THE INFLUENCE OF SERVICE DELIVERY SYSTEM EFFECTIVENESS ON PERCEIVED SERVICE QUALITY IN PUBLIC HOSPITALS IN CROSS RIVER STATE

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Abstract
This paper examined the role of service delivery system (SDS) effectiveness on the perception of service quality in public hospitals. Specifically, this study examined the effect of four SDS effectiveness indicators (viz., service coordination effectiveness, effectiveness of frontline employees' role performance, effectiveness of employee adaptability to individual customers' needs, and service process control effectiveness) on clients' perception of service quality in various public hospitals. Structured self-administered questionnaires were used in collecting data from a convenient sample of clients/patients who were either visiting the hospitals to see a doctor or leaving after being attended to by a doctor (final n = 276). Results of data analysis and test of hypotheses using multiple linear regression analysis technique confirm the positive influence of the four dimensions of SDS investigated on perceived service quality. It was concluded that a well-designed and properly-managed SDS which incorporates the dimensions considered in this study can enhance the efficiency and effectiveness of service delivery in public hospitals, as well as service providers' performance.

Keywords: Service delivery system; service quality; public hospitals; employees' role performance; employee adaptability; service process control; job coordination.

Introduction
The third of the seventeen sustainable development goals (SDGs) set by the United Nations (UN) and agreed by all member countries to achieve by 2030 is aimed at ensuring healthy lives and promoting well-being for all, irrespective of age. Among the many strategies governments all-over, the world may deploy to achieve this goal is the repositioning of public health institutions to deliver high quality services. According to Gronroos and Ravald (2011), service firms that aim to create and constantly offer value to their clients are continually engaged in the pursuit and delivery of high-quality services. In the context of public health services, providing high quality services that meet the needs and wants of clients/patients may translate to better health and improved quality of lives. Indeed, it has been observed that quality improvement and qualitative service delivery are increasingly being recognized as important issues that must be addressed, if the health care needs of the people must be met (Morris & Bell, 1995). To be able to provide high quality services and create required value for clients/patients, service providers need to have a functional service delivery plan/procedure or system which must be implementable (Parasuraman et al., 1985). The continuous improvement/adjustment of the components of this system as the need arises enhance the optimization of SDS and standardization of services rendered.

In a bid to improve quality of healthcare services and thus increase patients' satisfaction (and

patronage) of government health facilities, both the federal and state governments have put in place quality improvement programmes aimed at ensuring that the quality of services rendered to patients meet their requirement. One of such programmes that is currently being implemented in public hospitals in Nigeria is SERVICOM. The SERVICOM programme is basically a service quality assurance programme which necessitates continuous determination to attain measurable improvement in the effectiveness, efficiency, performance outcomes and other pointers of qualitative services. Currently, many such programmes are being promoted in public health institutions with the goal of achieving the sustainable development goals (SDGs) related to healthcare and wellbeing, as well as improving patients' service experiences.

Given the decades of neglect suffered by the Nigeria public health system (as recently exposed by its inability to cope with the COVID-19 pandemic), as well as the preference for private healthcare services and medical tourism abroad (for those who can afford it), the pertinent question for this study is: To what extent would SDS effectiveness indicators influence or explain the service quality experiences of patients/clients who patronize public healthcare institutions in Calabar? Furthermore, given the significant relationship that has been established between SDS effectiveness and service quality (e.g., Hensell, 1990; Kingman-Brundage, 1991; Hartland & Ferrell, 1996; Parasuraman et al., 1985), empirical answer to this question may inform policy measures toward improving service delivery systems in public hospitals with attendant improvement in health services quality and quality of life. This study employed the SDS dimensions used by Lodorfos et al. (2015) in examining the hotel service sector in Greece. As a departure from, and contribution to, their work, as well as testing the generalizability of their findings to other service sectors, this study focuses on public health service providers in an emerging economy.

