Frontline Employees' Acceptance of and Resistance to Service Robots in Stationary Retail – An Exploratory Interview Study

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Due to rising online competition, increasing cost pressure and cross-channel customer journeys, stationary retail has tried to develop innovative value propositions and co-create value with customers through new technologies, which are expected to profoundly change the stationary retail's service systems. Among other technologies, service robots are said to have the potential to revitalise interactive value creation in stationary retail. However, the integration of such technologies poses new challenges. Prior research has looked at customers' acceptance of service robots in stationary retail settings, but few studies have explored their counterparts – the frontline employees' (FLEs) perspective. Yet, FLEs' acceptance of service robots is crucial to implement service robots for retail innovation. To explore FLEs' acceptance of and resistance to service robots, a qualitative exploratory interview study is conducted. It identifies decisive aspects, amongst others loss of status or role incongruency. The findings extend prior studies on technology acceptance and resistance and reveal i.a. that FLEs perceive service robots as both a threat and potential support. Moreover, they feel hardly involved in the co-creation of use cases for a service robot, although they are willing to contribute.

1. Introduction

Emerging technologies foster the transformation of business models and enable innovation across all sectors. One promising technology is robotics, which, alongside other technological advances such as big data, cloud computing and artificial intelligence, is expected to result in various profound innovations in service environments (Ivanov and Webster 2019; Matzner et al. 2018; Wirtz et al. 2018). In particular, physical service robots developed for interaction with humans are said to have great potential for innovation in stationary retail (Doering et al. 2015; Grewal et al. 2017; Iwamura et al. 2011). Stationary retail has to innovate in terms of value propositions due to rising online competition, increasing cost pressure and cross-channel customer journeys. To do so, retailers try to co-create value with customers through technology, such as service robots. Thus, a growing number of retailers (e.g., Nestlé, Lowe's and Marriott) have piloted service robots at their stores to determine how customers react to them.

In service research, the use of service robots has been controversially discussed. Service literature is growing in studies linking service robots to service environments: Almost two decades ago, Schraft and Schmierer (2000) emphasised that service robots can create new fields of application to add value to service industries. A few years later, Severinson-Eklundh et al. (2003) argued that 'addressing only the primary user in service robotics is unsatisfactory, and that the focus should be on the setting, activities and

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social interactions of the group of people where the robot is to be used' (ibid, p. 223). This conclusion gained importance, with van Doorn et al. (2017) predicting that 'future technology infusion [...] enables true relationships between service robots and humans' (ibid, p. 52). Consequently, Wirtz et al. (2018) point out specific research opportunities regarding service robots and employee interaction, as little attention has been paid to users' responses to date.

So far service literature discusses ways to incorporate service robots into service environments to foster customer acceptance. These applications range from functional use cases, such as navigation (Kanda et al. 2010), carrying of shopping bags (Iwamura et al. 2011) or distribution of flyers (Shi et al. 2018), to hedonistic use cases, such as entertainment of customers (Aaltonen et al. 2017; Meyer et al. 2018).

Previous studies have established that service robots enhance the shopping experience and shopping activities (Doering et al. 2015; Iwamura et al. 2011). However, a high degree of user acceptance is required for service robots to have a positive effect on their implementation (Čaić et al. 2018; Kirby et al. 2010) since the interaction partners of service robots are constantly changing and cannot be trained (Goodrich and Schultz 2007). To achieve acceptance, human-robot interactions must be user-friendly and needs-oriented (Kirby et al. 2010), taking both dialogue (Iwamura et al. 2011) and non-verbal communication (Doering et al. 2015) into account.

Emotional and psychological aspects also play a crucial role in the acceptance and implementation of service robots (Stock and Merkle 2017; Wirtz et al. 2018). The role profile of service robots often shifts due to changes in users' expectations and the technical possibilities of both hardware and software, such as processing of speech signals and emotions (Gollnhofer and Schüller 2018). Instead of simply receiving commands, service robots can become accepted interlocutors, which expand their potential field of applications (Kirchner and Alempijevic 2012).

Yet, scholarly research tends to confine customers to the crucial user group (e.g. Iwamura et al. 2011; Kanda et al. 2010), upon which prior studies have primarily focused (Subramony et al. 2017). There are two opportunities for research to contribute to the service field's knowledge: (1) First, Subramony et al. (2017) assume that the underexploited potential of research on employees results from a lack of awareness that employees are key for recognising and resolving predominant service-related issues. It seems especially fruitful to explore the FLEs' perspective, as this stakeholder group has frequent and direct contact with customers (Jonas et al. 2016) and is responsible for executing services and implementing new processes (Cadwallader et al. 2010). A rich understanding of FLEs' acceptance of and resistance to service robots has the potential to extend the service fields' knowledge by another perspective (Wirtz et al. 2018).

(2) Second, scholarly research can benefit from a service systems perspective on the FLEs' acceptance of and resistance to service robots. Among other technologies, service robots rapidly change the frontline of organisations, yet we lack insight into how these technologies are implemented in service systems (De Keyser et al. 2019). As it is acknowledged that service robots have the potential to transform the nature of service environments, including stationary retail (van Doorn et al. 2017), it seems fruitful to understand how FLEs perceive service robots within their working environment (Kaartemo and Helkkula 2018; Subramony et al. 2018). Accordingly, Wirtz et al. (2018) and De Keyser et al. (2019) call for research exploring not only customers' but also FLEs' acceptance of such service systems.

Based on the above, we aim to explore FLEs' perceptions of service robots in service systems, a topic that is interesting both theoretically and managerially (Kaartemo and Helkkula 2018; De Keyser et al. 2019; Wirtz et al. 2018). Specifically, we aim to answer the following research question:

From a service systems perspective, what are aspects of FLEs' acceptance of and resistance to service robots in stationary retail?

To answer this question, we review relevant literature and present our qualitative interview study. Then, we discuss how the findings shed light on FLEs' perceptions of service robots in service systems.

2. Review of Relevant Literature: Service Robots in Service Interactions

Interactive value creation occurs when a company and its customers interact (Reichwald and Piller 2009). Not only extrinsic benefits, such as monetary rewards, but also intrinsic benefits, such as the actual experience of a meaningful interaction, are crucial for interactive value creation to occur (Reichwald and Piller 2009). In other words, the experience of a meaningful interaction is necessary for companies to enable their customers to take up the company's value proposition and make it valuable.

