Hoteliers' Service Design for Mobile-Based Value Co-creation

Abstract

Purpose – This study investigates how hoteliers leverage mobile technologies to shape services that allow customers to create their own unique and personalized experiences.

Design/methodology/approach – Guided by S-D logic and sociomateriality, this study analyzes hoteliers' reasoning behind the design of mobile-based services through qualitative research. Data were collected from interviews with hotel managers representing best-practice companies in the industry.

Findings – The findings provide a rich description of mobile-based value co-creation in the hotel context. They delineate hoteliers' understanding of mobile technologies as a means to co-create value, their strategic considerations, and the forms in which value is expected to be co-created.

Research and practical implications – This study unearths the new roles of hoteliers, unique forms of value co-creation and their underlying structures in the specific context of mobile-based value co-creation. Practical implications based on industry best practices are provided for hospitality companies seeking to innovate through co-creating value with customers using mobile technologies.

Originality/value – This research paper contributes to the hospitality literature on IT-enabled service innovation and value co-creation by comprehensively explaining the underlying structure and design of co-created experiences facilitated by mobile-based services.

Keywords: Value Co-creation, Mobile-based Services, Hotel, Hospitality, Service Design

Paper type: Research Paper

1. Introduction

Intensive knowledge sharing as a result of rapid information technology (IT) development has complicated the behaviors of contemporary customers. Amidst a sea of consumer information and choices, companies are challenged to stand out from competitors and foster customer loyalty (Olsen and Connolly, 2000). This is particularly true in the hospitality industry, where product and service offerings are highly substitutable and imitable among service providers (Shaw *et al.*, 2011; Victorino *et al.*, 2005). Thus, hospitality organizations have been forced to innovate to stay competitive and differentiate. Furthermore, realizing the potential of intangibles as a source of competitive advantage, hospitality service providers no longer rely on innovating physical goods alone. They also create exceptional services to deliver superior customer value (Grönroos, 2000).

The rapid rise of IT has revolutionized the travel industry and brought numerous possibilities for service innovations (Buhalis and Law, 2008; Olsen and Connolly, 2000). As this revolution creates opportunities for unprecedented firm-customer interactions, companies are gradually relying on mobile technologies to connect ubiquitously with customers. Especially, in the hotel sector, hoteliers have developed and implemented a range of mobile-based services (e.g., mobile check-in, mobile requests, and mobile keys) that customers can use throughout their travel journey (Ahmed, 2017; Marriott International, 2017).

According to service-dominant (S-D) logic, the practice of providing resources for customers to generate their own experiences through interacting with a service supplier is called the co-creation of value (Vargo and Lusch, 2004). Value co-creation, as one aspect of service innovation, helps firms shift focus from physical products to co-creating memorable experiences and emotional bonds with customers. The concept also echoes an emphasis on placing customers

24 at the center of service innovation rather than practicing innovation "in-house" (Dörner *et al*.,

25 2011). Co-creation has been recognized as an ideal way to deliver greater customer value in the

26 hospitality industry, where differentiation is particularly difficult (Chathoth *et al*., 2013).

27   While hoteliers continue to invest in mobile technologies for service innovation, little is

28 known about how hoteliers leverage them to involve customers for value co-creation. Through

29 the lens of S-D logic, and using the concept of sociomateriality as a theoretical tool, this study

30 explores how hoteliers consider mobile as a means to achieve service innovation through co-

31 creating value with customers. The goal is to describe the underlying mechanism and

32 expectations behind hoteliers' design of mobile-based services for value co-creation. This study

33 fills the void in extant literature on the role of human commitments and the reasoning behind the

34 provision of IT-enabled services for innovation and value co-creation.

35 **2. Literature review**

36 *2.1 Value co-creation and service innovation*

37   In the hospitality literature, service innovation has been defined as "the introduction of

38 new or novel ideas which focus on services that provide new ways of delivering a benefit, new

39 service concepts, or new service business models through continuous operational improvement,

40 technology, investment in employee performance, or management of the customer experience"

41 (Verma *et al*., 2008, p. 7). Traditionally, service innovation tends to be reactive. Companies

42 often adopt "backward-looking" techniques using customers' prior experiences and sets of pre-

43 designed questions to improve existing products or services. These approaches, although

44 somewhat helpful, limit service and experience innovation because they make it difficult to

45 discover customers' latent and contextual needs (Trott, 2001; Witell *et al*., 2011).