Literature Review and Hypotheses Development

In general management context, Drucker (2004) opines that a system is 'effective' if it is capable of generating a specific desired outcome or doing the right thing or achieving a set of specified objectives. Within the context of service management, a service delivery system comprises the infrastructure, structures, and the service delivery protocols/processes/procedures (Goldstein et al., 2002). Structure here refers to such essentials as equipment and facilities, while infrastructure refers to job design and skills set. Going by the foregoing descriptions, SDS effectiveness is conceptualize as the extent to which a system can achieve the objectives for which it is designed, that is, its capability to produce or deliver the outcome for which it is put in place (Kingman-Brundage, 1991). By their nature, SDSs exist in organizations to bridge the gap between the specifications of a qualitative service and the actual delivered service (the so-called 'third' gap of service quality) (Parasuraman et al., 1985). To this end, it has been suggested that an effective SDS should result in high qualitative services in terms of technical performance and customers' judgement, because customers are most likely to rate the services offered to it by an organization very high when promised values are delivered (Zeithaml et al., 1988; Parasuraman et al., 1991). In addition to serving as a mechanism for closing the gap between actual quality of delivered services and customers' experience, SDSs generate several positive outcomes including, operational cost reduction, increased operational efficiency, improved service quality, and positive customer experience (Walley & Anin, 1994).

The pertinent literature describes two broad approaches to studying the effectiveness of SDSs in organizations. The first approach involves determining or measuring the specific outcomes of SDSs, which may include the time efficiency (i.e., salvaged time) during the performance of a task, operational cost reduction resulting from systems optimization, percentage increase in turnover, etc. (Haynes & DuVall, 1992; Mandell, 1991). The second approach centres on using the important components of a service delivery system as proxy variables to measure or determine its effectiveness (Lodorfos et al., 2015; Ponsignon et. Al., 2011). Although both approaches have their merit, this study adopted the second approach because it enabled the researchers identify the key factors/component underlying SDS effectiveness, and then relate them to service quality with a view to understanding their relative influence. Consistent with the literature (e.g., Lodorfos et al., 2015; Bettencourt & Brown, 1997), this study argues that the most important components of a service system effectiveness are: the degree to which

frontline staff perform their roles well (frontline employee role performance), their ability to accommodate or adapt to each individual patient's needs, the degree to which functions in the system are effectively coordinated (coordination effectiveness), and the effectiveness level of the service process control put in place. These four components are considered critical because, given that SDSs are aimed at creating customer value and satisfaction, the degree to which frontline employees can arouse a positive impression about the services rendered by the organization as well as their ability to adapt their skills and functions to meet unique customer needs may determine whether the system is effective or not. Furthermore, because a service delivery system is essentially a complex multi-functional interdependent service process, hierarchically integrated into a synergistic process architecture (Sousa & Voss, 2006), the effective coordination and control of the service delivery processes and functions are important underlying determinants of the overall system's effectiveness. This study developed the below hypotheses to be tested (Fig. 1).

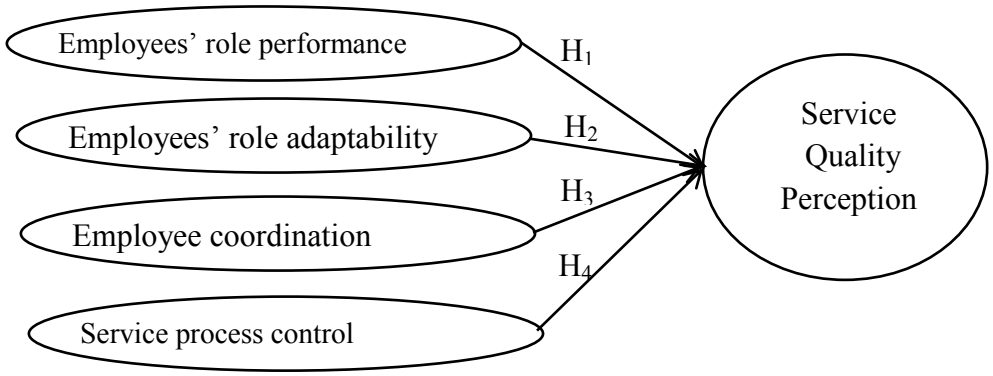

Fig. 1: Conceptual framework

Frontline Employee Role Performance

Most service providers have detailed job descriptions and manuals which their staff are expected to execute effectively and efficiently if they are to satisfy their customers. In addition to describing the detailed role expectations of employees, these documents reflect organizational standards and customer needs, as well as the visions and objectives of the organization. Given that frontline employee (and the back-office staff that support them) constitute an organization's 'frontline' – the meeting point/experience between customers and the service organization – the effective enactment of their roles will impact positively on customers' experience and perception (Kostopoulos, 2018; Shneider & Bowen, 2019). This is because service employees are an inseparable part of the services they provide, and their performance is intricately linked to the performance of the SDS as a whole (Lovelock, 1985). In other words, when frontline service employees perform their task/role effectively, they help in attaining organizational goals related to standards and quality, thus bridging the gap between service delivery and customers' expectations (Zeithaml et. Al., 1988).

