Customer satisfaction is caused by different predictors when services are delivered by technology instead of employees

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Abstract

Self-service technologies (SST) are widely used. However, to what extent service quality and recovery, crucial for customer satisfaction of traditional services (TS), also determine customer satisfaction of SST and subsequently customer loyalty and repurchase intention is unclear. This research quantitatively investigates this issue by testing a hypothesized model using two sets of questionnaire data (n=385) from the fast-food context that use both employees and technology to deliver ordering services. Findings show that while the impact of service reliability and recovery on customer satisfaction is not significantly different, service usability and efficiency have a greater impact on customers using SST than TS. Similarly, the relationship between satisfaction and subsequent loyalty and repurchase intention is stronger for TS. This suggests that replacing TS with SST reduces customer expectations to a barebone sufficiency level . The value of this research lies in the direct like-for-like comparison between SST and TS, with results suggesting that the same service is reframed in the consumer's mind by the use of technology instead of employees.

Keywords: Self-service technology, traditional services, customer satisfaction

Track: Services marketing

1. Introduction

Past developments in robotics and computing, and current developments in artificial intelligence and big data increasingly allow companies to replace traditional service (TS) delivery based on human-to-human interaction with self-service technologies (SST). Customer demand for semi-customized service experiences, rising labor costs, and high turnover and low efficiency among service employees engaged in fairly repetitive tasks are given as drivers for this development (Shin & Perdue, 2019). Numerous industries have therefore reduced service employee numbers by way of autonomous driving technology, self-checkout machines, or online chatbots.

SST is defined as "technological interfaces that enable customers to produce a service independent of direct service employee involvement" (Meuter et al., 2000, p50). SST therefore fundamentally changes how services are delivered, which results in a different customer experience (Meuter et al., 2005). The significant advantage of SST for service providers is that it can standardize service delivery, reduce labor costs, and expand service scale. However, early research also indicates that customers may not always be accepting towards SST, which can become problematic for companies as service delivery is hindered (Curran & Meuter, 2005). Recently, research has made progress on the impact of robotics on utilitarian and hedonic consumption choices (Longoni & Cian, 2020) or the balance between personalization and privacy issues of SST design (Kelly et al., 2019), but at a fundamental level it is not clear whether satisfaction from the same service output delivered through TS or SST results is influenced by the same predictor factors. In studies where this question has been touched upon, focus has been on the acceptance of the technology itself, or studies have differentiated between the two service delivery modes and reduced their comparability (e.g. Meuter et al., 2005). This is problematic for researchers because it is unknown to what extent findings, theories, and insights from TS and SST are transferrable. It is also a relevant for practitioners as the transition from TS to SST is not always intuitive or unproblematic – it is reported that the "unexpected item in bagging area" error from self-checkout machines causes anxiety among 67% of British supermarket customers (Smithers, 2015).

This research therefore aims to explore a) whether the service quality and recovery factors that determine customer satisfaction are the same for TS and SST, and then to assess b) to what extent the influence of customer satisfaction on repurchase intention and loyalty is the same for these two different service delivery modes. These two questions are answered below

using a classical deductive research design that includes quantitative testing of hypotheses in the context of fast-food restaurants.

2. Literature review

SST changes the relationship between customers and service providers by allowing customers to access services without the active assistance or participation of provider employees (Kelly et al., 2017). Challenges to successful consumer adoption include technology usability, which inhibits customers from trying out SST in practice or diminishes the extracted value (Lee & Coughlin, 2015). Customers may have to wait longer for self-service in some instances and then perform a task previously provided by the service provider, which can negatively affect satisfaction as customers believe the service provider is less active and involved, reducing value-for-money perceptions (Van Riel et al., 2012). Ultimately, customer expectations may remain unmet if the SST is not able to perform its core task as completely as a service employee, although direct comparative studies are scarce. Topics like service failure (e.g. Bagherzadeh et al., 2020) and service recovery (e.g. Hazée et al., 2017) have therefore become increasingly relevant to SST research in recent years. While SST is maturing, service failure due to technical or user difficulties remains a possibility After a service failure, companies can have a positive impact on customer satisfaction through service recovery however, and redeem the perception of the brand (Knox & Van Oest, 2014).

