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Completed Research

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Abstract

This paper exposes the contingent implications of Augmented Reality (AR) on customer experiences in retail. We investigate how an AR application commissioned by the Danish designer house Louis Poulsen affects the customer experience in retail. Our study shows that AR provides possibilities to engineer the conditions influencing the customer experiences as well as to redistribute control of touchpoints in the customer journey. Consumer's perception of the experience is exposed to a widening of the consumer-to-consumer influence, changing demographics, new event sequences and less manageable service recovery. Yet, these effects are contingent causalities where the effective harnessing of AR's experience-enabling capacities require deep transformation of the existing structures by which customer experiences are formed. We therefore advance the argument that broad diffusion of AR in the retail setting will only happen in relation to a reformation of the retail industry, to which AR can contribute but not single-handedly motivate.

Keywords

Augmented reality, Virtual reality, Customer experience, Retail, Case study.

Introduction

The retail industry is subject to a dramatic shift in the logic of competition; from a traditional transaction focus on 'buy low, sell high and optimize everything in between' to the creation of complete customer experiences (Jain et al. 2017; Sorescu et al. 2011). In their efforts to create superior customer experiences, retailers embrace digitization "*to engage a technologically-savvy and selective customer*" (Glidden 2019). While the use of digital technology to enable retail is by no means new, the more recent wave of technological adoption addresses the frontend of retail, the customer-facing activities, with an ambition to enhance the customer experience rather than cost-optimize transactions (Balaji and Roy 2017; Javornik 2016). Specifically, one digital technology that is expected to have far reaching transformative impact on customer experiences is Augmented Reality (AR). In the retail industry, the transformative effects of ARs will "*offer retailers the opportunity to transform how people shop*" (Cullen 2016), but also challenge retailers to develop the radically different capabilities to seize opportunities (Philips 2017).

AR and the related concepts of Virtual Reality (VR) that together forms a technological cluster of Immersive Virtual Environments (IVE's) (Hofma et al. 2018), are subjects to a growing interdisciplinary academic research. This literature has investigated: (a) the components that enable IVE's from a technological engineering standpoint, (b) user's readiness to adopt IVE-related technologies, and (c) the transformative impact of AR in a few specific contexts; predominantly gaming, healthcare and education (Hofma et al. 2018). In the context of retail, the emerging research has followed two distinct strands. With

basis in the technology acceptance model (TAM) (Davis 1989), the first stream has investigated customers' willingly to adopt and use AR technologies (Huang and Liao 2015; Spreer and Kallweit 2014). The second stream addresses AR's impact on retail. This impact has been framed by AR's capacity for telepresence explaining how AR overcome the geographical distance in online retailing (Javornik 2016; Schwartz 2011) and how the novelty of AR contributes to brand recognition.

We add to the emerging literature on AR's impact on retail by taking our starting point in the increased focus on customer experience as the basis for competition. A customer experience-perspective (Jain et al. 2017; Kranzbühler et al. 2018) emphasize the hedonic values of AR and the ability to contribute to the overall experience. Taking a fundamentally explorative stance, the research question guiding this paper is: *How does AR impact the customer experience in a retail context?*

We attend to this question through an interpretative case study, based on an integrative theoretical framework for customer experience (Kranzbühler et al. 2018). Empirically, the paper draws on a case study that pivots around Louis Poulsen (LP), a Danish furniture designer house. We specifically investigate how LP's AR app, developed for smartphone use and with the functionality of displaying LP's designer lamps in its intended use context, is impacting the customer experience. The analysis shows a possibility of impact on both how customer experiences are created by retailers and perceived by consumers. However, the analysis also shows that these effects are mostly contingent on structural transformations on the production of retail experiences. In consequence, we propose that broad diffusion of AR in the retail setting will happen in relation to a reformation of the retail industry, that also draws on parallel developments in complementary technologies.

Theoretical framework

We define AR as a type of IVE where the user remains close to the real world and only enhances the real-world situation with a digitally induced experience. In contrast to VR's complete immersion, AR enhances a user's interaction with reality through a digital environment (Steuer 1992).

Augmented reality in retail

For a general overview of AR research, see for example Hofma et al. (2018). AR research in the context of retail is focusing on two forming models. One explaining how AR comes into *use* and the other explaining the *impact* of AR in the retail context. Within the use model, TAM (Davis 1989) consists the basis for most research. In retail, research has validated that general applicability of TAM to predict the use of AR in this specific context (Huang and Liao 2015; Spreer and Kallweit 2014). In addition, work within the use model has also moved from generic statements in TAM to substantive models explaining what usefulness and ease of use actually means within the retail (Schwartz 2011).