2.1. Value co-creation through service interactions

Consequently, through digital innovations and implementation of new technologies, companies, especially those in the retail sector, have explored new types of service interactions with customers to co-create value (Grewal et al. 2017). According to Lyons and Tracy (2013), '[v]alue is realized through interactions and co-creation among service systems' (ibid, p. 1). Service interactions are also valuable for customers when they occur in the situation of customers' needs since they then promise appropriate benefits for customers, as beneficiaries. A service interaction as such is perceived as positive and beneficial when it conveys the feeling of fun, competence, exploration and creativity (Deci et al. 1999). In service systems, service interactions entail a set of formal and informal processes that define the nature of the exchange and enable value co-creation (Sandström et al. 2008).

Companies and their customers co-create value within service systems as their roles are indistinct (Vargo and Lusch 2017; Vargo et al. 2008). Service systems are configurations of interacting resources, including people and technologies, that enable value co-creation during the service encounter (Larivière et al. 2017), which Solomon et al. (1985) define as 'the dyadic interaction between a customer and a service provider' (ibid, p. 99) and Larivière et al. (2017) define as 'any customer-company interaction that results from a service system that is comprised of interrelated technologies (either company- or customer-owned), human actors like employees and customers, physical/digital environments and company/customer processes' (ibid, p. 2). The service encounter has evolved to become dominated by technology (e.g., mobile sales assistants, computer terminals, AI-based service agents; Genennig et al. 2018; Larivière et al. 2017; Wünderlich and Paluch 2017). Thus, it is no longer understood as a strictly human-dominated phenomenon in which FLEs serve as the face of the company to customers and specific learned behaviours appropriate for the situation are performed, but as a balanced composition involving the 'interdependent roles of technology, employees, and customers' (Larivière et al. 2017, p. 1) enabled by a service system.

2.2. The interplay between technology and FLEs in service systems

With reference to the aforementioned balanced composition between human and machine actors, the primary human actors at the interface of service interactions are customers and FLEs. FLEs bring competence, knowledge and experience to these interactions, enabling them to adequately serve customers' needs and co-create value with customers. However, the incorporation of interactive service technologies into service systems has influenced interactive value creation (Larivière et al. 2017). Interactive service technologies in a retailer's service system have been classified into various schemes (Ahearne and Rapp 2010). Interactive service technologies serve distinctive roles in the service encounter – *(1) augmentation*, *(2) substitution* and *(3) network facilitation* – which have different consequences on the interaction between FLEs and customers (Larivière et al. 2017). (1) FLEs are *augmented* by technologies that 'assist and complement' them (Larivière et al. 2017, p. 3). For example, service robots may collaborate with human medical staff in the field of elderly care (van Doorn et al. 2017). Also, FLE-centric technologies, such as mobile computers that can take inventory of shelves, *augment* as they speed up the transactions handled by FLEs, leaving more time for them to care for customers. (2) Interactive service technologies serve as a *substitute* for interactions with human FLEs (Larivière et al. 2017). For instance, customers may use self-checkouts at retail stores, reducing the need for FLEs (Ahearne and Rapp 2010). (3) FLEs can network more comfortably using interactive service technologies that *facilitate networking*. These interactive service technologies act as 'an enabler of connections and relationships [...] rather than focusing on replacing human employees' (Larivière et al. 2017, p. 4).

In consequence, the growing dependency on technology in service encounters has already altered FLEs' role in the service system. Yet, as noted by Böhmann et al. (2018), '[e]mphatic interaction, creative solutions, and authentic experiences all remain mostly the domain of human actors in service systems' (ibid, p. 1). Nevertheless, it is expected that new technologies will be developed that 'defy limitations to enable organization-customer interactions of ever-increasing diversity and consistency across multiple points of customer contact' (Singh et al. 2017, p. 1). Such technologies will not only digitalise existing services but also offer new types of service interactions (Grewal et al. 2017).

2.3. The impact of service robots on service interactions

New types of service interactions are only some of the many changes produced by service robots; as Parasuraman and Colby (2015) note, '[r]obots will open a revolutionary frontier that could upset traditional customer-employee relationships' (ibid, pp. 59–60). In particular, service robots are expected to alter FLEs' role in the service system (Wirtz et al. 2018).

Because these robots can read, understand and respond to people's emotions with empathetic intelligence (in addition to intuitive, analytical and mechanical intelligence; see Huang and Rust 2018), they 'become increasingly important during service encounters' (Stock and Merkle 2018, p. 1056). They largely operate autonomously and interact with both FLEs and customers. According to Ahearne and Rapp (2010), the latter characteristic of these technologies offers a wide spectrum of possibilities for research on service robotics in retail (e.g., Goodrich and Schultz 2007; Schraft and Schmierer 2000; Stock and Merkle 2017; van Doorn et al. 2017; Wirtz et al. 2018).

To summarise prior literature, service robots are machines with the capability to make autonomous decisions and sensitively adapt to the given context (Kirchner and Alempijevic 2012). In order to do so, service robots receive data from a variety of local input channels (e.g., sensors or cameras) and process these data to execute an intricate set of actions (Singer 2009). We stress that, in addition to customers, FLEs are a relevant group of users.

In order to interact and communicate on an emotional-social level or to deliver services to human counterparts, service robots require a certain degree of social presence (van Doorn et al. 2017). Wirtz et al. (2018) argue that three design attributes are relevant in a service context: *(1) presence*, *(2) anthropomorphism* and *(3) task orientation*. (1) A robot with a *physical presence*, such as the semi-humanoid robot Pepper, makes users feel as though they are communicating with another social entity (Jones 2017). Virtual artificial intelligence (AI) software can be also categorised as a service robot (Wirtz et al. 2018), but in this article, we focus on physically represented and mobile service robots (Schraft and Schmierer 2000). (2) Service robots may be *anthropomorphic* (e.g., Sophia, a social humanoid robot) or *non-anthropomorphic* (e.g., Walmart's shelf-scanning robot) (Kirby et al. 2010). (3) Service robots can be designed for *cognitive-analytical tasks*, such as image analysis, or *emotional-social tasks*, such as reception of customers (Wirtz et al. 2018). The latter tasks are most relevant to interaction and communication with users in service system environments.