Several theoretical angles have been utilized in SST research to explain customer satisfaction and other customer-related factors relevant for a service provider. Among them are the Expectation-Confirmation Model (ECM) and the Technology Acceptance Model (TAM). Bhattacherjee et al. (2001) proposed the ECM on the basis of Expectation Confirmation Theory (ECT) to explain the relationship between perceived usefulness, satisfaction, and relevant intentions about future behaviour. The structure of these models has fed into the conceptual framework of this study. Another inspiration for this study is the TAM (Legris et al., 2003), which predicts that technology is adopted by users if the perceived ease of use contributes to perceived usefulness and positives attitudes towards use. These factors then predict intentions to use and actual use, highlighting the importance of making technology accessible as its usefulness is otherwise obscured from users. Both models posit that satisfaction or attitudes predict future engagement, which has fed into the hypothesized model of this study. Furthermore, the assumptions that a) satisfaction of a relatively new

technology is determined by its usability and b) the usefulness of a technology may be obscured by its inability to recover from difficulties during its use are also both taken forward.

This study therefore extends work on SST service quality and recovery on satisfaction and subsequent customer behavior in comparison to TS by integrating insight from ECM and TAM and testing a hypothesized model formalized in the following. In particular, this is achieved by testing the hypothesized model twice – once to evaluate a specific TS and once to evaluate the same service when delivered through SST.

3. Conceptual framework and hypotheses

Service quality has occupied service research since the inception of the field. Early research mainly focused on determining the dimensions of service quality in conceptual models (e.g. Zeithaml et al., 2002). In this study, service quality is decomposed into three dimensions, each of which is expected to contribute to customer satisfaction (CS).

Firstly, reliability is an important sub-dimension of quality according to research (e.g. Orel and Kara, 2014). That expectations around service performance are being met consistently is important for customers, and the reliability of a technology to do the same, relatively simple task repeatedly cheaply and without fail is seen as a distinct strength of SST (Van Riel et al., 2012). Thus, compared with SST, reliability is hypothesized to have a greater impact on CS for TS (**H1**) as reliability here is more dependent on employee training and other variable factors. However, usability is a worry that customers have in regard to technology as user interfaces and control modes may be unfamiliar. A lack of usability in SST will be detrimental to successful service delivery and ultimately satisfaction, while in TS a service employee may be more able to explain and compensate for unintuitive processes (Sharma, et al., 2021). Thus, it is assumed that usability has a greater impact on CS in SST compared with TS (**H2**). When evaluating SST, customers care about efficiency, especially since on-demand access without wait, time-savings, and general convenience is one of the main value propositions of SST in comparison to TS (López-Bonilla, 2013). Therefore, efficiency is hypothesized to be more important for SST than for TS (**H3**) since this is a core feature of SST from the customer perspective.

Even when expectations focus on relatively simple tasks. service failures are not uncommon for SST, which consumers are sensitive to. If the failure requires service personnel to come to "help", customers may experience feelings of shame or embarrassment (Forbes, 2008). Also, insecurity in the use of technology can also have a significant impact on

consumer attitudes and behavior (Lin and Hsieh, 2007). Thereby, it is hypothesized that service recovery has a greater impact on CS in SST compared with TS (**H4**) as service failure is a bigger worry when technology is involved.

Several studies establish that CS has a positive effect on repurchase intention and customer loyalty, as well as different desirable customer behavior (Liao et al., 2017, Orel and Kara, 2014). Compared with traditional TS, however, CS gained through SST is less likely to result in repurchase intention (**H5**) and customer loyalty (**H6**) however. Although satisfaction from SST use can drive repurchase intention, the interaction between consumers and service personnel likely results in a greater influence on satisfaction and loyalty as it is easier for humans to tie positive experiences to other humans than to technology (Sharma, et al., 2021).