46   Therefore, scholars have called for more research on the important role of customers as

47   idea creators and detectors of value-in-context (Witell *et al.*, 2011). The involvement of

48   customers should not be limited to new product development. They should also play a role in

49   creative problem solving and assessing their latent needs so they are not merely creating value

50   for others but also for themselves (Gustafsson *et al.*, 2012; Witell *et al.*, 2011). This emphasis on

51   customers' role in the value creation process is grounded in S-D logic, which suggests value as a

52   result of exchange and integration of operant resources (i.e., knowledge and skills) that produce

53   effects (Vargo and Lusch, 2004). As consumers phenomenologically perceive value, service

54   providers should collaborate with them to adapt to these dynamic customer needs (Vargo and

55   Lusch, 2004). Such "joint creation of value by the company and the customer—allowing the

56   customer to co-construct the service experience to suit her context" (Prahalad and Ramaswamy,

57   2004, p. 8)—is referred to as the co-creation of value. The goal is to recognize and incorporate

58   customers' idiosyncratic needs to craft personalized service offerings (Prahalad and Ramaswamy,

59   2004; Vargo and Lusch, 2004). As value is created in the customer's sphere, firms can only

60   suggest value propositions. Thus, understanding how goods and services can be provided to

61   support customers' creation of value-in-use becomes critical (Grönroos, 2000).

62   Scholars have explored value co-creation through different theoretical approaches (Alves

63   *et al.*, 2016; Galvagno and Dalli, 2014; Saarijärvi *et al.*, 2013). For example, from the service

64   science perspective, scholars emphasize co-creation as the foundation underlying business

65   operations and study how service systems interact with one another to co-create value; From the

66   innovation and technology management perspective, scholars investigate how technologies

67   facilitate firm-customer interactions which foster customer engagement and innovation; From the

68   marketing and consumer perspective, scholars focus on customer participation behaviors and

69 customer perceived value; From the S-D logic perspective, recognizing service, rather than

70 physical goods, as the fundamental unit of exchange is emphasized. Value is actualized in use

71 and thus the customer is always a co-creator of value. The role of the service provider is thus to

72 provide resources in forms of services through which customers can act on and materialize value

73 propositions. The S-D logic perspective thus provides a foundation for this study which is

74 interested in the roles and activities of hoteliers (i.e., the provision of certain types of services

75 through configuration of various resources).

76   In the hospitality literature, researchers who studied value co-creation are interested in

77 understanding the impact of co-creation on customer experience and behaviors (Campos *et al*.,

78 2016; Jeon *et al*., 2016; Mathis *et al*., 2016; Prebensen *et al*., 2016; Prebensen and Xie, 2017; Tu

79 *et al*, 2018; Xu *et al*., 2018; Zhang *et al*., 2018); the factors that affect customer participation in

80 value co-creation (Im and Qu, 2017; Ma *et al*., 2017); and how customers co-create value with

81 firms (Camilleri and Neuhofer, 2017; Jarvenpaa and Tuunainen, 2013; Johnson and Neuhofer,

82 2017). A few conceptual papers have attempted to synthesize previous studies and suggested

83 future research directions (Chathoth *et al*., 2013, 2016; Shaw *et al*., 2011). While some

84 researchers have also investigated value co-creation from the supplier's perspective (Chen *et al*.,

85 2017; Lee *et al*., 2017; Santos-Vijande *et al*. 2018), they have rarely gone beyond examining the

86 antecedents or outcomes of co-creation to connecting the configuration of resources with service

87 development. An exception is Neuhofer et al.'s (2015) pioneering study yet the authors focused

88 on a single case study which may not be specific enough to explain the phenomenon of interest

89 in this study (i.e., hoteliers' mobile app services).

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92   *2.2 Mobile technology for value co-creation*

93   Mobile technology has been recognized as an accessible tool with high potential for

94   enhancing customer experiences and facilitating value co-creation in the hospitality industry.

95   With their portable, ubiquitous and synchronized nature, mobile technologies have enlarged the

96   spatial and temporal dimensions in which value can be created (Neuhofer *et al*., 2015; Wang and

97   Fesenmaier, 2013). Potential service encounters are no longer restricted to, for example, the hotel

98   premise, but can occur through multiple touch points that lead to more personalized interactions

99   and valuable overall experiences (Neuhofer *et al*., 2015). Empowering customers to interact with

100   service providers ubiquitously in real-time, throughout their travel, presents a forward-looking

101   technique. It allows on-the-go travelers' contextual and latent needs—rather than spoken

102   needs—to be better captured (Lamsfus *et al*., 2014).