Based on the previously mentioned characteristics and capabilities of service robots, we utilise the following operating definition of a service robot in this article:

> *Service robots are mobile, system-based, autonomous, adaptable, physically represented machines that provide service to an organisation's customers and FLEs by interacting and communicating at an emotional-social level.*

As FLEs may perceive a service robot's role within service interactions differently than the organisation adopting it; the technological innovation may fail (Pantano et al. 2018). Technology adoption depends on organisations' capabilities to accurately respond to FLEs' needs (Lewis and Loker 2014); making it crucial to understand their acceptance of and resistance to the distinct technology, such as service robots, beforehand.

2.4. Acceptance of and resistance to service robots

Acceptance of and resistance to new technologies have been discussed in service literature since the 1970s. The most frequently used model to interpret acceptance of technologies is Davis' (1989) technology acceptance model (TAM), which is based on the theory of reasoned action (Fishbein and Ajzen 1975) and social cognitive theory (Bandura 1986). Yet, it lacks circumstantial aspects to clarify how technology is adopted and used (Benbasat and Barki 2007), drawing criticism.

Technology acceptance theories focus on social and technological aspects such as social influences. To incorporate specific influences into the TAM, two variations (TAM2 and TAM3), were developed from different perspectives, such as marketing and sales (e.g., Lewis and Loker 2014). A more integrated model is the unified theory of acceptance and use of technology model (UTAUT), which was developed by Venkatesh et al. (2003). The UTAUT considers social influences, such as normative beliefs about peers and supervisors, and facilitating conditions, such as organisational and technical support, to be significant criteria affecting the use of a system.

Studies have also examined technology acceptance in the context of sales interactions (Ahearne and Rapp 2010). FLE-specific aspects are of particular interest in this regard as FLEs facilitate interaction between an organisation and its customers, spanning boundaries (Ahearne and Rapp 2010). Customers appreciate pleasant relationships with FLEs who create social and emotional value during service encounters, which is sometimes described as rapport, engagement or trust (Wirtz et al. 2018).

Acceptance models have begun to focus on service robots as they are piloted in an increasing number of organisations. Based on Solomon et al.'s (1985) role theory and Davis' (1989) TAM, Stock and Merkle (2017) developed a theoretical social frontline robot acceptance model (SFRAM) to examine customers' expectations for an interaction with a frontline social robot during a service encounter. Also, Wirtz et al. (2018) developed the service robot acceptance model (sRAM), which builds upon the TAM (Davis 1989). They include customers' social-emotional needs, perceived humanness, perceived social interactivity and perceived social presence, relational needs, trust and rapport. However, both SFRAM and sRAM focus only on customers, although FLEs' acceptance must also be evaluated in order to orchestrate the use of service robots in a service system: 'Addressing only the primary user in service robotics is unsatisfactory [...] the focus should be on the setting, activities and social interactions of the group of people where the robot is to be used' (Severinson-Eklundh et al. 2003, p. 223).

A different stream of research focuses on resistance to technologies (Lapointe and Rivard 2005). The sudden infusion of service robots in service environments triggers various emotional states, from happiness to anxiety; not all FLEs want to be confronted with new technologies (Harris and Ogbonna 2002). The uncertainty associated with being replaced by technology may be alarming, resulting in fear and resistance (Shah et al. 2017). While technology acceptance theories tend to assume that users have the freedom to choose, technology resistance theories tend to assume that users, including FLEs, are frequently required to adapt to a new technology the company provides them with (Saga and Zmud 1993). In line with Sheth (1981), we expect that, due to the perceived lack of usefulness of new technology, the majority of individuals, including FLEs, will prefer to avoid change, and a minority will be interested in adapting. To shed light on this, the current study explores aspects of FLEs' acceptance of and resistance to service robots in a stationary retail context from a service systems' perspective.

3. Research Method

A qualitative explorative approach was chosen to examine aspects of FLEs' acceptance of and resistance to service robots in a retailer's service system. A qualitative approach is suitable for obtaining implicit knowledge of FLEs (Johnson 2015), and an explorative approach 'can be particularly useful in exploring phenomena where little understanding exists' (Johnson 2015, p. 262).

An interview study was chosen so that FLEs could share rich descriptions of the meaning ascribed to service robots while leaving the data up to the investigator's interpretation (Tewksbury 2009). More specifically, individual in-depth interviews were chosen to gain a thorough understanding of how FLEs perceive and experience service robots in a retail working environment, allowing them 'to delve deeply into social and personal matters' (DiCicco-Bloom and Crabtree 2006, p. 315). Overall, the study aims to achieve profound insights and a more complete understanding of FLEs' acceptance of and resistance to service robots from a retail service system perspective (Johnson 2015).

3.1. Data collection

FLEs were included in the study if they met two criteria: (1) the respondent's employer has tested or implemented service robots and (2) the interviewee has had experience with a service robot in a retail service system. By combining the insights derived from the interviewees with heterogenous service robot experiences, the reality of the retail context can be appropriately represented. FLEs are the most relevant source of information for this study as they have personal experiences, assessments and emotions regarding service robots in their working environment (Johnson 2015).

The selected interviewees are FLEs of six retailers in the grocery, shopping centre, sporting goods, electronics and fashion sectors of the sales markets of Germany and Austria. At these retailers, service robots perform service tasks such as provision of information, entertainment and navigation.