The second model is formed through research on how the use of AR impact purchases. Predominantly, research has explored the impact on purchase through for the utility value that AR can generate in the purchase process. One such way is through AR's ability for *telepresence* as the mediating variable between AR and increased purchase intent (Schwartz 2011). An impediment online shopping is the distance between customers and the physical product (Schwartz 2011). A consumer may have interest in purchasing a product, but the inability to see it firsthand can leave them with doubts. AR is investigated as a technology that may help shoppers overcoming the spatial disconnect (Schwartz 2011). AR's ability to provide additional information about a product at hand, the purchase conversion ratio increases (Chen et al. 2002a). The impact that the ability of telepresence have is explained through the reduction of perceived risks in online retail. AR can reduce Time Risk, Performance Risk, Psychological Risk, Financial Risk and Social Risk in online retail (Alimamy et al. 2017).

A customer experience perspective on AR in retail

We propose customer experience as a construct to explain the impact of AR on purchase in retail. Customer experience is the *aggregate and cumulative customer perception created during learning about, acquiring, using, maintaining and disposing of a product or service* (Carbone and Haeckel 1994; Jain et al. 2017). An experience occurs when a company intentionally engages individual customers in a way that creates a memorable event. The "*organization needs to create a cohesive, authentic and*

sensory-stimulating total customer experience that resonates, pleases and differentiates organization from the competition to build an emotional connection with customers" (Berry and Carbone 2007). The interaction between the organization making an offer and the intended consumer of that offering is the central tenant of customer experience (Jain et al. 2017). Experiences occur as a result of encountering, which provide emotional, cognitive, behavioral and relational values (Schmitt 1999).

We use a literature review (Kranzbühler et al. 2018) on customer experience and the integrative customer experience framework that was the result of this review to systematically investigate the impact of AR in the context of retail. This framework organizes the customer experiences literature according to the organizational and consumer level of analysis, and whether the works take a static (structural) or dynamic (process) view on customer experience (Table 1).

Focus area	Key construct	Indicative references
Organizational - static	Contextual conditions	(Mathwick et al. 2001; Surprenant and Solomon 1987)
	Employee-customer interactions	(Bitner 1992; Wilder et al. 2014)
Organizational - dynamic	Customer journeys	(Patrício et al. 2008; Wilder et al. 2014)
	Co-created experiences	(Akaka and Vargo 2015; Chandler and Lusch 2015)
Consumer - static	Consumer-consumer influence	(Chen et al. 2009; Kim and Lee 2012)
	Personal characteristics	(Holbrook and Hirschman 1982)
Consumer - dynamic	Sequential effects	(Ross and Simonson 1991; Verhoef et al. 2009)
	Negative impressions	(Sivakumar et al. 2014; Tax et al. 1998)

Table 1. Customer experience framework

Customer experience research on the *organizational level* of analysis seeks to explain how organizations create and manage customer experiences. The *static view* identifies the factors that contributes to an experience, including environmental conditions, such as colors, sound, physical distance, inventory levels and other customers in the store. The static view also deals with the design of the service. While some studies emphasize the importance of personalizing every touchpoint (Mathwick et al. 2001; Surprenant and Solomon 1987), others identify employee–customer interactions as a means for this personalization. Employees ability to empathizing and anticipating customer needs is seen as one key to adapting a service experience (Bitner et al., 1994, Wilder et al., 2014).

The *dynamic view* of organization's creation of customer experiences is based in the production of customer journeys. This involves the consideration across multiple channels within the same company, both offline and online (Patrício et al. 2008; Wilder et al. 2014). Blueprinting the customer journey has become a technique to visualize the service. In the work of blueprinting customer journeys, scholars propose designing a 'dramatic' series of events with certain peak moments (Stuart and Tax 2004). Adding to the dynamic view of organizational creation of customer experiences, a stream of literature argues that customer experiences are produced within a broader network of actors that create value for the customer. With the terms 'value constellation' (Patrício et al. 2008) and 'service ecosystem' (Chandler and Lusch 2015), explanations have moved away from the notion of purely dyadic firm–customer relationships to focus on the coordination of touchpoints distributed among different actors.

Taking the *consumer as the level* of analysis, the *static view* has focused the factors that determines how the consumer perceives and values the experience. These defining factors includes other customers in the store. Other customers have an impact through the mere presence. High customer density discomfort some consumers' experience, termed the 'sardine effect' (Chen et al. 2009). Present customers also effect an experience by their age, gender and appearance (Kim and Lee 2012). The second group of factors influencing the consumer's perception of the experience are the private factors, including monetary and time resources, task definition, involvement, the nature of the search activity and individual psychographics (Holbrook and Hirschman 1982). The goal of a retail store visit (e.g. urgent purchase, large quantities, looking for a gift) significantly influences store choice and the salience of store attributes.