Based on the foregoing argument, and consistent with the suggestions of previous studies (e.g., Kostopoulos, 2018; Lodorfos et. Al., 2015; Hartline & Ferrell, 1996), we posit that:

> *H_1: Service employee role performances significantly influence customers' perception of service quality.*

Employees' Role Adaptability

Organizations often expect their employees to act or behave in certain ways when dealing with customers as part of their roles. However, there are situations where specific customer needs require employees to deviate from their stated duties to satisfy customers. Described as employees' ability to adjust their behaviour to meet individual customer's needs (Hartline and Ferrell, 1996), employees' versatility or role adaptation is distinct from the random deviant behaviour and performance sometimes noticed in employees (Lodorfos et al., 2018). Because each customer is unique, and because the service employee is inseparable from the service, employees' ability to adapt to meet customers'

needs is an important integral aspect of a organization's SDS.

Frontline employees occupy an important boundary position which serves as a critical bridge between customers and the organization (Schneider & Bowen, 2019). Their ability to be innovative in attending to customers' needs at any given time may result in positive customer perception and satisfaction, and consequently, favourable organizational outcomes (Harris et al., 2014; Lodorfos et al., 2018). Therefore, we reason that given the crucial role empowered frontline employees play in shaping customer service experiences (Kostopoulos, 2018), their ability to adapt their roles under different conditions in reaction to customers' peculiar needs will lead to quality services and customer satisfaction. Indeed, scholars have shown that a direct link exist between employees' ability to adjust to individual customers' needs and perception of service quality (Singh, 2000; Bettencourt & Brown, 1997), and employees who neither have the ability to adapt nor willing to adjust to meet customer needs contribute marginally to the organization's quality service assurance (Sony & Mekoth, 2012). Moreover, it is not uncommon to find customers who go to a service centre and request the attention of a particular service employee because they felt satisfied with the previous service encounter they had. We propose here that employees' ability to understand the individual needs of their customers and to adjust/customize their service offerings will lead to satisfaction and perception of high-quality service.

> *H2: Frontline employees' role adaptability significantly influence perception of service quality by customers.*

Employee Coordination

Effective employee coordination pertains to the degree to which employees cooperate and work in synergy, or as a team, to achieve mutually agreed objectives (Ellinger et al., 2011). A typical service organization may have different departments staffed by personnel with different skills and responsibilities. Effectively coordinating the employees from the various departments brings about a number of benefits, including improved communication among organizational members/units, improved synergy in work/task flow, improvement in overall organizational functions, optimization of team synergy, avoidance of bottlenecks, minimization of miscommunication during service delivery, and the generating of greater values for customers (Demirbag et al., 2012; Gittel & Weiss, 2004; Zeithaml et al., 1988; Lings & Brooks, 1989).

By effectively coordinating its service employees and task, both within a given department and at inter-department levels, the service delivery system is enhanced and the customers are the happier for that (Schneider and Bowen, 2019; Zomerdijk & Vries, 2007). Studies have also provided support for the critical importance of effective employee coordination plays in ensuring qualitative service delivery. For example, Zeithaml and Bitner (2000) suggests that proper coordination between frontline staff and back-office personnel is critical to an effective and efficient service delivery system. Similarly, it has been noted that effective coordination of employee activities in an organization will lead to less managerial and organizational failures, and an improved service delivery system (Saraph et al., 1989; Lings & Brooks, 1998). To this end, we argue that effective and proper coordination of employees and tasks in service organizations will enhance staff efficiency and communication, thus prompting positive customer service experiences/encounters and favourable feedback on service quality. Based on the above premise, we put forward the below hypothesis:

> *H_3: Effective employee coordination significantly influence consumer perception of the quality of services offered by service providers.*

Service Process Control

Service delivery systems often involve complex, but complimentary, interface between humans, technology, internal subsystems, and the external environment (Schneider and Bowen, 2019). To ensure every component of the interface perform optimally, standards and operational procedures are put in place. The continuous monitoring and controlling of the workings of these interfaces so as to ensure overall optimal performance of the SDS is what process control aims at achieving. The pertinent literature describes process control as the totality of measures and procedures aimed at guiding work-flow and the deployment of organizational resources so as to minimize deviations from specified standards and

performance objectives (Armistead, 1990). In addition to using the commonly-used process control tools such as performance measurement and control charts (Antony et al., 2007), management experts have suggested that SDSs may be greatly improved by using process control tools such as bench marking (BM), process re-engineering (PR), root cause analysis (RCA) and continuous improvement (CI) (Yasin & Yavas, 1999).