Between early August 2018 and mid-October 2018, 24 interviews were conducted, recorded and transcribed verbatim (*Tab. 1*). For privacy reasons, interviewees' names

No.	Pseudonym	Gender	Age	Retail segment	Sales experience (years)	Interview duration (minutes)
Part 1: Unstructured open-ended interviews						
I1	Sandra	F	55	Grocery	30	24
I2	Richard	M	43	Grocery	25	23
I3	Betty	F	28	Grocery	9	15
I4	Joseph	M	22	Grocery	4	16
I5	Dorothy	F	64	Grocery	38	24
I6	Thomas	M	27	Grocery	7	27
Part 2: Semi-structured in-depth interviews						
I7	James	M	52	Sporting goods	36	54
I8	Mary	F	25	Sporting goods	2	72
I9	Patricia	F	60	Shopping centre	7	35
I10	Jennifer	F	29	Shopping centre	4	37
I11	Linda	F	48	Grocery	25	30
I12	John	M	26	Grocery	3	16
I13	Elizabeth	F	26	Grocery	11	24
I14	Robert	M	37	Grocery	7	18
I15	Barbara	F	21	Grocery	5	47
I16	Susan	F	35	Fashion	16	41
I17	Jessica	F	27	Fashion	9	46
I18	Sarah	F	29	Fashion	4	43
I19	Michael	M	22	Fashion	2	40
I20	Margaret	F	28	Fashion	9	30
I21	Karen	F	31	Electronics	16	37
I22	William	M	26	Electronics	11	46
I23	Nancy	F	28	Electronics	11	37
I24	David	M	55	Electronics	25	41

Tab. 1: Qualitative sample description

were anonymised. Since this study aims to build, not test, theoretical knowledge, the sample size is largely sufficient (Creswell and Poth 2012; Marshall et al. 2013). Data collection ceased when theoretical saturation was reached (Guest et al. 2006).

Following Yeo et al. (2013), the study is comprised of two parts. First, a basis for a broad, mature understanding of potential drivers and barriers to adoption of service robots is created by conducting unstructured, open-ended interviews with six FLEs from a grocery retailer. Second, the information gathered in the first part is used as a gateway to additional exploration through semi-structured interviews (Yeo et al. 2013). We developed an interview guideline that aligned with extant literature to ensure that relevant aspects of prior technology acceptance and resistance research and a service system perspective were considered in the interviews (Maxwell 2008). Three iterations of the guideline were pre-tested with an opportunity sample (Saunders et al. 2009). These pre-tests confirmed that the structure of the interview guideline was appropriate.

3.2. Data analysis

Following Miles et al. (2014), interpretative data analysis was performed to reduce the complexity of the interview transcripts and transform the data into a lucid, workable set of connections. Specifically, following Saldaña (2009), a transparent, open two-cycle coding process was applied to 'break up and segment the data into simpler, general categories and [...] to expand and tease out the data, in order to formulate new questions and levels of interpretation' (Coffey and Atkinson 1996, p. 30).

First, descriptive coding was performed to create an inventory of topics to summarise segments of data (Wolcott 1994). This is an appropriate approach for studies with a wide variety of data (Miles et al. 2014; Saldaña 2009). Second, pattern coding was performed to group those summaries into a smaller number of aspects (Miles and Huberman 1994). The coding process was conducted using the software MAXQDA 2018.

We implemented several measures to ensure that the data analysis was rigorous and trustworthy. First, to ensure intersubjective traceability, a transparent, open two-cycle coding process was applied. Second, we tested and verified the results by analysing the data set for contradictory events and modified the findings over various iterations of analysis and discussion. Third, the objectivity of the analysis was evaluated in terms of intercoder reliability (Campbell et al. 2013). A randomly selected reliability sample, representing 11.3 % of the total sample, was coded by two independent researchers who reached a broad consensus on the definition and completeness of the categorisation (Cohen 1960). Particularly, the coefficient kappa values for each category were above the 0.61 threshold, representing substantial consensus (Landis and Koch 1977). The overall intercoder reliability was 0.85, indicating almost perfect objectivity in the categorisation (Landis and Koch 1977).

4. Findings

The interview analysis uncovered 20 aspects of FLEs' acceptance of and resistance to service robots from a service system perspective. We assigned these aspects to five higher-order categories: (1) loss of status, (2) tension, (3) required commitment, (4) role incongruency and (5) advocation (*Fig. 1*, p. 27). Key quotations were used to describe the findings (*see Tab. 2*, p. 28) as they add transparency and deepen our understanding (Patton 2007).

As proposed by Erlingsson and Brysiewicz (2017), the 20 identified aspects were grouped into higher-order categories according to their contextual proximity and constituent properties. In total, five higher-order categories emerged. These higher-order categories aim to phrase the underlying meaning, i.e., latent content, found in a group of aspects. Moreover, they aim to communicate the identified aspects to the reader on both an intellectual and interpretative level.

In particular, (1) four aspects were clustered around the first notion of 'loss of status', relating to FLEs' concerns about losing their standing through the use of service robots (Gaudiello et al. 2016; Pellegrini and Scandura 2008). (2) Five aspects were assigned to the second notion of 'tension', related to FLEs' concerns about inconvenient changes in the working environment which are perceived as unpleasant by FLEs (Karr-Wisniewski and Lu 2010; Spreer and Rauschnabel 2016). (3) Three aspects were assigned to the third notion of 'required commitment', relating to an increase in responsibilities and psychological burdens (Boxall and Macky 2014; Lee et al. 2016). (4) Five aspects were clustered around the notion of 'role incongruency', relating to FLEs' perception of service robots as a threat to social relationships and an unpleasant interaction partner (Kamide et al. 2014; Okazaki et al. 2010). (5) The remainder were assigned to the notion of 'advocation', relating to FLEs' desire to be sufficiently trained in the use of service robots to be able to actively contribute to the organisational changes due to the use of service robots (Dong et al. 2008; Hanaysha 2016).

(1) Loss of Status. The fear of losing one's job is a major barrier to acceptance of service robots. Although FLEs refer to the operational imperfections of service robots and conclude that their own manpower cannot be replaced yet, they still express several fears. (a) FLEs fear that they will be *substituted* with a service robot and 'would have to find another job' (see *Tab. 2*, p. 28, John, 26 years old). FLEs do