The *dynamic view* of how consumers perceive customer experiences focus on the sequential effects across a series of touch-points between the customer and a firm. Research have located certain key indicators in

the perception formation, including the first touchpoint, final touchpoint extreme performance and average performance (Ross and Simonson 1991; Verhoef et al. 2009). A strand in the dynamic view has honed in on the negative impressions in a customer experience. Because consumers constantly adjust their reference or expectation levels, they give a better assessment of a dynamic customer experience when delight follows failure, rather than the other way round (Sivakumar et al. 2014). Finally, time perceptions, in particular the perception of waiting time, is an aspect of how consumer's value customer experiences. The perception of waiting time, for example through standing in line, is generally negative for the experience (Lim et al. 2015). In particular, if the waiting time can be attributed to the providers lack of ability. A long queue is expected before Christmas, but not a malfunctioning payment system. The negative effects of waiting are mitigated when the delay is seen as beyond the service provider's control, and when this firm attempts to fill the waiting time for customers.

As a vehicle for the interaction between the retailer and the consumer, AR holds the capacity to influence the customer experience. AR embodies the organizational aspiration to create positive experience that set the firm apart from competition. AR also forms one of the touchpoints in the customer journey that forms the consumers perception of the experience. To further the understanding about these relationships, we conducted an in-depth case study of LP and its introduction of an AR app showcasing its designer lamps in the intended use context.

Method

This article is based on an interpretative case study (Sarker et al. 2018; Walsham 1995) with the ambition to produce a 'consultable record' (Walsham, 1995) of how AR relates to customer experiences in retail. To achieve this, we searched for a case to study that met three predefined criteria. First, the AR solution had to be introduced into a retail setting framed by competition through customer experiences. Second, the AR solution needed to be mature enough for commercial use, to avoid technical glitches to influence perceptions. Third, to cover both the organizational and consumer perspectives on the customer experience, we needed access to both sides of the customer experience production. We found such a case in LP and its AR app for visualizing lamps in the home environment, allowing us to create a rich and contextualized understanding of the introduction of the AR app. To adequately cover organizational and consumer sides, we conducted 15 interviews with representatives from LP, three retailers, the firm behind the technical development and nine customers. The interviews were complemented with document studies and observations (documented through notes) with the aim of providing contextual and technological understanding, and to triangulate findings from interviews.

The interviews were conversational to their nature, but with a charter to cover the themes in the customer experiences framework. Interviews were recorded and transcribed, with the exception of the technical development interview that was documented through notes. Data analysis was "interpretive" in nature. To provide a broad framing for our interpretative inquiry we used the theoretical customer experience framework (Table 1) "*as a lens to interpret or unfold*" (Sarker et al., 2018, p. 759) the case analyzed. This is consistent with Walsham (1995), who recommends "*the use of theory in the earlier stages of interpretive cases studies …*". While the use of an overarching theoretical framing could constrain the potential discoveries made during the empirical analysis, our motivation for this approach would be the deliberate ambition to re-frame the current analysis of AR from a transactional view of retail, to an exploration of the novel phenomenon within an explanatory logic of additional relevance for the retail industry. In the analysis, we took several measures to "*preserve a considerable degree of openness to the field data, and a willingness to modify initial assumptions and theories* " (Walsham, 1995, p. 76). Three researchers worked with the customer experience framework (Table 1) as top categories to organize the data. Each of the known aspects about how customer experiences are produced and consumed became coding categories that were applied to the material. This was done to organize the data around the different ways that AR could impact each of the themes of the customer experience production. Contextual elements of relevance was captured through inductively generated coding categories.

Case interpretation

The Danish lighting manufacturer LP was founded in 1874 in Copenhagen Denmark and today employs approximately 270 people globally. LP positions themselves as a premium brand with high price and high

value within the market. LP's customer based consist a demographic group that at some point in life is willing to pay USD 1000 for a dining table lamp. Contributing positively to the customer experiences is a stated objective of the AR app (Figure 2). The app uses a markerless method for overlaying a lamp on a smartphone screen (AR Developer). The 3D model of the lamp is pre-loaded, but the room is dynamically captured by the smartphone's camera. Customers can see what a specific lamp would look like at a specific place. Essentially the AR app allows customers to walk through their home, experiencing the design at close range and see how it look in their own environment.
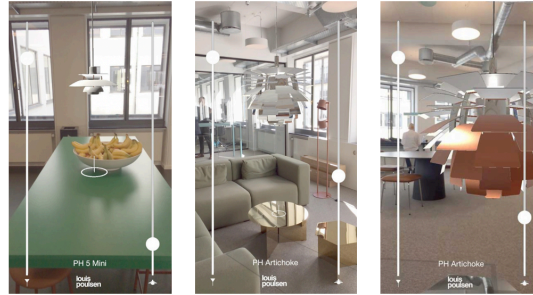

