Time lags, non-linearity and asymmetric effects in an extended service-profit chain

Gregory Strydom[1], Michael T. Ewing[2,4], Campbell Heggen[3]*

[1] Frizelle Sunshine Automotive Group, Southport, Australia
[2] Department of Marketing, Deakin University, Melbourne, Australia
[3] Department of Accounting, Deakin University, Melbourne, Australia
[4] Michael T. Ewing is an extraordinary Professor in the Department of Marketing Management at the University of Pretoria.

*Corresponding author: Campbell Heggen can be contacted at: campbell.heggen@deakin.edu.au

Abstract

Purpose: This study aims to present an extended service-profit chain (SPC) framework for assessing service performance. This framework is then used to investigate non-linear and asymmetric links between service delivery investments and customer satisfaction, as well as time lags in organisational performance outcomes.

Design/methodology/approach: The study draws on panel data with repeated measures from a sample of automotive after sales service departments. Data collected comprises both objective and survey-based data, including operational inputs, productivity, service quality, service experience, behavioural intentions, customer retention and organisational performance.

Findings: Non-linear and asymmetric effects are identified, suggesting that customers' evaluations of service performance are more sensitive to negative performance (dissatisfaction) than positive performance (satisfaction). Accordingly, focusing on attributes for which customers are experiencing negative performance first, and then allocating resources to attributes for which customers are experiencing positive performance, can be far more consequential for improving customer satisfaction.

Practical implications: From a practical perspective, the findings deepen current understanding of the relationships between service performance metrics. They also provide guidance for managers seeking to better deploy service resources to enhance service quality, customer satisfaction and customer retention to improve profitability over time.

Originality/value: Drawing on a unique and rich data set, this study provides a significant improvement on previous SPC frameworks by adding new dimensions identified in recent meta-analyses and addresses calls for more research into non-linear, asymmetric and longitudinal effects within the SPC.

Keywords: Organisational performance; Customer retention; Customer satisfaction; Service-profit chain; Firm performance; Time lags; Non-linearity; Panel data

Citation
An ongoing challenge for service organisations is the need to more effectively evaluate investments in service delivery against organisational profitability (Coelho and Vilares, 2010). To date, examinations of this return on investment have largely focused on specific aspects of the value chain, as opposed to viewing the chain in its entirety. Prior research has assessed return on quality (Rust *et al.*, 1995; Rust *et al.*, 2002); return on marketing (Rust *et al.*, 2004); the impact of customer satisfaction on financial performance (Anderson *et al.*, 1994; Anderson *et al.*, 1997); and how balancing resources between customer acquisition and customer retention impacts on return on investment (Reinartz *et al.*, 2005). The service-profit chain (SPC), as conceptualised by Heskett *et al.* (1994), and subsequently tested by a number of researchers including Kamakura *et al.* (2002), attempted to address this through the adoption of a "returns-based" approach to the entire service value chain, considering service inputs against a series of antecedents and consequences, leading to organisational profitability.

Recent meta-analyses by Hong *et al.* (2013) and Hogreve *et al.* (2017) show that while the links proposed in the SPC appear statistically significant and substantial, further examination is warranted. Specifically, effect sizes within the SPC are context specific and vary according to the type of service provided. For example, assessment of the SPC within retail and franchise environments has provided mixed results (Silvestro and Cross, 2000; Pritchard and Silvestro, 2005; Maritz and Nieman, 2008; Gelade and Young, 2005).

In addition, prior studies have largely drawn on cross-sectional data, which limits understanding of potential longitudinal effects across SPC linkages. Larivière (2008) modelled multi-period customer profitability, focusing specifically on share of wallet at the customer level, but did not evaluate performance over time at the firm level. Evanschitzky *et al.* (2012) identify lagged effects within the SPC, specifically between operational investments and employee satisfaction, and between customer satisfaction and operational profits. However, they did not factor in the impact of customer loyalty or customer retention, a key component of the Heskett *et al.* (1994) and Kamakura *et al.* (2002) SPC models. Thus, there is a need to further test the concept temporally.

