (Bob)

Smart services also caused financial downside uncertainty. To cover costs for edge devices and installations, case companies charged initial setup fees to connect equipment to the internet. Additional recurring fees were billed for service delivery. Customers were cautious of the uncertain return-on-investment (ROI):

The Asian customers are still very conservative on this topic, because they don't have this kind of experience. Also, they are conservative to put their money in. Because all you are talking about is just some figures, but not the actual things they have experienced before. (Yong)

Conversely, potential customers perceived upside uncertainty regarding the value created by new smart services. Most were recently launched, and documented evidence of value creation was scarce. Absent such evidence, customers were reluctant to become pilot users:

'We don't wanna be guinea pigs'. We hear that a lot. But you know, in reality, right now what we are doing – with [our smart service] – we are trying to set this expectation – is we are tweaking it all the time. This symptom happened; OK we need to manage that better. In kind of this scenario, when there was no alert, OK we have to change that . . . (Bob)

Power distance

PD appeared within and beyond firm boundaries. Intra-firm, decision-making on a local and global level was highly centralized. Restrictions on the implementation of smart services applied to lower-level managers, especially when installation and operation entailed expenditure:

Only for three [connected assets], they have to write a paper . . . and the whole cost investment would be about S\$15,000 to install and maintain and to have a subscription. I reckon the amount of time they have spent to write the paper would have been three times that already, in man-hours and everything. (Bob)

SEA subsidiaries were frequently the 'receiving end'. Decisions, particularly those concerning the use of smart services, were often taken in the HQ. SEA subsidiaries could hardly influence these decisions:

Southeast Asia unfortunately is the receiving end. We have many other multinational companies here with HQ probably in Japan, in Europe or elsewhere. Sometimes the local guy may not be able to make the decision, especially for Japanese companies. (Liam)

The Southeast Asian countries, especially the emerging countries like Vietnam, I call them a like a receiving country. So somehow somewhere it has been decided in the headquarter. People locally just have to follow. (Fang)

Inter-firm power distance appeared between service providers and customers. In Singapore, the socioeconomic background of FLEs was one reason. Average wages in Singapore were higher than in neighbouring countries such as Malaysia or Indonesia. This attracted a substantial number of migrant workers into occupations the local Singaporean population considered substandard. Hierarchies between FLEs and customers were pronounced:

The paymasters in Singapore are generally Chinese Singaporeans. Very wealthy, very well-educated. The workers are foreigners that maybe have very very limited education. So in Australia you have a technician, who has probably more education and is more assertive and gets paid higher than the guy who is managing him. In Singapore, you have the customer [up here] and the technician [down] here. It's a huge gap. So the paymaster does not trust what this guy is saying. The paymaster also believes: 'You know, I'm a highly educated Chinese Singaporean. I demand a certain level of respect that you as a worker must show me'. So the way they treat them sometimes is not so nice. (Bob)

PD also materialized in the asymmetric power distribution between service providers and customers in Korea:

The customer is the master and the supplier is the sub. (Seo-jun)

The supplier has to serve the ordering company. (Ji-ho)

Power asymmetry was particularly visible with chaebol customers. Chaebols are large conglomerates benefitting from strategic advantages such as high market shares and capital resources (Ulrich 2019; Yoon and Suh 2019). Chaebols leveraged their bargaining power to obtain smart services for free:

[Chaebol A] pays for the product, so they feel like they could get every information from the product. In Korea, I think the customer thinks that when they buy something, all property belongs to them when they pay for it. They think that they could buy not only the product but also the technology itself. (Seo-jun)

Long-term orientation

Personal relationships were considered fundamental for doing business in Pacific Asia. FLEs established and maintained personal rapport with customers. Min's routine customer visits were revealing. After inspecting the equipment's condition, Min spent substantial time to converse informally with factory workers, drink tea with office employees and eat with owners.

Similarly, a significant amount of time was invested to build and foster relationships before settling business issues. Establishing a certain level of trust was fundamental for subsequent sales:

Relationship, relationship. Relationship is based on confidence. When your customer has confidence in you, or your service, or your product, this can build up a very good relationship. And then, whatever you promote to him, he will believe. This is very important in our Asian countries. (Yong)

If you go [to Vietnam], if you are friendly, once they trust you – that means, okay, this guy doesn't cheat on me, then it's easy to do business with them. (Ajai)

Personal relationships were expected to remain paramount in the age of smart services. Face-to-face meetings with the service provider were crucial to foster the customer's trust:

I've seen the transition from – 10 years ago – a very face-to-face, human touch kind of business to – in the last three to four years – moving to the digital world. The con is, and I really see this as a con: the lack of face-to-face discussion . . . you don't need a face-to-face at all for everything based on data. I would say, in general, Asia is very much still face-to-face, especially for developing countries. Yesterday, we had a Skype meeting with Thailand, our distributors. They keep asking us to visit their Navy just to give them the assurance of proving what we can perform. Certain countries it's just that . . . sometimes you just have to show face and . . . you know . . . present yourself, and people will have the assurance. (Zhuo)

Creating and capturing value from smart services required a long-term horizon. As many offerings were just recently introduced, user bases were embryonic. Services were expected to get 'smarter' and create superior value once extensive data were collected from the field. Yet, not all European manufacturers considered the long-term horizon required for capturing value from smart services. Our data reveal inconsistencies between short-term value capture expectations and long-term value creation:

Whenever we come up with a digital product, we want to see results right in the third year. Even though there is no value to the customer, we just have to sell. Ideally, you are supposed to give the customer the value, because once the customer sees the value, he will stick with you a longer period. But, somehow, the company may not look at that kind of long run. Because they are looking at revenue. I may say there is a gap here. On one hand, we need to hit the target. On the other hand, we are talking about value. And the value can be a long process, it's not just a short process. (Zhuo)

Smart service RMs in Pacific Asia

Our data reveal two dominant RMs: indirect and freemium. [Table 6](#) highlights the fundamental differences between both. In indirect RMs, no direct charge is levied for service provision. Instead, revenues come from other customers, physical goods or services sales. Freemium RMs imply direct service fees and consist of two or more product bundles. One bundle is provided for free; others are sold at a positive price.

Table 6. Differences between indirect and freemium RMs.

RM dimension	RM parameter	Indirect RM	Freemium RM
RD	Revenue origin	Customers of other services, third party	Customers of focal service
	Revenue object	Physical good, physical service	Focal service
OB	Bundling approach	Mixed bundling	Pure bundling
	Product bundle	≥1	≥2
PM	Charge	No	Yes (for advanced package)
	Invoicing mode	N/A	Recurring
	Price metric	N/A	Various
	Pricing logic	N/A	Value
	Price level	N/A	Various

N/A: Not applicable.

Indirect RM

We found two ways of monetization through indirect RM. One was bundles of physical goods. Oftentimes, customers considered services being complementary to physical goods. Services were expected to be included in equipment sales without extra charge:

[Our customers] purchase our machine because we can provide good service. If we cannot provide good service, they will not buy our machines. So good service in their mind is a must. But they will not pay any additional cost for it. (Yong)

Service fees were not immediately visible ('the line'), but dissimulated in larger transactions:

If we buy air-conditioning for our home, in Asia, you just buy the devices and then they will be installed. In the Western world, you buy an air condition and that device is the physical product; also you have a line for installation, a separate line to be charged. But here . . . very simply, you don't see it. Maybe it has been combined to get into this physical product, but that's the mentality. People don't really charge for this kind of service. In our quotation, you don't see this line. Even, somehow, we find a way to put it into the machine price, but you don't get this line. If you have this line showing up, except for a very, very special machine, this will be the first discussion and item that will be kicked out. (Wei)

Another way of monetizing smart services were bundles with physical services. Three types of service bundles emerged from our data: spare parts provision, maintenance agreements and outcome-based contracts. First, even if many customers were reluctant to pay for services, urgent situations left them no choice:

[Customers in Vietnam, Taiwan and Indonesia] would keep their spare parts inventory as low as possible and only request our quick supply for the spare parts. Today, we may just receive a phone call from them: 'Ah [Yong], we need this spare part quickly, I can pay but please send me tomorrow!' [laughs] (Yong)

Second, the value was captured from smart services through maintenance agreements. EngineCorp included remote monitoring in maintenance agreements to improve the quality of physical services:

Data collection services are an added value on our service to the customers. But the normal people-to-people contact and on-the-job is still very much higher, as compared to the [smart service] that we are giving to the customers. (Kate)

Third, smart services enabled outcome-based contracts, billed by the number of elevator rides or metres of earth cut. Smart services such as remote monitoring were included in the contract to ensure equipment availability:

We have customers, ferry operators, [who] only pay by running hours – means if the engine runs at 800 hours, [EngineCorp] is paid 800 hours by [x] dollars. We call it 'power-by-the-hour'. We always make sure we maintain all the things and they only pay us by the running hours of the engines. (Kate)

Freemium RM

Freemium RMs consisted of bundles at zero (basic packages) and positive (advanced packages) price. Free trials and VBP were essential for advanced packages.