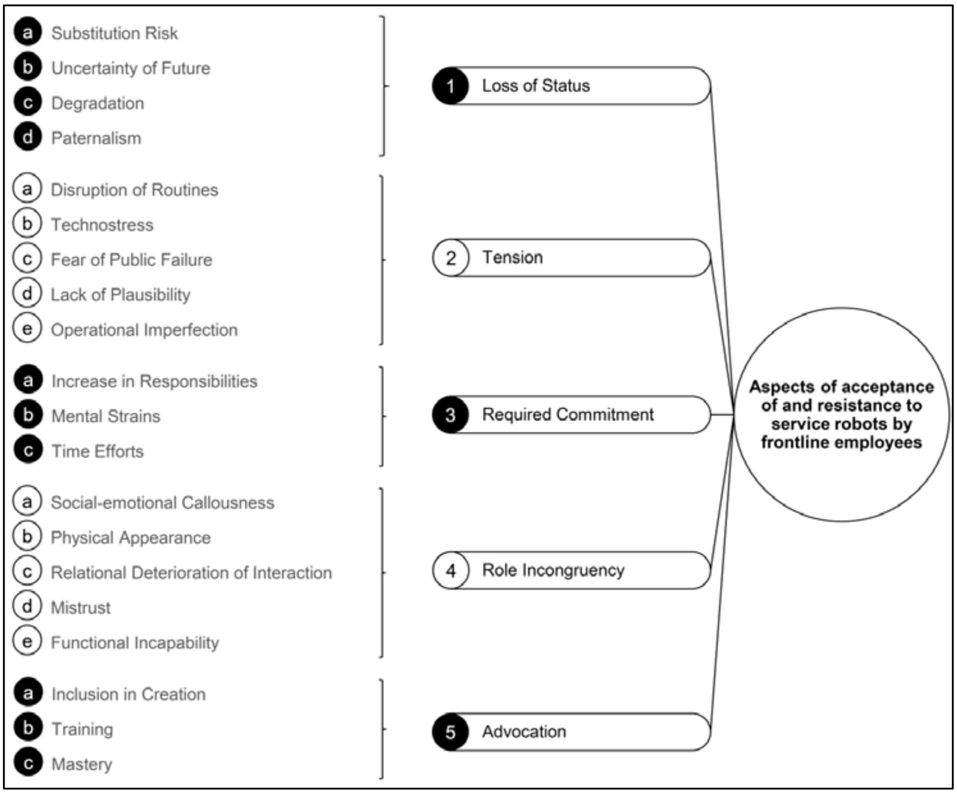

Fig. 1: Aspects of acceptance of and resistance to service robots by frontline employees

not resist change per se, but may resist a loss of pay, loss of comfort, and especially a loss of status (Dent and Goldberg 1999). (b) A majority of FLEs is *uncertain* about whether they will be able to continue to work or whether they will be dispensable due to service robots' capabilities. This situation is different from the certainty of being made redundant. Due to the *uncertainty* about a service robot's future capabilities, FLEs cannot start preparing for redundancy and future (un)employment (Ali et al. 2016) since they simply 'don't know how far it can go with technology' (Karen, 31). (c) FLEs fear being *degraded* and 'a little less respected' (Nancy, 28) by customers or service robots. FLEs desire a working environment in which they feel valued by management and customers; they do not want to be perceived as less essential due to the existence of service robots. Fear of this type of disempowerment can undermine the perceived raison d'être of FLEs. (d) FLEs do not accept *paternalistic* behaviour by a service robot; they want to have the final say. They may accept service robots, as long as the service robots do not tell them what to do. Thus, FLEs would prefer to delegate tasks to a service robot (Patricia, 60).

(2) Tension. The introduction of service robots causes FLEs to face novel challenges within their daily working environment as they are unknown actors in the service system. FLEs are placed in a stress field of heterogeneous demands by the customer, organisation, technological devices and service robots. (a) This leads to *disruption of routines* as FLEs are confronted with new challenges regarding service robots as stated, 'no employee expects a robot to suddenly stand behind him' (Barbara, 21). (b) Unprepared, fast incorporation of service robots into a familiar working environment results in *technostress* among a majority of FLEs as 'it puts you under additional stress' (Nancy, 28). (c) *Fear of public failure* while using a service robot arises simultaneously to technostress. FLEs fear unintended malfunctions while interacting with a service robot and being incapable of providing information about a service robot to customers. As stated, FLEs 'feel a bit humiliated' (Sarah, 29) when realising that they are not as well informed about the service robot as they wish to be. (d) Some FLEs cannot comprehend the retailer's decision to pilot or implement a service robot. The perceived *lack of plausibility* of the decision may lead to interpersonal hurdles. For example, one participant explained: 'Emotionally I honestly must say that there is a certain hatred' (William, 26). (e) FLEs note *operational imperfections* in the service robots, including technological issues (e.g., short battery life, poor acoustics, slow motor skills or frequent breakdown) and difficulties related to daily use (e.g., the service robots block pathways or cannot be switched off). A few FLEs are patient with service robots, as they understand that more innovative technologies are more likely to be buggy or to break down (Thomas, 27). However, the majority of FLEs are frustrated and annoyed by operational imperfections. For example: 'In the course of the afternoon he just went really limp and then shut down, which was a bit of a pity, because people were there and asked where Pepper is' (Jessica, 27).

(3) Required Commitment. The participants mentioned three types of effort-related barriers to adoption. (a) FLEs feel an *increase in responsibilities*; in addition to their daily workload, they must keep an eye on the service robot. As stated, they perceive to 'bear the responsibility for it' (Barbara, 21). This requires adjustment of FLEs' duties in order to avoid overload and the perception that service robots do not support FLEs' work. (b) FLEs experience *mental strains* related to learning how to command and interact with a service robot. Doing so is seen as necessary because FLEs believe it is their duty to answer customers' questions, including those about service robots (Jessica, 27). (c) The *time efforts* required to become familiar with a service robot may be a barrier to adoption. Aptly, one participant explained that 'you couldn't stand in front of the robot for half an hour and deal with it' (Jessica, 27).