Finally, though examination of the SPC has often implied linear relationships, empirical studies have identified that the effects could be non-linear or asymmetric (Agustin and Singh, 2005; Matzler *et al.*, 2004; Mittal *et al.*, 1998). Further, Anderson and Mittal (2000) propose that an assessment of the potential non-linear and asymmetric relationships that exist among the various linkages within the SPC may provide for both improved empirical insights, as well as more accurate guidance for the allocation of resources and successful implementation.

Accordingly, the aims of this study are:

- to extend the SPC model as proposed by Kamakura *et al.* (2002), incorporating employee-focused measures as well as technical, non-technical and operational inputs;
- to use the service performance metrics identified in this extended SPC model as a basis for examining lagged performance effects; and

- to investigate and identify potential non-linear and asymmetric effects among the previously validated SPC linkages.

This will be achieved through the application of structural equation modelling (SEM), drawing on panel data from a sample of automotive after sales service departments. Such an approach will provide a better understanding of the drivers of service performance and ultimately, this will elucidate improved levels of output *vis-à-vis* invested inputs and guidance regarding the allocation of resources.

Conceptual development

Kamakura *et al.* (2002) contend that applications of the original SPC have, despite their inherent value, fallen short in one key respect: the failure to consider the input costs associated with the implicit goal of output maximisation. Specifically, Heskett *et al.* (1994) had focused on the maximisation of customer retention and sales revenue with no apparent consideration of the inputs associated with the delivery of the service in question. In other words, having profits or margins as the dependent variable was not enough and that unless the positive *and* negative impact of service expenditure and investment was included in the analysis, empirical models would be incomplete.

A series of SPC applications were offered as evidence of this apparent deficiency. These included an application at Sears where sales and revenue increases were favoured over profitability (Rucci *et al.*, 1998). Similarly, the SPC model at PNC Bank focused on customer satisfaction and bank balance, not profitability (Carr, 1999), while at Holiday Inn, service quality was modelled against potential room revenue (Kimes, 2001). The trend of quantifying financial outputs in isolation from investment in inputs continued after the Kamakura *et al.* (2002) insights. These include an examination of a European financial services organisation, attempting to link customer satisfaction, service quality and share of wallet (Larivière, 2008); a study of the linkages between employee factors and customer profitability in a Chinese securities firm (Xu and van der Heijden, 2005); and consideration of how customer satisfaction and repeat-purchase intention drive corporate performance in restaurants (Gupta *et al.*, 2007). All of these are of interest, but none address the fundamental “input-output” issue.

The return on quality framework introduced by Rust *et al.* (1995) provides guidance for closing this gap. The simultaneous consideration of positive and negative inputs and outputs results in a more measured view of profitability, thus providing the inspiration for a revised SPC. Based on this, the SPC model proposed by Kamakura *et al.* (2002) reshaped the Heskett *et al.*’s (1994) conceptualisation and proposed a framework that considers operational efforts, consumer perceptions and business performance. This primary contribution, together with two others, namely, inclusive modelling of the SPC as opposed to an isolated study of SPC linkages (Soteriou and Zenios, 1999) and the consideration of a simultaneous strategic and operational focus, differentiates the Kamakura *et al.*’s (2002) extension from the original Heskett *et al.*’s (1994) conceptualisation.

Despite Kamakura *et al.*’s (2002) contribution, salient gaps still remain. Specifically, the open nature of the “input – output” framework proposed by Kamakura *et al.* (2002) provides for the consideration of alternative and additional constructs in

building the empirical model. Key internal controllable variables that facilitate greater organisational efficiency include technology, advancements of which make service methods that are simultaneously effective and innovative possible (Keh *et al.*, 2006; Rust and Huang, 2012), and personnel, whose self-efficacy and engagement are significant determinants of service productivity (Hogreve *et al.*, 2017; Lee *et al.*, 2017; Myrden and Kelloway, 2015). In this study, variable operational inputs are classified as either variable technical or variable non-technical, accounting for those staff members or resources deployed directly to perform the service, and those who provide front or back-office support. In addition, fixed operational inputs are classified as the overall service department operating expenses inclusive of rent, administration, marketing and utilities.