103   In the hospitality literature, previous studies have mainly focused on investigating

104   customers' adoption of mobile technologies to co-create value (Heidenreich and Handrich, 2015;

105   Morosan and DeFranco, 2016, Morosan, 2018; Sarmah *et al*., 2017). From an organizational

106   perspective, scholars have investigated how companies use mobile technologies to co-create

107   personalized customer experience (Neuhofer *et al*., 2015; Schmidt-Rauch and Schwabe, 2014)

108   and achieve higher values for themselves (Wu *et al*., 2018). Although these studies have

109   provided valuable insights from customer and organizational perspectives, they often focus on

110   the effects produced by the technology itself with limited consideration of the human

111   commitments and decision-making process behind it. Thus, based on the current body of

112   knowledge, it remains difficult to explain how these mobile services are shaped (i.e., their

113   structures and the components underlying these structures).

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2.3 Sociomateriality as a theoretical tool

Sociomateriality helps explain the assembly of technologies by separating the role of human and technology artifacts into parts (Leonardi, 2011). It views technologies as a combination of human practices and intrinsic technological features. The intrinsic features also refer to its materiality, which allows the same technology to be used by humans in different ways (Orlikowski, 2007). When humans intend to achieve certain goals, they approach technologies based on their perceived affordances (i.e. their possible uses in supporting those goals) (Majchrzak and Markus, 2013). In this sense, technology affordance is determined by the user who approaches the technology for a specific purpose. The resulting effects, therefore, are dependent upon users and specific contexts (Leonardi, 2011, 2012).

Sociomateriality helps us move beyond seeing technology as artifacts or tools and treat it as an effect shaped by the synthesis of human actions and the intrinsic features of technologies. It emphasizes the role of human intelligence on the impact of a technology, rather than seeing such impact as a result generated by the technology itself. Based on the importance of understanding the use of technology from a social and material perspective, the lens of sociomateriality is adopted as a tool to understand the imbrication between hoteliers' intentions and their use of mobile technologies to co-create value with customers.

Research on value co-creation through mobile technologies in tourism and hospitality is limited. As value co-creation stresses the importance of context (Chandler and Vargo, 2011), scholars have continuously called for more empirical studies to explore different forms of co-creation across contexts (Chathoth *et al*., 2016; Mathis *et al*., 2016; Sarmah *et al*., 2017). Furthermore, as previous studies often investigate value co-creation from customers' perspective,

137 this study explores how hoteliers leverage mobile technologies to involve customers in value co-

138 creation.

3.   Research design and methodology

140   As pragmatic social researchers, the authors of this study believe that research goals can

141 best be achieved by flexible research approaches (Ritchie and Lewis, 2003). The authors agree

142 with the argument of Ritchie and Lewis (2003) that reality is "itself diverse and multifaceted,"

143 and follow the ontological stance of "subtle realism" (p.19). It is believed that critical reflection

144 on and interpretation of respondents' descriptions provides a fuller understanding of the social

145 world. Based on the research question of this study, the most appropriate research paradigm is

146 interpretivism, which sees knowledge as generated based on humans' interpretations and

147 understanding of their "lived experiences" in the social world (Denzin and Lincoln, 2000).

148 Guided by the lens of S-D logic and sociomateriality, a qualitative research approach was

149 adopted to investigate hoteliers' considerations and expectations behind the design and provision

150 of mobile-based services.

151   Data were collected through semi-structured interviews with hotel managers (Table 1)

152 representing three of the largest international hotel chains in the world which provide renowned

153 digital services (Table 2). The participants were identified based on the relevance of their

154 positions and were selected through convenience sampling. They were informed about the

155 research objectives and interview questions prior to the interviews, to ensure rich data could be

156 obtained. The names of these focal companies are not revealed to protect the confidentiality of

157 participants. The interviews focused on the services provided through the companies' official

158 mobile apps, which are designed and developed by the hoteliers. A total of 13 hotel managers,

159 ranging from property to corporate level, were interviewed between November 2016 and April

160 2017. These professionals were in charge of different areas including sales and marketing, IT and

161 operations. The interviews were conducted through different means, including face-to-face,

162 telephone and Skype interviews. All interviews were recorded and transcribed for later use.

163 *** Please insert Table 1 here ***

164 *** Please insert Table 2 here ***

165 Data were stored and analyzed with the help of Nvivo 11, computer software for

166 qualitative data analysis. The data analysis approach follows the typical steps in handling

167 qualitative data—i.e., data immersion, coding, interpretation, and integration of codes and

168 categories for theory building (Savin-Baden and Major, 2013). The goal is to move up the

169 "abstraction ladder" from the development of descriptive to explanatory accounts (Ritchie and

170 Lewis, 2003). Specifically, this study's data analysis procedure follows narrative thematic

171 analysis (Creswell, 2013; Riessman, 2008) where the emerging themes construct the overall

172 writing structure. The reliability and validity of qualitative research lies in the depth and

173 rigorousness of the researchers' reflection on the data. Detailed coding frames are presented in

174 the following sections to clarify the underlying logic behind the construction of the "building

175 blocks," upon which the explanations are grounded from the data (Ritchie and Lewis, 2003).