It is not far-fetched to see how an effective process control structure may enhance SDS performance in a service organization. The continuous monitoring and evaluation mechanism embedded in process control enables the service provider to continually refine and adjust the service delivery process with a view to making it more efficient and customer-oriented (Yasin & Yavas, 1999; Lodorfos et al., 2018). Therefore, an effective process control mechanism has the potential to improve and upgrade service delivery quality and to trigger customer satisfaction (Zeithaml et al., 1988; Seith et al., 2005). Given the suggestion that process control is an integral part of a service delivery system (Parasuraman et al., 1991), and the finding that an improvement in process control procedure will lead to effectiveness and efficiency in service delivery quality and, consequently, to positive customer service encounter (George & Gibson, 1991), we propose that:

> *H_4: Effective process control system will significantly influence service quality perception in public hospitals.*

Research Methodology

Sampling and Data Collection

To achieve the objectives of this study, a quantitative survey was used. This study targeted public (government-owned) hospitals in Calabar, Cross River State, Nigeria, as its empirical setting. Although they enjoy more patronage than privately-owned hospitals (mainly because of their subsidized services), there are no shortage of complaints and outcry about the quality of services they offer. According to the Nigeria Federal Ministry of Health, there are seventeen public hospitals and clinics in Calabar. To ensure representativity and accurate approximation of opinion of opinions across target hospitals, a multiple-informant approach was adopted. The initial decision of the researchers was to allocate 20 copies of the structured questionnaires developed for this study to each of the 17 public hospitals identified in Calabar (i.e., target a sample of 340 patients/clients). However, because these hospital and clinics vary in size and patronage strength, the questionnaire were distributed fairly proportional with larger hospital having more while smaller hospitals and clinics were allocated fewer copies.

Respondents were conveniently sampled and questionnaires were personally distributed to patients/clients either at the reception or waiting areas of the respective hospitals. In a few cases, patients had to be assisted to fill out the questionnaires. The questionnaire took place between July and August 2019. In all 287 questionnaires were returned (representing a response rate of 84%). After checking for completeness of responses provided by respondents, only 276 questionnaires were found useable for our analysis. To ensure the suitability of our informants, and as a quality check, respondents were asked to provide information on the average number of times per year they patronize the hospital, their age range and highest level of education. The average age of respondents is 32 years and they visited the hospital to seek medical services 2.5 times per year. As par their highest educational qualification, 14 of the respondents (or 5.07%) had a Ph.D degree or its equivalent, 67 of the respondents (representing 24.27%) had a Master's degree or its equivalent, and 156 respondents (representing 56.52%) had a BSc degree or equivalent. While 32 of the respondents (or 11.59%) had some form of post-secondary qualification lower than a BSc., the rest of the respondents did not attend formal education beyond the elementary level.

Measurement Scales' Reliability and Validity

To ensure the validity of our conclusions, as well as the generalizability of our findings, all construct measures were adapted from scales used in previous studies. To assess and measure employees' role performance, we used the scale developed by Bettencourt and Brown (1989), while employees' ability to adapt/adjust to satisfy patients' unique needs was measured by the scale developed by Hartline and Ferrell (1996). Jaworski and Maclnnis' (1989) scales were used to measure coordination effectiveness and process control effectiveness. The abridged version of the 22-item SERVPERF scale developed by Cronin and Taylor (1992) from the original SERVQUAL

scales introduced by Parasuraman et al. (1985) was used in measuring service quality perception. All responses were measured on 5-point Likert scales ranging from strongly agree (5) to strongly disagree (1). The mean scores for each construct for all respondents were computed to give a continuous score rating for each construct.

Before mean-centering the item scores on each construct for use in hypotheses testing, the items' unidinensionality, validity and reliable were first determined using confirmatory factor analysis (CFA) in *SPSS AMOS (Version 23)*. Table 1 below displays the results of CFA and Cronbach's alpha (α). As can be seen from Table 1, the average variance extracted (AVE) and composite reliability (CR) are above acceptable conventional thresholds, thus indicating discriminant and convergent validity (Hair et al., 2012). The Cronbach's alpha values for each of the scales were also withing acceptable range (i.e., $\alpha > 0.70$), thus indicating internal consistency of the measurement scales (Hair et al., 2012). In sum, the combined examination of the measurement model fit indices (CFI > 0.9, TLI > 0.9 and RMSEA < 0.5) and the measures of validity and reliability indicate that the multi-item scales used in this study is unidimensional.