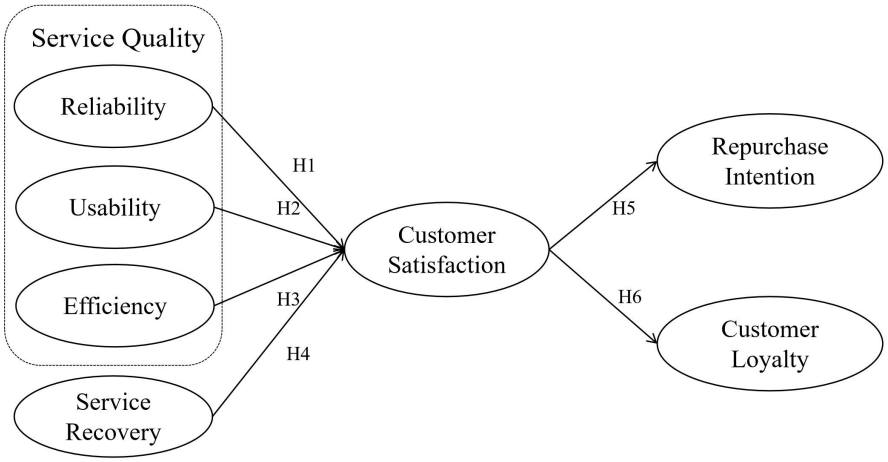

Figure 1: Hypothesized model of this study.

4. Methodology

To test these hypotheses, a group comparison analysis using covariance-based structural equation modeling (CBSEM) was conducted. The data collection was conducted in the context of fast-food restaurants in China – a context where TS and SST are used next to each other in the same store. The use of SST is widespread in the food and catering industry and a significant proportion of point-of-sale service employees have been replaced by technology such as cashless touch screen kiosks or self-service ordering and payment tablets (Hanks et al., 2016). Labor cost saving and service standardization rationales are clear, as are waiting time reductions in fast-food restaurants (López-Bonilla, 2013). However, the common use of SST has received limited attention in the restaurant industry research literature (Ahn & Seo, 2018) and is therefore a suitable context to explore the hypothesized model in.

Data were collected via an online questionnaire instrument using Qualtrics. Four screening questions were asked to confirm that the respondents had experience with both SST and TS in Chinese fast-food restaurants. Afterwards, a randomizer allocated respondents to either of two groups. These two groups answered the same questions in the remainder of the questionnaire, but the questions were either aimed at the use of TS for the traditional services group (TSG) or the use SST for the self-service technology group (SSTG) in Chinese fast-food restaurants. This means the hypothesized model was investigated twice, once with respondents answering the questionnaire items in regard to TS, and once with different respondents answering the items in regards to SST. Each construct was operationalized using three to four items that were previously employed in peer-reviewed publications in journals of at least AJG 2 rank (omitted here for brevity but available on contact). Four final questions on demographic variables concluded the questionnaire. 385 valid questionnaires were collected in June 2020 (TSG n=195 and SSTG n=190).

Data were analyzed in SPSS 26 and AMOS 26 following the two-step approach to SEM (Anderson & Gerbing, 1988) by establishing whether the collected data reflected the constructs in the hypothesized model first via a confirmatory factor analysis. Afterwards, hypotheses were tested via a structural model analysis and Z-Tests (Casella and Berger, 2012).

5. Analysis and results

The constructs displayed good reliability based on Cronbach's α scores, which ranged between 0.840 (Efficiency) and 0.888 (Customer Satisfaction). The χ^2 test of the measurement model during the CFA was 1.409 and the GIF was 0.940. In addition, NFI, TLI, and CFI were all greater than 0.9. The CR values were all greater than 0.7, and the AVE values were all greater than 0.5, indicating that the internal consistency and convergent validity of the constructs was acceptable. The result of the correlation and discriminant validity showed that the absolute values of the correlation coefficients between variables are all lower than 0.7 (due to space constraints, the detailed validity results are omitted here). As such, the measurement model had good fit and the constructs showed good reliability and validity according to thresholds given by Hair et al. (2010). The structural model showed the value of χ^2/df was 1.675, less than 3, and therefore passed the detection index according to Hair et al. (2010). The GFI was acceptable at 0.928. Other measures such as NFI, TLI, and CFI were greater than 0.9.

Concerning the results, first it is to note that all hypothesized relationships between constructs for the two groups were individually statistically significant as indicated by p-value below 0.05 in Table 1. To test for significant differences between the two groups, Z-tests were performed to test the hypotheses (Casella and Berger, 2012). An absolute Z-value of above 1.96 implies that the unstandardized regression coefficients of the two groups are significantly different; otherwise, there is no significant difference.

Table 1: Statistically different paths between TSG and SSTG (in grey).