176 Two coders worked separately on the transcripts applying the same codebook to reassure inter-

177 coder reliability. The coding comparison query in Nvivo 11 calculates Kappa coefficient to

178 measure the degree of agreement between coders. The resulting Kappa coefficients for the four

179 sets of codes (above 0.7) indicate a fair level of agreement between coders on the interpretation

180 of data (Krippendorff, 1987).

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4. Findings

4.1 Understanding mobile as a means of value co-creation

4.1.1 Hoteliers' perceived affordances and value propositions

Hotel managers focus on four major functions when discussing hotel mobile apps: room reservations, information, self-check-in/out, and service requests. Hoteliers design these functions in ways that involve customers in co-designing or co-developing their own experiences. The room reservation function not only enables basic actions but also personalized options through which customers can specify personal preferences such as room location and pillow type. The in-app information allows customers to receive the most updated generic (e.g., hotel and destination information) as well as personal (e.g., booking records) information. Furthermore, customers can receive personalized content from the hotel, such as promotions matching their interests. Additionally, the self-check-in/out and room access functions empower customers to manage the ways they prefer to complete tasks (e.g., self-service or human service). Lastly, using the service request functions, customers can personalize their stay experience by deciding the means of communication with hotels (e.g., face-to-face or instant messaging) and making "open-ended" personal requests.

Table 3 demonstrates the coding frame of hoteliers' perceived affordances and value propositions of their mobile-based services. For ease of understanding and explanation, the different types of value emerged from the interviews are categorized following the definitions developed by Sheth *et al*. (1991) and Sweeney and Soutar (2001). The definition of personalization value follows S-D logic interpretation, which suggests that personalization is achieved by satisfying customers' idiosyncratic needs and wants (Vargo and Lusch, 2004). Thus, the value of personalization is a unique form of consumption value that involves benefits beyond

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205 basic functional value (Chellappa and Sin, 2005; Ranjan and Read, 2016). Hoteliers aim to

206 deliver functional value by making customers' travel easier. Specifically, when customers can

207 interact with hotels and design experiential elements which will be recognized in their future

208 stays, hoteliers expect customers to perceive the value of personalization. For example, as stated

209 by informant #5:

210 *"Yes, through the booking they can indicate whether they want smoking or non-smoking*

211 *rooms, a high or low floor, king or queen beds, early arrival or late departure, arrival or*

212 *departure limo. Some people may be allergic to feather pillows, they may ask for form*

213 *pillows. These kinds of things they can request through the app. If he likes banana but not*

214 *apple, this is personalization."*

215 Additionally, customers are expected to perceive emotional value when they are delighted by a

216 more comfortable stay. Hotel managers indicate how customers were engaged and surprised

217 when their personal needs were well-addressed. Customers are also expected to perceive social

218 value by feeling privileged and recognized from these "members-only" services. Lastly, hoteliers

219 believe customers will perceive epistemic value from these innovative mobile services.

220 *** Please insert Table 3 here ***

221 *4.1.2 Hoteliers' core co-creation strategies*

222 Hoteliers' perceived technology affordances and value propositions infer two core

223 strategies that their collaborative activities with customers are based upon: *mass customer data*

224 *collection* and *one-to-one interaction with customers*. First, on a regular basis, hoteliers

225 systematically store, share, review, and analyze the data collected from customers at different

226 points throughout the travel journey (i.e., before, during and after trip). This allows hoteliers to

227 detect and anticipate customer needs and preferences so as to provide consistent, personalized

11

228   experiences on a continuous basis. This is particularly beneficial for hotel chain properties

229   among which customer information can be shared:

230   *"Since the app is actually linked to their membership accounts, we can track a lot of*

231   *things. For example, room preferences, or any other information filled out by the guests*

232   *in the app, all our properties around the world will know this…so guests would feel that*

233   *they have consistent experience not only in this property, but the entire brand or hotel*

234   *group. In result they have a much higher brand loyalty." (Informant #7)*

235   Several managers pointed out how the integration of customer information into their property

236   management software (PMS) helps avoid repeating mistakes. Hoteliers' use of customer data

237   goes beyond rigid memorization to new experiences creation. For example, informant #6 recalled

238   how a guest was "wowed" by a decorated room when he had only asked for flowers for a

239   marriage proposal. More importantly, hoteliers rely on such customer data for "finding

240   preferences" as exemplified by informant #10. That is, by obtaining a little piece of information

241   about a customer, hoteliers can go further to analyze the likes and dislikes of that customer to

242   craft a personalized stay experience:

243   *"Again, it's all about getting information. Having the right information will help you*

244   *personalize the stay for them. And personalize the stay means also looking at what the*

245   *needs are. If he's here for a business trip, personalizing the stay means to expedite the*

246   *check-in, not to give you all the details and bore you at the check-in counter."*

247   Hoteliers not only want data but also one-to-one personal interactions with customers,

248   enabled by being able to proactively reach customers through apps. Through service request

249   functions, and specifically instant messaging/texting, customers are empowered to communicate

250   open-endedly without being constrained time, space, and the scope of the matter of

251 communications. Hoteliers designed this service to prepare for travelers who might have sudden

252 needs especially when under unfamiliar environments. Offering such an open channel not only

253 unearths customer needs that hotels might not think of, but also opens the door to any potential

254 interactions between hotels and customers. Managers pointed out the importance of providing

255 prompt feedback and reaching mutual understanding to construct personal interactions with

256 customers:

257   *"Or guests would actually send a text or chat message that proactively says that, 'Hey, I*

258   *am coming, can I have this and this and this?' And this opens a door for the associates to*

259   *ask leading questions, so that they can proactively plan for this stay. We want that*

260   *information, we want that connection, and once we have that connection, we can*

261   *proactively say 'yes' or 'no' in a polite way; we honor their requests" (Informant #10).*

262   *** Please insert Table 4 here ***

263 **4.2 Supportive elements in service design**

264 *4.2.1   Hoteliers' proactive engagement*

265   The data analysis unveils certain facilitation efforts through which hoteliers engage

266 customers to participate in the exchange of information and personal interactions. First,

267 managers emphasize the exclusivity of these various mobile-based services. They believe the

268 range of exclusive benefits provided by the mobile-based services is the number-one reason that

269 attracts customers to use the apps. Second, hoteliers reinforce the app's "stickiness" as another

270 incentive for customers to interact with hotels. Hoteliers believe the mobile platform is where

271 customers want to be active and manage tasks in their daily lives. Therefore, hoteliers'

272 engagement strategy is to drive customer perceptions that "everything" can be done through a

273   single platform. For example, informant #10 explained that the goal is to create a "one-stop shop"

274   to connect with next-generation travelers:

275   "*We are trying to create everything in the app because we want the app to be 'sticky.'*

276   *Once you create the stickiness for the guest, you don't have to do much. The guest would*

277   *automatically go into the app to do everything" (Informant #10).*

278   *4.2.2   Hoteliers' resources contributed*

279   Managers stressed the higher level human resources required to facilitate mobile-based

280   value co-creation. Besides the need to spare a portion of manpower to handle customers'

281   information flow from the apps, the fact that customers' communication is no longer restricted in

282   terms of time, location, and even the scope of communication denotes the need for employees

283   who are intelligent, empowered, and well-trained. Hoteliers need determined, intuitive and

284   creative staff members to handle unpredictable interactions with customers. Especially when the

285   interaction is real-time (i.e., facilitated by instant messaging), the service representative needs to

286   be quick-witted and determined to provide responsive and appropriate solutions:

287   "*I think it all goes back to creativity. So the customers have changed to gen Y, the*

288   *workforce has also changed to gen Y, right? So then how do you use the creativity of the*

289   *generation to serve the new creative requests from the same group of customer? Number*

290   *two, more focus on creative solutions because people don't want to hear the word 'no' in*

291   *our industry. You can say 'no' in a very nice fashion by giving alternatives" (Informant*

292   *#9).*

293   The second type of resource focuses on the corporate level. Corporate culture is fostered

294   to embrace change and dynamics. It takes time for businesses to adapt and master the use of

295   mobile technologies to achieve their goals, which is a continuous learning process reliant on

296 monitoring customer reactions through measures such as customer satisfaction, usage rate, and

297 revenues. Since the apps are used across thousands of properties, individual properties rely on

298 corporate guidelines to ensure the delivery of quality and consistent customer service.

299 Compliance with privacy policy is particularly important when individual customer information

300 is involved. Furthermore, managers discussed how horizontal (operations, marketing, IT,

301 research and development) and vertical internal coordination (property-level and corporate-level)

302 support the smooth delivery of mobile-based services. Internal coordination is also critical to

303 determine if a new service is not only favored by customers but also employees:

304 *"So our staff can say no,' it's very clunky for me because I used to do this at three steps.*

305 *With this, the customers may gain from it, but from my end, it would create a lot more*

306 *work. So we have to make sure we find that balance where we provide a service to the*

307 *customers where they like it and they use it, but it also helps our staff for executing from*

308 *the back end"(Informant #10).*

309 The third type of resource is IT support. IT's role in monitoring app performance and

310 supporting an integrated database is particularly vital for providing mobile-based services.