Figure 1.   The LP AR app

Organizational level impact

The static and dynamic impact of the AR app on the organizations' creation of customer experiences (Kranzbühler et al. 2018) is summarized in Table 2. The relevant static influences that organizations can address includes the contextual conditions and the employee-customer interactions. Concerning the contextual conditions (Mathwick et al. 2001; Surprenant and Solomon 1987), LP seeks to control the physical retail experience in a shop by an its shops-strategy. LP is too small to have its own retailer network, but the in-shops carries the lamp's aesthetic design. It is, however, beyond LP's reach to control for environmental conditions such as sound, smell, inventory levels and social stimuli. LP has furthermore limited possibility to control the employee-customer interaction.

Focus area	Key construct	Impact	Indicative empirical evidence
Org. - static	Contextual conditions	Increased control over contextual conditions/Customer empowerment of contextual conditions.	*"We can see that the pace in product launches and patience to getting access to products and complications of moving physical products is a struggle for our sales consultants, for our logistics and manufacturing" […]* (LP Brand Communications Manager).
	Employee-customer interactions	Retailer employee interactions replaced by digital interactions.	*"So that if we can help the decision process at an earlier stage where we are only dealing with virtual products it would be an immense help for both the selling process."* (LP Visual Concept and Merchandising Manager).
Org. - dynamic	Customer journeys	Addition of touchpoints, uncoupling of touchpoints.	*"This is yet another feature or tool or possibility that makes online more relevant and will be yet another asset to move spending in that direction"* (LP Visual Concept and Merchandising Manager).
	Co-created experiences	Redistributes the touchpoints from one actor to another.	*"Sometimes you can go in and ask for a product and they try to sell you something else."* (Customer 6).
Consumer - static	Consumer-consumer	Introduces new channels for customer-customer	*"…[I]t would probably through blogs, social media and through influencers."* (Customer 1)

	influence	influence.	
	Personal characteristics	Personalizing of experience and potentially new customer demographics.	*"I definitely think it is personal because you can see it in relation to your own stuff rather than in a store"* *(Customer 7).*
Consumer - dynamic	Sequential effects	Alters and makes less predictable the sequence of events.	*"I think the possibility of being allowed to do that would make me more likely to buy it and I think I would be more pleased with the product"* (Customer 7).
	Negative impressions	Possibility of new experience low's without retailer or producer awareness.	*"Of course, they must be easy to get in touch with. If it suddenly gets too cumbersome to purchase something, then it can actually decline, for me at least"* (Customer 2).
	Waiting time	New possibilities to entertain customer during a wait.	*"Then I can suddenly sit and play around with their products and it gives me engagement combined with the fact that it is in my own home."* (Customer 4).

Table 2. Overview of key findings

The AR app has the potential to increase LP's control over the factors influencing the customer experience. Inventory management is one such parameter that is specifically targeted. By introducing AR earlier in the customer decision-making process where the products are still at a virtual phase it would ease the business processes. More generally, the AR app allows LP to take charge of some of the contextual conditions and relocate the control of others to the customer itself. The employee-customer interaction (Bitner 1992; Wilder et al. 2014) is partially replaced by an AR-customer interaction, controlled by LP. The replacement is only partial, as the AR app is not fully integrated with online sales channels and customer service. From a customer experience perspective, this would have given LP more possibilities to engineer the experience.

Through the AR app, customers are given control over some contextual conditions. They can study the lamp at home, in charge of lightning and sound. They can also influence the social experience. They can show the lamp to friends and family to get approval. Yet, since the app is not integrated with social media the social stimuli requires physical co-location. The app being decoupled from social media and online stores also means that LP is not seizing an opportunity to engineer the social experience for example by pointing to customers or customer-relevant influencers that have praised the design of the lamps.

The important dynamic considerations include coherent customers journeys (Patrício et al. 2008; Wilder et al. 2014) and controlling the experience across retail partners (Akaka and Vargo 2015; Chandler and Lusch 2015). With the AR app, LP has ambitions that extend beyond improvement of an isolated touchpoint, but to create a new touchpoint that can change the customer journey. The aim is to move the first interaction with LP to earlier in the customer decision-making process. LP also see the potential of extending the customer journeys with more touchpoints, as the AR app encourage the customer that have seen a LP lamp in a store to virtually take the product with them and try it out at home. LP identified AR as an opportunity to move more customer media spending and their marketing-mix towards online.