(4) Role Incongruency. Role incongruency occurs when an actor's perception of another actor's role does not match the latter's actual behaviour. FLEs mentioned five potential barriers to adoption associated with role incongruency. (a) FLEs criticise the *social-emotional callousness* of interactions with a service robot, which is felt by both FLEs and customers. 'This personal, valuable contact, the smile, the warmth, that's not what a robot can do' (Patricia, 60). (b) FLEs tend to anthropomorphise a service robot's *physical appearance*. In other words, they imbue a nonhuman service robot with humanlike characteristics, motivations, intentions or emotions based on its real or imagined behaviour, which influences how they interact with it. For example, one participant explained: 'You can identify a little better with something that looks more like a human than [...] a moving plastic part' (Nancy, 28). (c) FLEs fear *relational deterioration of interaction* within the service system caused by service robots. In other words, they believe that service robots disturb the interpersonal relationships between FLEs and customers, thus diminishing the quality of interactions for customers and leading to alienation of both customers and FLEs. Aptly, one participant stated that 'in the past you went to a shop to gossip, to talk, to get rid of worries [...]. With computers like that, it's just sad' (Linda, 48). (d) FLEs express *mistrust* towards service robots as they do not feel secure and psychologically comfortable when one is present (Jessica, 27). (e) FLEs cite *functional incapabilities* as a potential barrier to adoption. In other words, they report that service robots do not deliver the expected functionality: 'communication [...] is clearly a problem here' (William, 26). The more useful the service robot, the more likely it is to be adopted (see Schepers and Wetzels, 2007).

(5) Advocation. Studies show that a general practice of employee advocation and participation can be associated with higher levels of organisational commitment and job satisfaction (Speier and Venkatesh 2002). (a) FLEs like to feel *included in the creation process* for service robots' use cases, although in most cases they are not (Karen, 31). Some FLEs are willing to not only learn about service ro-

Aspect	Key quotation
(1) Loss of Status	
(a) Substitution Risk	*'For me that would mean I'd have to find another job' (John, 26).*
(b) Uncertainty of Future	*'I mean, if you think back a few years, I don't think you even thought about using a robot like that anywhere. And now it drives around on its own, can talk to people, speaks to them. I don't know how far it can go with technology' (Karen, 31).*
(c) Degradation	*'If, of course, I'm now an employee who really knows a lot and that's what distinguished me, but now a robot is coming, and it knows that and a lot more, so in the end I'm a little less respected. Because then customers will go straight to the robot' (Nancy, 28).*
(d) Paternalism	*'But one should be able to tell it that Mrs. XY wants to pick up her parcel, then it rolls off and fetches it' (Patricia, 60).*
(2) Tension	
(a) Disruption of Routines	*'I believe that if you do something somewhere no employee expects a robot to suddenly stand behind him' (Barbara, 21).*
(b) Technostress	*'That puts you under additional stress, because you are under time pressure anyway, and you want to get this robot off' (Nancy, 28).*
(c) Fear of Public Failure	*'I think that most customers rightly assume that we know all about it. Of course, you feel a bit humiliated at first when you realize, okay, somehow, I'm not as well informed as I should have been' (Sarah, 29).*
(d) Lack of Plausibility	*'Emotionally I honestly must say that there is a certain hatred, because I have learned this profession. I went to school and thought it would really be in my time' (William, 26).*
(e) Operational Imperfection	*'It has initial malfunctions, it often has to be brought to the programmers to get repaired or because it hangs up' (Thomas, 27).*
(3) Required Commitment	
(a) Increase in Responsibilities	*'The main thing for us was to switch on, to switch off, to know what to do in case of problems. By the fact that we also bear the responsibility for it. Or should it have any malfunction whether you can restart it or whatever' (Barbara, 21).*
(b) Mental Strains	*'I think somewhere you have to deal with such things and find out a lot of things yourself or together with someone' (Jessica, 27).*
(c) Time Efforts	*'But you couldn't stand in front of the robot for half an hour and deal with it. Unfortunately, that doesn't work' (Jessica, 27).*
(4) Role Incongruency	
(a) Social-Emotional Callousness	*'That's always quite monosyllabic or mechanical. This personal, valuable contact, the smile and the warmth, that's not what a robot can do' (Patricia, 60).*
(b) Physical Appearance	*'Because, I think, you can identify a little better with something that looks more like a human than with something that looks like a piece that is cut off at the top and happens to have eyes. It is simply a moving plastic part' (Nancy, 28).*
(c) Relational Deterioration of Interaction	*'I went into the furniture industry to interact with a person, help him, support him, communicate with him. And when I look into the future, to say that at some point I will only be there to store the shelves – I don't want to. I hope I won't experience it' (William, 26).*
(d) Mistrust	*'Sure, it took getting used to, especially at the beginning, because you might have felt observed in between, when it somehow follows you when you pass it. And first you don't know what kind of technology is really involved' (Jessica, 27).*
(e) Functional Incapability	*'Communication with him is clearly a problem here. I just can't interact with him as much as with a person where I can say "hey, you've got time right now, look back with the customer." Unfortunately, I can't do that yet' (William, 26).*
(5) Advocation	
(a) Inclusion in Creation	*'He's already been delivered that way. But in terms of design and something like that, I think that was someone's project and they delivered him that way, so to speak' (Karen, 31).*
(b) Training	*'And I would have thought that you could do a little training and explain what kind of device it is, what it can do, where it comes from, what we can tell the customers, what they can try out when dealing with it. And that we can also accompany the customers a little bit on their voyage of discovery' (Sarah, 29).*
(c) Mastery	*'I know from my colleagues, that's the way it is, okay, uh, he does something funny or that doesn't work and then they are simply overwhelmed because they don't know what to do now' (Nancy, 28).*

Tab. 2: Exemplary key quotations of identified aspects of acceptance of and resistance to service robots by FLEs

bots but also contribute to the development of valuable use cases with their personal experience and intrinsic knowledge as stated, 'the perceived added value of the service robot increases considerably if FLEs can actively contribute to the development of the use case, because their experiences count, their ideas are listened to and then perhaps are implemented.' (Mary, 25). (b) Proper *training* may not only support FLEs' acceptance of service robots but also enable them to better engage with customers regarding the service robot. The service robot was barely introduced or explained to the FLEs. While a few felt comfortable with no introduction or a short explanation, the majority would have liked to be given more information: 'you could do a little training and explain what kind of device it is' (Sarah, 29). (c) FLEs have not yet *mastered* the handling of a service robot. FLEs perceive themselves as incompetent with regard to the service robot and fear being judged by customers. Aptly, one participant explained that colleagues 'are simply overwhelmed because they don't know what to do' (Nancy, 28); thus, desire to be able to master service robots properly.