Basic and advanced packages were required to segment customers. Basic packages were necessary for price-sensitive customers, which appeared to predominate in the region, except for Singapore and Japan, as Figure 4 illustrates. Advanced packages targeted performance-sensitive customers. Customers were willing to pay if superior value was provided:

If we can improve their quality, improve their yield rate, I think, for such service, they're willing to pay. (Wei)

They're willing to pay something. So we've sold it, but then they expect much much better performance. So if today, the lift is breaking down once a month, I put this remote monitoring in, I should be able to get it to once every two months or three months. They really wanna see a visible performance. (Bob)

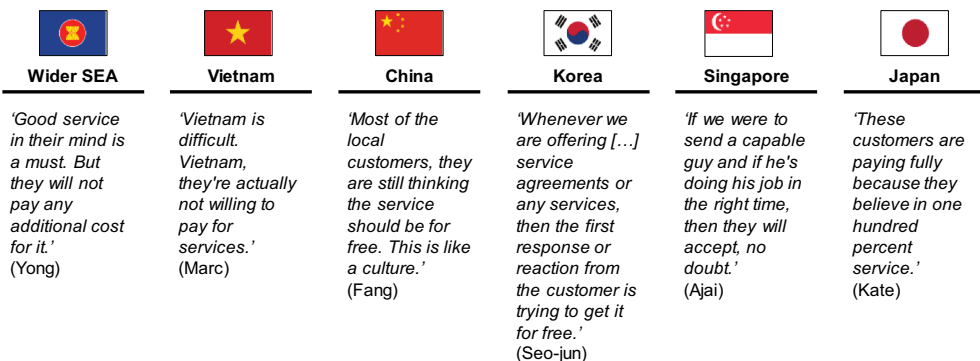
Subscriptions with free trial generated recurring revenues in freemium RMs. For a given duration, customers could test advanced packages without charge:

In China, we offer a lot of apps for free for the first stage. So in this case, we can just let the customers get used to our service. For the next level, if they want more features on the service, the software, they can pay for this. (Fang)

Information goods blazed the trail for subscriptions. Instead of one-off invoices, yearly or monthly service fees were charged. Yet, to capture value for a prolonged period, value creation was to remain consistent:

If [customers] say they can see that they are enjoying the benefit, why should they cancel? The reason why people cancel Spotify or Netflix it's because they probably no longer need it. Or they don't see that they will get benefit out of it. That's why they probably think that is good to cancel. For example, I'm personally subscribed to [Microsoft Office 365]. So every year I pay \$5148 without question, because I need it. (Liam)

Prices required alignment with value creation. Three imperatives for VBP of smart services emerged from the interviews: (1) value identification, (2) value quantification, (3) price levels adjusted to substitutes. First, drivers of customer value needed to be identified, including higher equipment availability:



Price sensitivity for industrial services

Figure 4. Heterogeneous price sensitivity.

The outcome we seek – reliability – should improve and it's no longer based on the time we spend on the equipment and the number of times we visit, but more the availability and intervention using technology. (Bob)

Second, value needed to be quantified. Because customers in Pacific-Asia were particularly 'driven by numbers' (Lei), they expected financial estimates of the benefits smart services created. Calculations reflected cost savings and ROI:

We have to find out how much money [customers] could save from their services. [A customer] asked us how much money they can save if they use our smart services. For example, maybe they don't need to buy something, they don't need to store the spare part. Then they could save the money from their working capital or storage place. (Seo-jun)

I need to work on some of those ROI calculations. We need this kind of arguments, statements to tell them that 'Even though you're paying maybe [x] per month for the year, you will be getting double of your return'. (Liam)

Third, price levels needed to reflect substitutes. Remote monitoring services were designed to substitute physical monitoring of the status of assets, such as engines or elevators. Substituting workers was conceivable:

If I can use this technology to substitute a physical man with it? Yeah, can. (Bob)

To fit customer value, pricing needed to consider local wages. Differences between high (e.g. Japan) and low wage countries (e.g. Indonesia) were substantial. Thus, price levels of physical services were typically country-adjusted:

We charge, let's say 180 USD in Singapore. But maybe we charge only 60 USD in Malaysia. (Ajai)

However, this rationale was inconsistently applied to smart services. Some HQs set global prices, making the smart service unattractive compared to local substitutes:

We are charging S\$50 per month per equipment for this [smart service]. But in Indonesia, the cost of having one person sit there for eight hours monitoring this, plus he can do other things, is about US\$100 a month. So the cost of very cheap labour is one reason why they might not use it. Because it's cheaper for me to sit the guy there and I can get him to clean up when he is not doing anything. Your app is not going to clean up. (Bob)

If you want to have one year's usage, one machine, you can pay almost RMB10,000. But this is something too expensive to the customers. (Fang)

Smart service RM configurations to capture value

Table 7 and this section unfold how indirect and freemium RMs achieved fit with UAV, PD and LTO.