Reaching customers at an earlier stage of the decision-making process is also identified as an opportunity for LP to bring the company closer to their customers. This is, however, also putting light to the fact that LP's customer experience is co-created together with retailers. The consequences for the retailers are that customers more clearly comes into the store looking for the LP lamp specifically, which moves some of the power in the relation between LP and the retailer in favor of LP. More importantly, the AR app may also move the sales closure from the retailer to LP's online store. Therefore, there is currently only negative implications for the retailer for pointing the customer to the app.

Consumer level impact

The consumer-level perspective of customer experiences focus' on consumer's perception of customer experiences (Kranzbühler et al. 2018). Table 3 summarizes the findings on consumer perceptions of

customer experiences. The static factors influencing the consumer's perception includes other consumers being present at the time of experience (Chen et al. 2009; Kim and Lee 2012). That customers starts to use the app opens up for the possibility of receiving input from other virtual shopper on social media. The consumer-level side of this possibility refers to the uncontrollable influence that other customer can have through their reviews and social media posts. The digital world brings dramatically more possibilities of these interactions and influence. One customer's poor experience that traditionally would stay in the store can now after being documented online reach millions of potential consumers in a blink. LP's prospective customer's recognized this possibility, declaring that the AR app would increase the impressions from other customers. Both LP and retailers recognize that they also catalyze the empowerment of consumers to influence each other in this way.

The personal characteristics (Holbrook and Hirschman 1982) that links to the perception of LP's AR-mediated customer experience includes the demographics of the consumer group. LP expects that the AR app will change the demographics of the customer base, towards a younger clientele that shares the interest for interior design, but for whom the price of the lamp makes it a sizeable investment. For this group, the AR app's quality to visualize the product at home reduced the risk involved in the purchase. Allowing for a more personalized consumption process, LP's AR app gives another opportunity target a specific subgroup for which the purchase of an LP lamp is a very substantial investment. Because there is limited possibility to try out a lamp at home, fitted over the dining table the app is considered to deliver a more personal experience: "*And since the lamps are quite expensive I think it would be a good idea if you were able to see them at home beforehand.*" (Customer 2) But it is important to stress that this is a quality that suits some consumers, not everyone*: "For me it would work better to go down to the store and be able to physically see the lamp in front of me".* (Customer 8)

The dynamic side of the consumer perspective focuses on key events in the customer journey and how they implicate the experience (Ross and Simonson 1991; Verhoef et al. 2009). The AR app introduces new events that may stand out as extreme events. First, being able to visualize the lamp at home is seen as possible high that can determine the whole experience: "*Yes I think so. Again, it enables one to go and fall in love with a lamp when you have the opportunity to see it at home*" (Customer 3). A brand with AR app has an advantage, their competitors do not have: "*If you have a similar company with the same expensive lamps and comparing them against Louis Poulsen, […] [t]he decision-making process would be far easier by Louis Poulsen than the other company … *" (Customer 6)

Conversely, the AR app also has the potential to create events that stands out as negative experiences (Sivakumar et al. 2014; Tax et al. 1998). One issue expressed was an insecurity whether the lamp was correctly represented in the AR app: "The *lamp in itself is realistic but from the perspective I'm viewing it from, is it then the right size compared to the distance I've got the table. That I don't know.*" (Customer 7). Another issue was the lack of rich information about where to buy the lamp, inventory, makes and materials, etc.: "*Maybe I did not discover all the features but it did not seem as if there was that much information.*" (Customer 4).

Another way the AR app transforms the events of the customer experience, is by moving the interaction with the lamp spatially from the premises of the retailer to the home of the consumer. At the store, staff would be able to counter negative experiences. When using the app, LP or the retailer are not aware of any negative experiences that may happen. Because there are limited channels to connect to LP when using the app, consumers expressed that they may simply walk away from the product.