311 Conducting regular IT testing helps hoteliers identify and repair any system defects. The

312 majority of managers pointed out the importance of an integrative system, across all individual

313 hotel properties, for successfully delivering consistent, personalized customer experiences. Some

314 managers highlighted their work-in-progress on such an integrative system, which would

315 strengthen their IT capability in the future:

316 *"But, really, the number one thing that I think is required to make this kind of capability*

317 *successful—and to do them well—is to have highly integrative systems across our hotels,*

318   *so that we can have a consistent platform across all of our hotels that our mobile app can*

319   *integrate with" (Informant #3).*

320   *4.2.3   Hoteliers' challenges and constraints*

321   When facing a larger inflow of customer information and interactions, hotels might not

322   always have sufficient resources to satisfy every customer. This is especially true when

323   customers ask for things out of the blue due to the convenience and "stickiness" of the apps. A

324   number of factors such as time, cost, customer status, and whether the request is attainable are

325   considered:

326   *"It is impossible for us to handle all requests or satisfy every single guest's special*

327   *preference. Of course the hotel is flexible, so we will see, for example, there are many*

328   *things we can analyze and consider. For example, how much the guests paid, what their*

329   *trip's purpose is, or if the hotel actually possesses any resources that can satisfy what*

330   *they want" (Informant #4).*

331   These open communications have enlarged the scope of customers' contextual needs,

332   which exacerbates the unpredictability and complexity of hotel-customer communications. Often,

333   hotels need to come up with alternatives for customers. This sometimes leads to conflicts and

334   complaints. As mentioned above, technological limitations pose another constraint for hotels to

335   share information among sister properties and provide consistent customer experiences. The third

336   challenge is the empowered customer. When things become relatively easier, customers start to

337   request more intensively and fastidiously, which imposes extra operational pressure:

338   *"Now many guests are spoiled, especially when these mobile apps provide so much*

339   *freedom for them to choose so many options…even though if they order 20 to 30 items,*

340   *we still need to do our best to satisfy their desire. So to me, one problem of the app is*

341   *there is no limit" (Informant #4).*

342   Lastly, managers also mentioned challenges and constraints related to investment risk;

343   legal issues involving anti-trust laws, copyright and privacy protection; relatively low autonomy

344   for individual properties to customize standardized apps; and relatively low customer awareness

345   and demand for new app functions.

346   *** Please insert Table 5 here ***

347   **4.3 The co-creation sphere for value to emerge**

348   This section integrates sections 4.1 and 4.2 to explain how value is expected to be created

349   through hoteliers' design of mobile-based services.

350   *4.3.1   Co-development of service patterns*

351   Figure 1 revisits the technology affordances of mobile-based services by separating them

352   into two groups according to the basis of co-creation in this study. The "functional" affordances

353   are more relevant to self-serving and one-way provision of information. The "interactional"

354   affordances normally require hotels' timely responses to be meaningful. Considering that the

355   definition of value co-creation stems from S-D logic, one may wonder how functional

356   affordances could be associated with co-creation when they involve customers simply serving

357   themselves. Linking these affordances with hoteliers' intention provides an answer. The ways

358   that data are collected and used reveal important hints to explain this form of co-creation. The

359   various mobile-based services are designed for some of the most essential service encounters in

360   hotels. With the unique materiality of mobile technology, hoteliers are able to collect useful

361   information at different important points and react appropriately upon receiving it. For example,

362   the reservation function is presented at the starting point of the journey; the self-check-in/out and

363   digital key functions replace traditional check-in; and service-request functions symbolize hotel

364   concierge and housekeeping.

365   *** Please insert Figure 1 here ***

366   Through various mobile-based services, hoteliers are able to identify the ways they

367   should serve a particular customer. For example, knowing that a particular customer always

368   needs extra pillows and bottles of water, hoteliers remember this and always prepare accordingly.

369   Hoteliers serve customers based on their behavioral patterns, to consistently provide personalized

370   experience unique to each individual. This is what they interpret as personalization of customer

371   experience:

372   *"Personalization means, if you are coming in and usually check in at 5:00, I am going to*

373   *prepare an amenity for you. I reach out to find out what your preferences are. I like to*

374   *send amenities, so I like to know what fruits you like to eat, what drinks, what beverages*

375   *you like. So if I have a preference that says you don't like alcohol, I need to make sure*

376   *your amenities don't have alcohol in them, and it has your favorite beverage. If you like*

377   *mangoes, can I make a canopy made of mangoes for you, so that's personalization,*

378   *instead of serving you a typical cheese and wine, because that's what I send everybody"*

379   *(Informant #10).*

380   Every customer's stay pattern is unique. By consistently collecting and acting upon

381   customers' information, hoteliers and customers co-create hotel stay patterns by "connecting the

382   dots" between the important points during a hotel stay in a systemic way. The co-development of

383   service patterns explains the rationale behind the "seamless experience" that managers described

384   as the biggest benefit apps bring to customers. The "dots connection," as a co-creation effort

385   between hotels and customers, leads to seamless customer experiences in both present and future

386   stays. The co-creation of service patterns is not only influential at the individual customer level

387   but also the aggregate level. Hoteliers rely on customers' aggregate behavioral patterns to adjust

388   their current practices and design future service.