Fit between UAV and RM configuration

Indirect and freemium RMs reduced customer-perceived financial downside uncertainty. Fees for using a smart service were invisible (indirect RM) or deferred (freemium RM). Customers were relieved from the financial risks of experimenting with smart services:

Table 7. Fit between smart service RMs and cultural values.

Cultural value	How indirect RMs achieved fit	How freemium RMs achieved fit
UAV	Reduced perceived financial downside uncertainty	Reduced perceived financial downside uncertainty and ambiguity of upside uncertainty
PD	Circumvented intra- and inter-firm PD	Circumvented intra-firm PD
LTO	Leveraged personal relationships	Leveraged long-term horizon

Why I mentioned about trial is: there's no loss. If you try something – at most, you stop using or you don't use [it]. It is not going to hurt you or cause you losing some money. (Fang)

Freemium RMs also reduced the ambiguity of upside uncertainty. Since uncertainty about the technological feasibility of smart services was high, providers strove to grow user bases, gather data and learn from market feedback to readjust features. Freemium RMs allowed value creation and value capture to converge over time:

[WirePro's smart service], I will suggest that we provide the visualization for free. In this case, we can establish the infrastructure for [customers], and we can start to get data, we can start to get their feedback. Then, this feedback will help us to improve our [smart service] and also we know the customer needs for it. Then we can improve it, right? So, on top of that, we can provide value-added services. Then we can charge for that part. It's not like we can charge for everything. (Fang)

Fit between PD and RM configuration

Foregoing immediate service fees alleviated intra-firm PD. Indirect and freemium RMs allowed lower-level managers to test smart services without seeking approval:

We can just find a deal that you just give it together, instead of we try to come back later on, so the guy needs to get the additional approval one more time. But the moment you're able to package it, maybe we can do it together. (Fang)

Indirect RMs also addressed inter-firm PD. Chaebols and others leveraged their bargaining power to obtain smart services without charge. As a countermeasure, indirect RMs were used to capture value through equipment sales.

Fit between LTO and RM configuration

Indirect RMs were designed to foster long-term personal relationships instead of maximizing short-term revenues. The TexCo case is revealing. The hours Min spent inspecting the installed base and solving ad-hoc problems were not billed. Similarly, to drive future equipment sales revenues, TexCo developed a remote support service to substitute existing mobile applications:

They will phone us, or maybe by WhatsApp or different kind of communication apps, to send their message and then request a quick feedback or some suggestion to solve the problem immediately. (Yong)

Freemium RMs addressed customers' long-term horizon. Free basic packages or trials allowed customers to assess the value of a smart service for an extended time period. Reference customers paved the way for long-term value capture:

Set up a reference, just as a gift to one or two customers in the market. Let them run the system for a few years and then they will say something about this system. Then the market will learn about it, the actual figures and the actual improvements. And then after that, they will think about having this system. (Yong)

Discussion

Our findings expand prior understanding of contingencies affecting RM configuration. Indirect RMs are preferred where contextual factors entail low willingness to pay for services. Our data suggest that the negative link between PD, UAV and LTO, and industrial service revenue found in China (Gebauer et al. 2007) appears in some Pacific Asian countries (e.g. Vietnam), but not in others (e.g. Singapore). We concur with prior studies that, often, Chinese customers prefer paying for tangible products and expect obtaining free services (Bao and Toivonen 2015; Gebauer et al. 2007). However, our research provides a more nuanced understanding of possible commercial responses. Services need not be offered strictly for free, as suggested by Gebauer and Von Zedtwitz (2007). Instead, indirect RMs monetize smart services through additional physical goods or service sales.

The findings allow theorizing further about three rationales for choosing freemium RMs. First, a lack of quality signals (Tidhar and Eisenhardt 2020). The smart services studied lack quality signals, which high UAV penalizes. The use of freemium RMs to let customers experience offerings at no cost is aligned with prior literature (Gu, Kannan, and Ma 2018).

Second, freemium helps to expand a service's user base (Shi, Zhang, and Srinivasan 2019). Akin to information goods, smart service quality increases with user numbers. The case companies used freemium to attract reference customers, subsequently capitalizing on word-of-mouth (Kamada and Öry 2020). The importance of personal relationships is likely to help growing the Pacific Asian user base.