Discussion and Conclusions

In this paper, we asked *How does AR impact the customer experience in a retail context?* Answering to the question we introduced an integrative theoretical framework for customer experiences (Kranzbühler et al. 2018) and applied it to produce a 'consultable record' (Walsham, 1995) of the transformative effects of AR in the retail context. Taking an organizational perspective, the analysis showed that the AR app allows LP to engineer the structural elements of the experience: the contextual conditions of the experience (Mathwick et al. 2001; Surprenant and Solomon 1987) and the employee-consumer interaction (Bitner 1992; Wilder et al. 2014). The app also alters the customer journey (Patrício et al. 2008; Wilder et al. 2014), by introducing new touch points between LP and the customer, challenging the prevailing process of co-producing experiences with the retailers. Taking a consumer perspective, the

analysis showed that the AR app opens up radically new routes for customer-customer interactions, typically through social media, outside the control of LP and the retailer. The app may also change the demographics and the personal characteristics (Holbrook and Hirschman 1982) of LP's customers. Finally, in relation to the key events determining the perception of the customer experience (Ross and Simonson 1991; Verhoef et al. 2009), the AR app holds the potential to both create an experience high when delivering on its promise, and at the same time can form an experience low when not living up to the high hopes of prospective customers. Importantly, because these negative experiences are formed without awareness of them from neither LP or the retailer, there is very little room for service recovery.

With respect to the AR literature, what is novel in this paper is the extension of the transformative impact of AR into a sparsely investigated context. This allows us to produce unique insights about the retail industry as a substantive context and learn new insights about the nature of AR that are emphasized in this context. As identified by Hofma et al. (2018), related research has investigated the transformative impact of AR in a few specific contexts; predominantly gaming, healthcare and education (Hofma et al. 2018). Contrasting retail with these industries, we see some similarities and some differences in the impact that AR has. Clearly, the focus on AR to produce experiences that are pleasant and fun is an important aspect in almost all contexts with voluntarily use. The exceptions would be healthcare and other areas with highly professional use, where usability is still and issue but the requirements would be different. Thus, positioning the retail context on a continuum where the end points are entertainment and utility, retail would position somewhere in between the two extremes.

What seems to be unique to the retail context in terms of impact, is how the effective exploitation of the AR technology is related to structural changes to the retail industry. For example, the new customer touchpoints warranted by AR can potentially redistribute control of customer interactions, both between existing actors but also by empowering the consumer to actively form the personalized experience. AR therefore asks new questions to retailers for how to design customer experiences for self-empowered customers that order lamps on their terms, rather than being offered lamps by an educated sales force. Critically, however, these effects of AR are contingent to their nature. As demonstrated by LP's AR app, introducing an AR app as a stand-alone technology without introducing related adaptation to the retail structure, only activates a small subset of the full capacities of the AR artefact. In other words, AR would be one driver for a redistribution of power in the retail industry, but seemingly not by its own be able to substantiate this redistribution. This is an important finding to understand that the implications of AR in that these technologies introduced now would have capacities to interact with the retail industry that will remain inactivated until the right conditions emerges (c.f. Autio et al. 2018). The finding of inactivated capacities in AR that are contingent on industry structure transformation is as far as the author knows a novel finding within the AR literature.

Another finding in this research is that AR applications cannot be seen as stand-alone technologies. While the AR app investigated here is exactly a stand-alone technology, the customers immediately attempt to connect it to their social media sites, see the potential of enabling direct sales, expect direct interaction with LP staff through the app, ask for channeling of inventory data and store availability, and expect automatically generated advice about how the lamp fits relative to other elements in the home. Clearly this indicates the need for future research to investigate the critical dependencies between AR applications and other digital components in different contexts, including retail.

More broadly, this research provides insights or relevance to understand a 'second wave' of digital technologies being introduced in retail, where digital technology is expanding the domain covered from primarily back-office functions to the customer-facing activities (Balaji and Roy 2017). Beyond the simple conversion of physical commerce to online ditto, retail is experiencing a more profound change in the convergence of physical and digital to omni-channel retailing and customer experiences. Linking AR to the customer experience manifest how these new customer-facing digital technologies have dramatic impact on how customer experiences are produced and perceived.

The findings in this paper has several important implications for practitioners. Critically, any actor that wants to introduce an AR solution into the retail industry has to embrace the technological and social contingencies of the AR technology. First, the technological contingencies relate to how well the technology integrates with other component technologies, such as social media and retailers' e-commerce technologies. Many of the potential effects captured in the analysis are contingent on the integration with such technologies. Second, AR solutions are socially contingent in that the potential effects only become

effective if followed by matching structural changes to the retail setting. For the sake of AR alone, actors of the industry will not change their relations and positions. For practitioners, the challenge is to find a context in which AR is one of several drivers to enable a radically different way of doing retail. For example, Nike has an app that combines artificial intelligence, machine learning and AR to measure the feet of customers and to visualize shoes on the customers feet. Our findings speak to that managers need to pursue these multi-technological combinations to warrant structurally different ways of organizing retail to fully leverage the capacities of AR to impact the customer experience.