Path	TSG			SSTG			Z-value
	Unstandardized estimate	S.E.	P	Unstandardized estimate	S.E.	P	
R→CS	0.144	0.056	0.01	0.177	0.075	0.018	-0.35256
U→CS	0.533	0.096	***	0.124	0.061	0.042	3.595891
E→CS	0.178	0.080	0.027	0.480	0.097	***	-2.4019
SR→CS	0.238	0.097	0.014	0.335	0.074	***	-0.79506
CS→RI	0.484	0.069	***	0.221	0.081	0.006	2.471691
CS→CL	0.470	0.076	***	0.193	0.089	0.030	2.36683

***p<0.01; R=Reliability; U=Usability; E-Efficiency; SR=Service Recovery; CS=Customer Satisfaction; RI=Repurchase Intentions; CL=Customers Loyalty

The results show that for the SSTG, efficiency has a stronger influence on customer satisfaction than for the TSG, confirming H3. Next, for the TSG, CS has a stronger influence on repurchase intention than for the SSTG, confirming H5. Similarly, CS has a stronger influence on customer loyalty than for the SSTG, confirming H6. However, the results show that for SSTG reliability has a stronger influence on customer satisfaction than for the TSG, rejecting H3 and H2 is rejected as usability influences CS for TSG more. Finally, the absolute value of Z test (-0.35256 and -0.79506) are less than 1.96, rejecting H1 and H4. Overall, the hypothesis H1, H2, and H4 were rejected, while the H3, H5, and H6 were supported.

6. Discussion and conclusion

This study has compared which factors contribute to CS when a service is delivered by an employee or by a technology that the customer operates independently via CBSEM and Z-tests. The impact of CS on relevant future intentions by customers were also investigated.

The results indicate that all hypothesized predictors impact on CS regardless of whether a service is delivered through TS or SST. However, only the hypothesis concerning efficiency

was validated as it impacts CS more in the context of SST. This confirms that whether a service is delivered efficiently is relatively more important for SST and forms a core advantage from the perspective of the customer, confirming work by López-Bonilla (2013) and others. No significant difference for the reliability construct and a similarly weak impact on CS suggests that customers do not worry about this factor in either context, alleviating worries regarding service failure. This aligns with service recovery seen as equally important in both contexts and suggests that SST has developed as indicated in recent papers (e.g. Kelly et al., 2019). The reversed effect of usability warrants further investigation, but can be interpreted as the ordering process in fast-food restaurants being easier through SST than TS. A high technology-affinity among fast-food customers in China is the likely explanation.

Concerning the effects of CS on repurchase intention and customer loyalty, it appears that these connections are stronger when services are delivered through TS instead of SST. This confirms the notion that the satisfaction gained through the use of technology is simply lower or less memorable than that created through interaction with a service employee. This ties in with previous research on how communication between customer and service employee contributes to enjoyment (Davis et al., 2011) and shows that service providers are unlikely to compete on the innovativeness or engagement of their SST in the near future. Well-trained service personnel allow for more personalized communication and customization, while the SST currently in use mainly focuses on the completion and use efficiency of basic services.

These results extend literature on service delivery (e.g. Van Riel et al., 2012; Meuter et al., 2005) by showing that satisfaction with different service delivery methods is determined by different factors, and that this satisfaction causes different degrees of behavioral intentions down the line. This paper shows that services in both contexts could be researched using different independent constructs as direct comparability along the same lines is methodologically possible as measurement validity for the predictor constructs held. But this approach is likely not practically desirable. Future research should take note that to allow for an empirically accurate prediction of CS and an actually equivalent comparison in practice cases, different quality predictors should be used in the two contexts to establish whether a transition from TS to SST means for CS and other constructs. This is somewhat unintuitive and this insight is the primary theoretical contribution of this paper. It was also was shown that a combination of ECM and TAM can detect these quality predictor differences, although future research should work on integrating such frameworks from technology adoption with frameworks of service satisfaction more.

From a practical perspective, the results imply that SST and TS are not fully substitutable, but not for the technological or practical reasons often cited in the literature. Rather it seems that the exact context and customer expectations about services influence when companies should favor one delivery mode over the other for growing their business sustainably without compromising customer perceptions. Specifying these differences in expectations, and conduct mediator analyses between different service quality dimensions and CS, could progress the field.

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