Third, freemium helps to get a 'foot in the door' of new customers. Absent costs of experimentation, freemium is attractive for new users (Gu, Kannan, and Ma 2018). Our research adds another facet to this rationale. Facing high PD in Pacific Asia, smart service providers leverage freemium RMs to circumvent restrictive purchasing policies and attract users.

Implications for theory and theory development

This article contributes to the RM and service literature. The smart service RM construct we offer extends RM literature in three ways. First, it is holistic. Most of the prior research discussed specific RM configurations such as pay-per-use (Rapaccini 2015) or freemium (Gu, Kannan, and Ma 2018; Shi, Zhang, and Srinivasan 2019). Our RM construct integrates missing monetization dimensions, thus building an important bridge between the RM and pricing literature. Second, it breaks new ground in terms of markets and offerings. Existing RM constructs primarily cover information goods and consumer markets (e.g. Casadesu-Masanell and Zhu 2010, 2013). Our expansion of the RM construct domain to smart services provides B2B scholars with a theoretical framework to better describe and compare emerging RMs. Third, it considers new contingency factors. Extant research investigated several antecedents to RM configuration, but not geographical or cultural factors (Saebi, Lien, and Foss

2017; Tidhar and Eisenhardt 2020). Enriching the nomological network of RMs with cultural values enhances our understanding of boundary conditions affecting RM performance.

We contribute to service research by theorizing on RM configurations aligning value creation, capture and cultural values. Value creation and capture need alignment for service BMs to work (Sjödin et al. 2020). However, Western European manufacturers struggle to capture value from services in Pacific Asia. Particularly in China, services are offered free of charge to sustain personal relationships and reduce customer-perceived risk (Bao, Zhou, and Su 2003; Gebauer et al. 2007). The RM construct offered here allows for more nuances beyond the dichotomy of zero and nonzero prices assumed in prior studies. Between both extremes emerge indirect and freemium RMs as a middle way to capture value in line with cultural values.

Implications for business and management practice

Our findings entail four business imperatives. Importantly, managers must localize smart service RMs. Cultural values and the relevance of physical substitutes differ greatly between regions. To drive global penetration and value capture, smart service providers must move from a one-size-fits-all approach to RM configuration to one that truly considers local idiosyncrasies.

Moreover, managers should zero in on lifetime value (CLV) when evaluating smart service customers. That is because indirect and freemium RMs entail time-lagged cash in- and outflows. In indirect RMs, service delivery and revenue generation are decoupled. In freemium RMs, not all users generate revenue. Certain users remain in the 'free' tier; others switch to paid tiers. Yet in both RMs providers still incur costs to serve customers. Therefore, industry executives should follow their peers in consumer markets and start monitoring customer acquisition costs, average revenue per user and CLV (McCarthy, Fader, and Hardie 2017) to manage their smart service user base.

Additionally, RMs should leverage complementarities between smart and physical services. Face-to-face interactions remain decisive in Pacific Asia in the digital age, so the managerial focus should move away from unbundled smart services sales as the sole revenue driver. Instead, RMs should capitalize on complementarities with physical services to grow revenue in the region.

Finally, providers of smart services must develop a VBP capability. Customers in Pacific Asia accept paying for smart services that clearly provide value. Thus, providers need processes and tools to quantify value and derive according prices. To develop this capability, change initiatives affecting organizational routines, roles and metrics are effortful but necessary.

Conclusion

We seek to answer two questions. First, how do cultural values affect smart service RMs in Pacific Asia? We find RMs to be shaped by up- and downside UAV, intra- and interfirm PD, and the importance of personal relationships and long-term orientation. Second, how can RMs be configured accordingly? Our findings point to indirect and freemium RMs enabling value capture and fitting cultural values.

This study comes with limitations that offer avenues for future research. As with any qualitative inquiry, our results are not generalizable. Furthermore, the findings suffer from two cultural biases. First, the case companies are headquartered in just two countries, Germany and Switzerland. Second, since the authors are German native speakers, interviews were held in English and German. Adding the perspective of an Asian researcher or conducting the interviews in the participants' native languages may have provided additional insights. Moreover, this study stretches over Pacific Asia, which is not culturally homogeneous (Thompson 2004). The cultural differences within the region uncovered in this research call for further exploration.

Finally, VBP for smart services merits further study. Pricing is a crucial piece in the RM puzzle because it determines the share of value captured. Our findings confirm VBP as the preferred pricing logic for smart services (Classen and Friedli 2019; Töytäri et al. 2018). More research is needed to understand how VBP practices unfold in industrial firms in Pacific Asia and beyond.

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