Table 1: Results of validity and reliability tests using CFA

Variables	*CFI*	*TLI*	*RMSEA*	*AVE*	*CR*	*Cronbach's α*
Employees' role performance	0.913	0.907	0.081	0.61	0.87	0.76
Employees' role adaptability	0.908	0.899	0.088	0.57	0.78	0.81
Coordination effectiveness	0.974	0.923	0.091	0.59	0.88	0.88
Process control effectiveness	0.933	0.905	0.088	0.66	0.82	0.79
Service quality	0.988	0.934	0.079	0.71	0.91	0.90

Results of Data Analysis

After establishing the validity and reliability of the measurement scales employed, the suitability of the data for use with the proposed inferential statistical method was determined by conducting appropriate preliminary data checks. The checks include test of data normality, linearity, continuity and variance inflation factors (Table 2). The mean score (standard deviation) for each of the variables are: Employee role performance = 3.92 (1.02), employee role adaptability = 3.77 (0.89), coordination effectiveness = 3.42 (o.98), process control effectiveness = 3.61 (0.67), and service quality = 4.09 (0.55). The scores on variable kurtosis and asymmetry (skewness) all fall within the conventional values of -1 and +1, thus suggesting that our variables are continuous and normally distributed (Field, 2009). As can be seen from Table 2, the variables are sufficient correlated with each other, and the variance inflation factor for each of the independent variables is below the rejection threshold of 5. This indicates that all the variables are sufficiently linear and none is redundant (Field, 2009).

Table 2: Descriptive statistics

Variables	Mean	S.D	VIF	Kurt.	Skew.	1	2	3	4	5
1. Empl. Role Perf.	3.92	1.02	1.78	-0.76	-0.87	1				
2. Empl. Role Adapt.	3.77	0.89	1.99	-0.46	-0.65	0.21	1			
3. Coordination Eff.	3.42	0.98	1.84	-0.91	-0.88	0.13	0.19	1		
4. Process Control Eff.	3.61	0.67	1.69	-0.34	-0.71	0.09	0.15	0.12	1	
5. SERVQUAL	4.09	0.55	-	-0.66	-0.43	0.32	0.24	0.18	0.22	1

Note: VIF = variance inflation factor; Kurt. = kurtosis; Skew. = skewness

To test the hypotheses proposed in this study, a linear multiple regression analysis was conducted (Table 3). From Table 3, it can be seen that the model-data fit [$F_{(4, 272)} = 8.236$, $\boldsymbol{\rho < 0.001}$], and 31.6% of the variation/changes in the dependent variable can be attributed to the four independent variables in our model. To determine the accuracy of the hypotheses developed in this study, the standardized *beta* weight of each of the predictor variables were inspected (Table 3). The result on Table 3 shows that each of the explanatory variables in SDS model tested in this study significantly and positively explained/influenced service quality perception by patients/clients of public hospitals: Employees' ability to performance their roles effectively ($\beta = 0.254$, ρ

< 0.001), employees' ability to adapt to customers' needs *(β = 0.196, ρ = 0.004),* the effectiveness of coordination among different service units *(β = 0.132, ρ = 0.010),* and the degree of effectiveness of the service process control *(β = 0.122, ρ = 0.035).* Based on relative influence, the result also shows that employees' ability to perform their roles effectively has the strongest influence on service quality perception, followed by their ability to adjust to customers' needs, then by coordination effectiveness and effectiveness of service process control.