In this work, we have used one specific AR app with some defining features as the vehicle to investigate the impact of AR on customer experiences in retail. One such feature is, that its developed as a stand-alone technology and not integrated with other digital technologies. Therefore, in this research we can see that this characteristics matters, but we cannot further investigate the effect that an integrated solution would have. Also, for future research, is to investigate if other forms of AR may impact the customer experience in different ways. For example, some of the most dramatic effects of this AR technology is that it moves the try-out touchpoint from the retailer to the home of the customer. Smart mirrors or AR glasses may not have this effect. However, one can expect that these technologies may have other effects that are not visible on this single case study that has focused on an AR app.

References

 Akaka, M. A., and Vargo, S. L. J. J. o. S. M. 2015. "Extending the Context of Service: From Encounters to Ecosystems," (29:6/7), pp. 453-462.

Aldredge, A., and Harris, A. L. 1999. "Implementing It-Based Systems: Lessons from the Retail Industry," *Journal of Computer Information Systems* (39:2), pp. 54-58.

Alimamy, S., Deans, K. R., and Gnoth, J. 2017. "Augmented Reality: Uses and Future Considerations in Marketing," in *Leadership, Innovation and Entrepreneurship as Driving Forces of the Global Economy*. Springer, pp. 705-712.

Autio, E., Nambisan, S., Thomas, L. D., Wright, M. 2018. "Digital Affordances, Spatial Affordances, and the Genesis of Entrepreneurial Ecosystems," *Strategic Entrepreneurship Journal* (12:1), pp. 72-95.

Balaji, M., and Roy, S. K. 2017. "Value Co-Creation with Internet of Things Technology in the Retail Industry," *Journal of Marketing Management* (33:1-2), pp. 7-31.

Berry, L. L., and Carbone, L. P. 2007. "Build Loyalty through Experience Management," *Quality progress* (40:9), p. 26.

Bitner, M. J. 1992. "Servicescapes: The Impact of Physical Surroundings on Customers and Employees," *Journal of marketing* (56:2), pp. 57-71.

Carbone, L. P., and Haeckel, S. H. 1994. "Engineering Customer Experiences," *Marketing management* (3:3), pp. 8-19.

Chandler, J. D., and Lusch, R. F. 2015. "Service Systems: A Broadened Framework and Research Agenda on Value Propositions, Engagement, and Service Experience," *Journal of Service Research* (18:1), pp. 6-22.

Chen, L.-d., Gillenson, M. L., and Sherrell, D. 2002a. "Enticing Online Consumers: An Extended Technology Acceptance Perspective," *Information & Management* (39:8), pp. 705-719.

Chen, Q., Clifford, S. J., and Wells, W. D. 2002b. "Attitude toward the Site Ii: New Information," *Journal of Advertising Research* (42:2), pp. 33-45.

Chen, R. R., Gerstner, E., and Yang, Y. 2009. "Research Note—Should Captive Sardines Be Compensated? Serving Customers in a Confined Zone," *Marketing Science* (28:3), pp. 599-608.

Cullen, P. 2016. "Top Technology Trends," in: *InvestingGlobal*.

Davis, F. 1989. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quaterly*), pp. 319-340.

Eckman, M., Damhorst, M. L., and Kadolph, S. 1990. "Toward a Model of the in-Store Purchase Decision Process: Consumer Use of Criteria for Evaluating Women's Apparel," (8:2), pp. 13-22.

Gabisch, J. A., and Gwebu, K. L. 2011. "Impact of Virtual Brand Experience on Purchase Intentions: The Role of Multichannel Congruence," *Journal of Electronic Commerce Research* (12:4).

Glidden, R. 2019. "Digital Transformation in Retail: Why It Is So Important Now!," Hitachi Solutions.

Haenlein, M., and Kaplan, A. 2009. "Flagship Brand Stores within Virtual Worlds: The Impact of Virtual Store Exposure on Real-Life Attitude toward the Brand and Purchase Intent," *Recherche et Applications en Marketing* (24:3), pp. 57-79.

Hofma, C. C., Henningsson, S., and Vaidyanathan, N. 2018. "Immersive Virtual Environments in Information Systems Research: A Review of Objects and Approaches," *Academy of Management Proceedings*: Academy of Management Briarcliff Manor, NY 10510, p. 13932.

Holbrook, M. B., and Hirschman, E. C. 1982. "The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun," *Journal of consumer research* (9:2), pp. 132-140.

Huang, T.-L., and Liao, S. 2015. "A Model of Acceptance of Augmented-Reality Interactive Technology" *Electronic Commerce Research* (15:2), pp. 269-295.