389   *4.3.2   Improvisation of experiences*

390   The other group of affordances shown in Figure 1 is associated with interactions.

391   Customer interactions can happen in unexpected ways thanks to the open nature of the

392   communication channels (represented by the question mark in Figure 1). For example, managers

393   shared their experiences with customers requesting the darkest room in the hotel with a photo of

394   Elmo placed on the TV; a picture of Lionel Richie on the night stand of the bed; a certain

395   newspaper which was not available in the hotel. Through the open communication channels,

396   customers talk about different things from leaving their wallets to having a causal chat with a

397   service representative, who, most of the time, relies on common sense and intuition to interact

398   with customers.

399   The freestyle interaction represents another unique opportunity for value co-creation:

400   improvisation of experiences. The evidence in this study shows that such unique co-creation has

401   transformed hotel stay environments into improvisatory experiences where what could happen in

402   the next moment remains unpredictable and difficult to control. This explains why hotel

403   managers stressed the importance of well-trained and creative employees to prepare for these

404   interactions. When allowing customers to improvise, hoteliers are themselves improvising,

405   especially when they have limited resources or customer information on hand. As discussed in

406   the above examples, if a customer requests to stay in the quietest room, what else should be done

407   to show extra care? When customers ask for a specific service the hotel cannot provide, what

408   should be the alternative solution? Hoteliers improvise based on bits and pieces of customer

409 information, which is valuable for them and opens up interactions with customers. Hotels need

410 sensitivity and creativity to deal with this dynamic environment of improvised solutions and

411 customer experiences. The combination of hoteliers' unique role, the affordances of the hotel

412 mobile-based services, and ubiquitous travel needs have opened a new sphere for value co-

413 creation to happen.

414 **5.   Discussion and Conclusions**

415 *5.1 Conclusions*

416   This study explores how hoteliers leverage mobile technologies to innovate service

417 provisions through co-creating with customers. Adopting the lens of sociomateriality, this study

418 shows how mobile-based value co-creation is shaped through analyzing hoteliers' underlying

419 reasoning and expectations for the design of mobile-based services.

420   Figure 2 demonstrates the structure of hoteliers' mobile-based service design to co-create

421 value with customers. With the intent to deliver greater value for customers, hoteliers leverage

422 mobile technologies, which are portable, ubiquitous and can exchange information in real-time

423 (i.e., materiality). The combination of hotelier intent and technology materiality results in a

424 series of mobile-based services, which are built upon what hoteliers believe as the strategy to co-

425 create value: collecting big data from customers and interacting with individual customers.

426 Hoteliers also consider the elements needed to support their practices. As a result, the design of

427 mobile-based services—manifested in forms of four main functions—incorporates hoteliers'

428 goals and the ways they believe customers will use these services (i.e., perceived affordances for

429 customer co-creation activities). Hoteliers believe that, if customers can specify their personal

430 preferences, consume personalized content, maintain higher self-control, and communicate with

431 hotels anytime and anywhere, customers can perceive the value propositions (i.e., an overall

432   enhanced and personalized experience). This innovative service experience is designed for

433   customers to co-develop service patterns and improvise experiences with hoteliers.

434   *** Please insert Figure 2 here ***

435   Analyzing the structure of hoteliers' mobile-based service design provides a more

436   complete explanation on how value is expected to be co-created through mobile-based services

437   in a hotel context. It helps understand how hoteliers are able to differentiate from competitors

438   through co-creation with customers. Through the innovation facilitated by mobile-based services,

439   hoteliers are no longer merely service designers and executors. They have become *analysts*, *fast-*

440   *thinkers*, and *all-rounders*. First, based on existing information about a specific customer,

441   hoteliers analyze the appropriate elements that should compose this experience. At the aggregate

442   level, hoteliers also analyze customers' behavioral patterns to obtain guiding insights for future

443   direction and practices. Second, the fact that hoteliers have opened the door for customers to

444   "throw in" different types of information and messages has forced them to become fast-thinkers.