Table 3: Multiple regression analysis results for hypotheses testing

Model		*Unstd. β*	S.E.	*Std. β*	*t*	*ρ-value*
1.	(Constant)	9.662	0.674		17.215	0.000
	Employees'' role performance	0.618	0.179	0.254	3.456	0.001
	Employees' adaptability	0.437	0.038	0.196	2.922	0.004
	Coordination effectiveness	0.397	0.115	0.132	2.688	0.010
	Process control effectiveness	0.309	0.122	0.105	2.116	0.035

Notes: $R^2 = 0.316$, *Adj* $R^2 = 0.201$, $F_{(4, 272)} = 8.236$, $\boldsymbol{\rho < 0.001}$

Discussions - Implications

The creation of meaningful customer value is tied to the provision of high-quality services. And for a service provider to ensure consistently high quality services, its service delivery system must be optimal and effective. Using four critical dimensions of SDSs that have been identified in previous studies, this study sought to determine the extent to which employees' ability to perform their roles effectively, their ability to adapt to customers' peculiar needs, the effectiveness of service process control procedures and inter-/intra-units coordination effectiveness influence the service quality experience of customers in public hospitals. Consistent with evidence from previous studies (e.g., Hartline & Ferrell, 1996; Bettencourt & Brown, 1997; Lodorfos et al., 2015), the current study found that, overall, an effective SDS leads to a significantly positive perception of the quality of services offered by service firms. Specifically, the findings of this study suggest that the more trained and empowered frontline service employees are to execute their jobs, the more efficient they become in delivering qualitative services, and the more positive customers' perception of service quality will be (hypothesis $\mathbf{H_1}$). The result also indicate that when employees are able to customize service offerings to meet customers' requirements, customers feel more positive about the service quality offered by the service providers (hypothesis $\mathbf{H_2}$).

The results of this study also suggest that a properly designed SDS which enhances the smooth coordination of employees/functional service units within the organization (hypothesis $\mathbf{H_3}$), and also ensure that the service delivery processes/procedures are monitored and controlled so as to maintain minimum standard (hypothesis $\mathbf{H_4}$), will lead to positive outcomes in term of customers' experiences and perceptions of service quality. Collectively, these findings suggest that the SDS dimensions examined in this study are critical to understanding patients' perceptions of the quality of services rendered by public hospitals in Cross River State and, by extension, Nigeria. These findings also have some important implications for managers of public hospitals and other similar service providers.

Firstly, only service organizations that provide customer value consistently can remain competitive, and customers often glean value from the quality of services they experience or receive. Our findings imply that a well-designed SDS where service employees training and empowerment is prioritized will enhance organizational service delivery and performance. Therefore, in designing their SDSs, managers of service firms will improve quality of services rendered to customers by first equipping their frontline staff to enact their roles efficiently, and then allow them some flexibility in the organizational service policies/procedures to accommodate customers' peculiar needs. This should be done within a well thought-out service delivery plan that incorporate effective service coordination strategies and process control mechanisms. On the whole, and consistent with extant studies, these findings imply that managers of service firms can improve their performance and actual service quality by concentrating on building effective SDSs where service employee role performance, employee empowerment to

accord individualized attention to customers, effective coordination procedures and service process control frameworks are emphasized.

Conclusions and Recommendations

Based on the findings of this study, we conclude that employee role performance, employee empowerment to enhance their adaptability in meeting customers' unique requirements, effective coordination among the various facets of service delivery and the capacity to effectively monitor and control the service delivery process are critical elements that must be considered in SDSs if high service quality and customer satisfaction/value are to be improved/achieved in public hospitals. Furthermore, given that customers' understanding and experience of values related to service quality is a sum of several dimensions, including reliability and responsiveness (i.e., technical value), empathy (i.e., emotional value) and tangibility (i.e., emotional value) (Zeithaml et al., 1988; Sweeney et al., 1999), a well-designed and properly managed SDS which incorporates the SDS elements examined in this study can guarantee the delivery of qualitative services and optimal service experience to customers of public hospitals.

Valid as the conclusions of this study may be, some important limitations abound which future researchers may have to consider. The conceptual model tested in this study only used four dimensions of service delivery systems. However, there are several employee-related and structural/managerial dimensions of SDSs that may be incorporated in future models to improve the explanatory power of our model. These dimensions include role ambiguity, level of technology adaptation, job motivation and satisfaction, and operational environment (Schneider & Brown, 2019). Beyond expanding the conceptual model to accommodate more SDS dimensions, future research may also consider other outcome variables such as re-patronage intensions and perceived values. Furthermore, the current study did not attempt to test the SDS dimensions in service environments characterized as high or low service contacts requirements or degree of service complexity. Research has shown that the effectiveness of a SDS may be impacted be whether the service is high or low contacts with service employees (Skaggs & Galli-Debicella, 2012) and the degree of complexity of the service (Kostopoulos, 2018). Future researchers may provide more insight into our findings by integrating these potential moderators into their models.

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