Jain, R., Aagja, J., and Bagdare, S. 2017. "Customer Experience–a Review and Research Agenda," *Journal of Service Theory and Practice* (27:3), pp. 642-662.

Javornik, A. 2016. "Augmented Reality: Research Agenda for Studying the Impact of Its Media Characteristics on Consumer Behaviour," *Journal of Retailing Consumer Services* (30), pp. 252-261.

Kim, J., and Forsythe, S. 2008. "Adoption of Virtual Try-on Technology for Online Apparel Shopping," *Journal of Interactive Marketing* (22:2), pp. 45-59.

Kim, N., and Lee, M. J. J. o. S. M. 2012. "Other Customers in a Service Encounter: Examining the Effect in a Restaurant Setting," (26:1), pp. 27-40.

Kranzbühler, A. M., Kleijnen, M. H., Morgan, R. E., and Teerling, M. J. I. J. o. M. R. 2018. "The Multilevel Nature of Customer Experience Research: An Integrative Review and Research Agenda," (20:2), pp. 433-456.

Mathwick, C., Malhotra, N., and Rigdon, E. J. J. o. r. 2001. "Experiential Value: Conceptualization, Measurement and Application in the Catalog and Internet Shopping Environment," (77:1), pp. 39-56.

Meyer, C., and Schwager, A. 2007. "Understanding Customer Experience," *Harvard business review* (85:2), p. 116.

Patrício, L., Fisk, R. P., and Falcão e Cunha, J. J. J. o. S. R. 2008. "Designing Multi-Interface Service Experiences: The Service Experience Blueprint," (10:4), pp. 318-334.

Philips, D. 2017. "Retail Faces a New Reality as Ar and Vr Adoption Swells," in: *The Drum*.

Ross, W. T., and Simonson, I. 1991. "Evaluations of Pairs of Experiences: A Preference for Happy Endings," *Journal of Behavioral Decision Making* (4:4), pp. 273-282.

Sarker, S., Xiao, X., Beaulieu, T., and Lee, A. S. 2018. "Learning from First-Generation Qualitative Approaches in the Is Discipline: An Evolutionary View and Some Implications for Authors and Evaluators (Part 1/2)," *Journal of the Association for Information Systems* (19:8), pp. 752-774.

Schmitt, B. 1999. "Experiential Marketing," *Journal of marketing management* (15:1-3), pp. 53-67.

Schwartz, A. M. J. A. a. S. 2011. "Augmenting Purchase Intent: An Empirical Study on the Effects of Utilizing Augmented Reality in Online Shopping,").

Sivakumar, K., Li, M., and Dong, B. 2014. "Service Quality: The Impact of Frequency, Timing, Proximity, and Sequence of Failures and Delights," *Journal of Marketing* (78:1), pp. 41-58.

Sorescu, A., Frambach, R. T., Singh, J., Rangaswamy, A., and Bridges, C. J. J. o. r. 2011. "Innovations in Retail Business Models," (87), pp. S3-S16.

Spreer, P., and Kallweit, K. J. T. o. M. R. 2014. "Augmented Reality in Retail: Assessing the Acceptance and Potential for Multimedia Product Presentation at the Pos," (1:1), pp. 20-35.

Steuer, J. 1992. "Defining Virtual Reality: Dimensions Determining Telepresence," *Journal of communication* (42:4), pp. 73-93.

Stuart, F. I., and Tax, S. 2004. "Toward an Integrative Approach to Designing Service Experiences: Lessons Learned from the Theatre," *Journal of Operations Management* (22:6), pp. 609-627.

Surprenant, C. F., and Solomon, M. R. 1987. "Predictability and Personalization in the Service Encounter," *Journal of marketing* (51:2), pp. 86-96.

Tax, S. S., Brown, S. W., and Chandrashekaran, M. 1998. "Customer Evaluations of Service Complaint Experiences: Implications for Relationship Marketing," *Journal of marketing* (62:2), pp. 60-76.

Teo, T. S., and Wong, P. K. 1998. "An Empirical Study of the Performance Impact of Computerization in the Retail Industry," *Omega* (26:5), pp. 611-621.

Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M., and Schlesinger, L. A. J. J. o. r. 2009. "Customer Experience Creation: Determinants, Dynamics and Management Strategies," (85:1), pp. 31-41.

Walsham, G. 1995. "Interpretive Case Studies in Is Research: Nature and Method," *European Journal of information systems* (4:2), pp. 74-81.

Wilder, K. M., Collier, J. E., and Barnes, D. C. 2014. "Tailoring to Customers' Needs," *Journal of Service Research* (17:4), pp. 446-459.