5. Discussion and Implications

Implementation of service robots into a stationary retailer's service system is a promising approach to foster retail innovation (Grewal et al. 2017). However, FLEs may reject service robots when they enter an otherwise consistent environment. As discussed above, extant technology acceptance and resistance theories are not able to satisfactorily and validly explain this phenomenon from a FLEs' perspective. Thus, we adopted a qualitative explorative approach to build (rather than test) theoretical knowledge. The findings are both theoretically and managerially relevant.

5.1. Theoretical implications

The findings reveal aspects that can be linked to constructs from established technology acceptance and resistance theories and aspects that are not covered or are only slightly covered in existing theories.

(1) Loss of Status. Research has already discussed the relation between FLEs' resistance to technology and perceived loss of status (Joshi 1991; Lapointe and Rivard 2005). FLEs do not resist change per se, but they may resist loss of pay, loss of comfort and, in particular, loss of status (Dent and Goldberg 1999). Our results support this. However, in contrast to prior studies adopting a unidimensional definition, we find that the loss of status is related to four concerns: *substitution risk* (the perceived risk that FLEs will be replaced by service robots, based on Roskies et al. 1988), *uncertainty about the future* (the degree of uncertainty FLEs feel regarding whether they will be able to continue to work due to the introduction of a service robot, based on De Witte 1999), *degradation* (the degree to which FLEs perceive their own roles to be reduced, based on Wagner et al. 2009) and *paternalism* (the degree to which FLEs perceive their autonomy to be limited by a service robot; Jörling et al. 2019). We present a sophisticated description of these aspects, thus contributing to extant literature and improving the understanding of the aspects in contexts other than those involving service robots.

(2) Tension. Prior studies have examined aspects similar to *disruption of routines* and *technostress* (De Witte 1999; Oreg 2003). FLEs feel pressured by changes within their working environment and feel alienated from tasks such as customer interaction due to the presence of service robots (see Marakas and Hornik 1996). Therefore, they may reject service robots, regardless of their capabilities (De Witte 1999). *Technostress* can trigger physical and mental health complaints, and negatively impact FLEs' work performance (Tarafdar et al. 2014). However, prior studies have not considered aspects regarding *fear of public failure* (the degree to which FLEs fear an unintended malfunction of a service robot within a collaborative situation, based on Oyedele and Simpson 2007), *lack of plausibility* (the degree to which FLEs do not understand the management's decision to pilot or implement a service robot, based on Charles et al. 1991) and *operational imperfection* (the extent of technological issues and difficulties that prevent proper use of a service robot).

(3) Required Commitment. Kim and Kankanhalli (2009) examined aspects related to an increase in economic inputs and switching costs (ibid, p. 571). In addition, our findings reveal aspects related to required commitment at a personal level. FLEs believe that an *increase in responsibilities*, *mental strains*, and additional *time efforts* are needed to properly deal with service robots and customer requirements (i.e. teaching customers how to interact with the service robot).

(4) Role Incongruency. A role involves social-emotional, relational and functional norms that stipulate how the involved actors, such as FLEs, service robots and customers, should interact to attain role congruency (Giebelhausen et al. 2014; Solomon et al. 1985). In contrast, *role incongruency* occurs when an actor's perception of another actor's role does not match his or her actual behaviour. FLEs perceive a service robot as unsatisfying in terms of social-emotional needs (*social-emotional callousness*) and as incapable of appropriately entering social spaces (i.e. displaying actions and emotions; *deterioration of interaction*; Jones 2017). The tendency to imbue a nonhuman service robot with humanlike nonverbal behaviour supports findings by Rosenthal-von der Pütten et al. (2018). Moreover, while humanizing service robots' physical appearance may help to compensate the lack of a real human (Gelbrich et al. 2017),

authentic behaviour on other levels of interaction become all the more crucial (Wünderlich and Paluch 2017); FLEs expect service robots to stimulate curiosity or create value by meeting service needs.

(5) Advocation. Since service robots are expected to not only autonomously perform supportive functions but also work side-by-side with FLEs (see Wirtz et al. 2018), involving FLEs in all phases of the implementation of service robots has tremendous potential for retailers. In addition to (current) operational imperfections, innovations may fail due to an inadequate approach to implementation (Klein and Knight 2005). Prior research has not examined this factor, and traditional technology and resistance models do not fully respond to FLEs' expectation that they will contribute to the development of new technologies.

5.2. Managerial implications

The findings of this study indicate concrete approaches for retailers. We adapted the behavioural conditions proposed by von Rosenstiel et al. (2005) and the framework of sustainable employee excellence proposed by Permana et al. (2015) to illustrate three approaches retailers may follow to both foster FLEs' acceptance of and reduce FLEs' resistance to service robots. The five higher-order categories call for *enablement*, *engagement* and/or *empowerment* of FLEs (*Fig. 2*). Retailers need to *enable*, i.e. provide FLEs with what they need to perform their jobs and an environment in which they feel valued. Retailers need to *engage* their FLEs, i.e. intensify FLEs' emotional attachment for the organisation since it positively influences the degree of extra effort committed. Retailers need to *empower* their FLEs, i.e. give them 'problem-solving and decision-making authority to take responsibility for using the organisation's resources to achieve results' (Permana et al. 2015, p. 581). Subsequently, we briefly describe the concrete approaches.

(1) Loss of Status calls for engagement. Retailers may respond to perceived loss of status by explaining that service robots will alter, but not eliminate, the role of FLEs in service systems. Currently, service robots are limited in capability, but in the future, they may work side-by-side with FLEs (Wirtz et al. 2018). As FLEs are willing to delegate tasks to service robots, retailers may explain that service robots should complement FLEs' work and create new types of interaction with customers.

(2) Tension calls for engagement and enablement. To reduce tension, retailers should plausibly explain their motivation for piloting or implementing service robots. Through clear communication, retailers can present service robots as a supportive rather than disruptive technology. To overcome the perceived *disruption of routines*, retailers may first focus on positively inclined FLEs. After they are enabled, these FLEs can motivate and help other co-workers better adapt to service robots.