445   They have to be highly flexible and agile to react to unpredictable and potentially formidable

446   interactions with customers, especially when customers' desires cannot be satisfied. Third,

447   unique forms of mobile-based value co-creation have transformed hoteliers into all-rounders.

448   Interactions between hotels and customers are no longer restricted to traditional communications

449   such as making bookings or arranging transportation. Perhaps even hoteliers themselves cannot

450   accurately state how many extra roles they have taken on since the introduction of mobile

451   services. Hoteliers act as travel agent when customers seek help for trip planning; event

452   coordinator when customers come for special occasion; or even social worker when customers

453   simply want someone to talk with.

454   Consistent with prior research, hoteliers' mobile-based service design demonstrates how

455   experiences can be co-created in an "agile" manner, at numerous service encounters and in real-

456   time (Buhalis and Foerste, 2015; Buhalis and Law, 2008; Neuhofer *et al*., 2015). Designing a

457   service experience in which service patterns can be co-developed corresponds to prior emphasis

458   on companies' information collection capability and their use of such information (Buhalis and

459   Law, 2008; Neuhofer *et al*., 2015) as indispensable for customer experience personalization.

460   Designing a service experience in which customers can improvise their own experiences is

461   coherent with previous studies' conceptualization of mobile technologies as a catalyst of

462   personalized interactions (Buhalis and Foerste, 2015; Neuhofer *et al*., 2015). Designing a service

463   experience in which customers can openly express themselves addresses the "building blocks" of

464   value co-creation suggested by Prahalad and Ramaswamy (2004). They emphasize an open and

465   continuous dialog as essential to showing the willingness of service providers to empower

466   customers a bigger role in creating unique experiences.

467   *5.2 Theoretical implications*

468   This study makes three main contributions to extant literature. First, this study enriches

469   the stream of mobile-based value co-creation research. It supplements previous studies which

470   stress customer adoption and the antecedents/consequences of value co-creation by delineating

471   the mechanism of innovative service experience design. The findings enrich service suppliers'

472   perspective by anatomizing their value creation process through the lens of sociomateriality. The

473   core components underlying the service structure and how they link with each other are also

474   uncovered. Second, this study takes a different perspective to understand technology by

475   considering it as an effect resulting from the amalgamation of human intelligence and technology

476   materiality. This directs researchers' attention to consider the role of the service provider as the

22

477 starting point of the human-technology imbrication process which results in transformed roles

478 and innovative services. While external factors (e.g., customer intention to use technology) may

479 affect customer experience and behaviors, firms' amalgamation of resources (e.g., strategic

480 considerations, the design of the service itself) may also play a role. This study presents the

481 groundwork for future studies to continue explore how services with various underlying structure

482 may affect customer experience and behaviors. Third, as value co-creation is highly context

483 specific, this study defines the new roles of hoteliers, the unique forms of co-creation and their

484 underlying structures which are distinct from those identified in previous studies.

485 *5.3 Practical implications*

486   Consolidating hoteliers' thoughts and practices, this study encapsulates the general

487 process of mobile-based value co-creation, which may seem to be an abstract and obscure term

488 for industry practitioners. The concrete presentation of the mobile-based service designs calls

489 hoteliers' attention to two innovative ways through which value can be co-created (i.e., co-

490 development of service patterns and improvisation of experiences). By better understanding the

491 essence of mobile-based value co-creation, practitioners have clearer directions to plan their

492 resources and develop future strategies. Additionally, the empirical evidence collected from best-

493 practice companies provide useful references regarding how hotel companies can innovate and

494 differentiate themselves through pursuing value co-creation using mobile technologies. The rich

495 insights, from co-creation strategies and necessary resources to potential challenges and

496 constraints, explain in detail how hoteliers can better prepare to serve contemporary customers in

497 the digital era. Practitioners can reflect on their current capabilities and assess their readiness for

498 implementing the service innovation discussed in this study. Especially, they should carefully

499   assess whether sufficient resources are available to confront the potential challenges and

500   uncertainties.

501   *5.4 Limitations and future research*

502   As the aim of this study is to understand the underlying structure of hoteliers' provision

503   of mobile-based services for value co-creation, it is not designed for establishing generalized

504   relationships and measurements. Future studies may further test the variables or the relationships

505   unearthed from the findings by using quantitative research methods. While this study only

506   focuses on the hoteliers' perspective, future studies can incorporate customers' experiences and

507   reactions to the specific service designs unearthed in this study. It will also be interesting to

508   measure the actual hotel improvements as a result of the implementation of mobile-based

509   services designed for co-creating value with customers. As new technologies continue to emerge,

510   future research should continue to explore the process and structure of the co-creation practices

511   facilitated by different types of technologies.

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