(3) Required commitment calls for enablement. Our findings indicate that FLEs are willing to learn about service robots but lack time and retailers' support. Thus, retailers could offer time for FLEs to experience service robots. Depending on the FLEs' familiarity with service robots, the time required will vary. This type of measure may communicate to FLEs that the initial phase of familiarisation with service robots is not only a personal commitment. More-

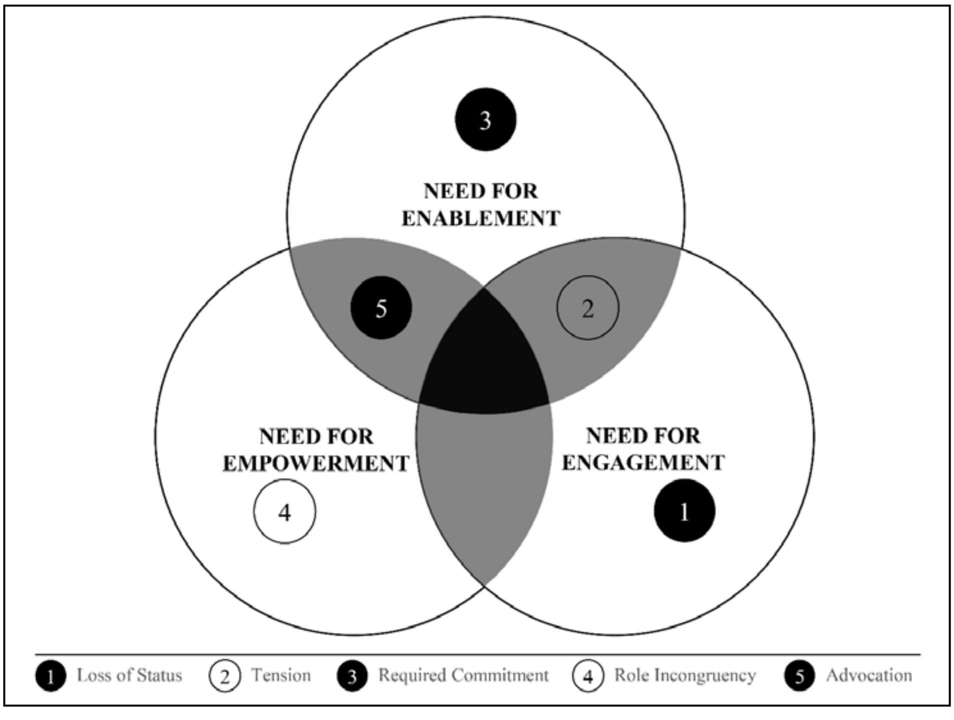

Fig. 2: The three Es for promoting acceptance of and reducing resistance to service robots

over, retailers may explain that the perceived *increase in responsibility* is particularly evident in the initial phase of implementation and will be reduced over time; the more familiar customers are with service robots, the less guidance they will need from FLEs.

(4) Role Incongruency calls for empowerment. Due to service robots' manifold *functional incapabilities*, retailers should refrain from large-scale implementation until the technology improves. Also, FLEs *mistrust* service robots and feel uncomfortable when it is necessary to depend on them (Komiak and Benbasat 2006). To reduce *mistrust* and avoid unclear roles and responsibilities, retailers should focus on developing small, well-demarcated, subordinate use cases (Huang and Rust 2018). Retailers may need to clearly establish role models for their FLEs as well as service robots. A defined set of tasks must be given to every role model in order to create role congruency (i.e. define the extent to which FLEs are allowed to delegate subordinate tasks to a service robot).

(5) Advocation calls for empowerment and enablement. Retailers can empower their FLEs by actively involving them, and the personal experience of FLEs can produce more valuable use cases for service robots. Specifically, they can best assess the activities from which customers benefit and the activities in which human expertise is indispensable. Retailers may enable FLEs to do so by helping them develop new skill sets to better cope with their new role and to better contribute to the design of use cases.

6. Conclusion, Limitations and Further Research

Research on service robots has primarily concentrated on programming issues, such as emotion recognition or behaviour patterns, or on customer's expectations for service robots (see Stock and Merkle 2017). To the best of our knowledge, service robotic research hardly focused on FLEs' expectations for service robots within a service environment, although the increasing presence of service robots in service systems requires deeper research (Wirtz et al. 2018). Our study is among the first to perform an in-depth exploration of aspects related to FLEs' acceptance of and resistance to service robots from a service system perspective. The study thus enhances the extant body of knowledge on technology adoption in retail.

The service robot is a promising, commonly discussed technology that is about to enter organisations' service systems. Unlike other retail technologies, service robots largely operate autonomously when interacting with both customers and FLEs. This opens up the traditional dyadic interaction between the service provider and customer (Larivière et al. 2017; Solomon et al. 1985; Teixera et al. 2017). As a consequence, FLEs' decision to accept or reject a service robot in a joint service system is influenced by aspects that go beyond the findings of traditional technology acceptance and resistance research. This qualitative exploratory study provides five higher-order categories of aspects related to FLEs' acceptance of and resistance to service robots. These categories can support and refine traditional acceptance and resistance models or lead to the development of new, more unified models.

On the managerial side, this study provides a comprehensive view of FLEs' perceptions of service robots, which stationary retailers must understand. As there is a link between technology adoption and job satisfaction (Speier and Venkatesh 2002) and sales performance (Jelinek et al. 2006), retailers can utilise the results of this study to develop suitable strategies for reducing and eliminating the identified challenges.

Although we were very conscientious in our development of the study, it is not free of limitations. First, we developed a list of aspects that are based on a sufficiently large sample of 24 individual in-depth interviews. While these aspects deepen the conceptual knowledge about service robots in service systems, we do not offer ways for practitioners and academics to measure them. Also, we have not yet empirically validated the aspects. Therefore, we recommend that a subsequent quantitative study be performed to validate their psychometric nature and further assess the underlying structure. Furthermore, self-reported data is a common limitation of studies adopting qualitative approaches, and the data collection was limited to FLEs working in Germany and Austria. It is recommended that future studies collect data from other regions.

The field of service robotics is rapidly evolving, but it is still nascent, offering manifold opportunities for future research. We have just scratched the surface regarding the interplay between service robots and FLEs. Scholarly researchers should consider extending acceptance questions to all stakeholders in the service system, as it is expected that 'high emotional and cognitive service tasks will be delivered by service employee-robot teams' (Wirtz et al. 2018, p. 36).

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Keywords

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