A further limitation of the Kamakura *et al.* (2002) framework is that it does not incorporate employee-focused measures included in the original Heskett *et al.*'s (1994) conceptualisation. Operational productivity (i.e. how effectively process-related inputs are transformed into economic results and customer value) also plays an important role in the revenue generation discussion (Grönroos and Ojasalo, 2004, 2015). Productivity as a construct is distinct from (Singh, 2000), yet, positively connected and elemental to service quality (Grönroos and Ojasalo, 2004; Lee *et al.*, 2017; Rust and Huang, 2012). In the context of firm performance, its significance is undisputed (Lee *et al.*, 2017; Marinova *et al.*, 2008). Therefore, the present study includes employee productivity as a mediating link between operational inputs and customer satisfaction.

Finally, this study acknowledges that customer perceptions and intentions may not directly impact customer retention and profitability in the same time period (Evanschitzky *et al.*, 2012). This is particularly the case in the automotive service environment, where interactions may be six to nine months apart. As result, positive service experience and customer satisfaction may impact customer retention and firm performance in both current and future time periods. Accordingly, a lagged measure of organisational profitability is included in the conceptual model, to evaluate temporal effects of expenditure and investment in fixed and variable operational inputs. As described in Figure 1, the extended SPC model proposed in this study has five levels of inputs:

1. Operational inputs: the investment in manpower associated with technical service delivery, non-technical service support and overall service department operating expenses;
2. Employee productivity;
3. Attribute performance perceptions: comprising service quality inputs (the perception of service quality relating to fixed right first time, completed on time and overall satisfaction with the work performed) and service experience inputs (the perception of the service received including overall satisfaction with the service provider, their knowledge and willingness to assist);
4. Behavioural intentions: behavioural loyalty measures relating to satisfaction and amplification; and
5. Customer retention: behavioural loyalty measures relating to customer retention and defection.

While the conceptual model outlined above implies symmetric and linear relationships between the SPC linkages, empirical studies often indicate that these relationships are complex and non-linear (Agustin and Singh, 2005; Matzler *et al.*, 2004; Mittal and Kamakura, 2001; Mittal *et al.*, 1998). For example, prior studies have identified an asymmetric relationship between attribute-level performance and overall satisfaction (Matzler *et al.*, 2004), and that negative performance on an attribute has greater impact on overall satisfaction than positive performance on that same attribute (Mittal *et al.*, 1998). Previous studies also demonstrate that overall satisfaction and performance are related non-linearly to repurchase intentions or loyalty (Oliva *et al.*, 1992; Agustin and Singh, 2005), and that satisfaction and dissatisfaction have different affective consequences (Oliver, 1993), which may be related differentially to repurchase intentions.

Two different theoretical lenses can be applied to explain these findings. One is based on prospect theory (Kahneman and Tversky, 1979), and the other on the disconfirmation paradigm (Oliver, 1980, 1997). Prospect theory (Kahneman and Tversky, 1979) postulates that people's judgements are reference dependent, and that losses loom larger than gains. That is, positive and negative performance are evaluated relative to an initial reference point, and that one unit of negative performance on an attribute could have a greater effect on overall satisfaction or repurchase intentions than a corresponding unit of positive performance (Mittal *et al.*, 1998). According to the disconfirmation paradigm (Oliver, 1980, 1997), satisfaction is formed through a cognitive comparison of perceived performance with pre-purchase expectations:

> Perceived performance can be greater than expectations, resulting in positive confirmation (satisfaction), or lower than expectations, resulting in negative disconfirmation (dissatisfaction). If the service is performed as expected, the comparison results in moderate satisfaction or indifference (Matzler *et al.*, 2004, p.273).

Accordingly, both theories imply that a basic level of service is anticipated by the customer in advance of the service experience, and that deviations in either the negative- or positive-performance domain may asymmetrically impact on customer satisfaction.

Research design

Research setting and sample

The research was conducted with a prominent global automotive brand's Australian operations. The after sales service sector of the automotive industry was selected for two reasons: the potential to further develop and consolidate knowledge from prior studies which have examined the SPC within retail and franchisee environments (Silvestro and Cross, 2000; Pritchard and Silvestro, 2005; Maritz and Nieman, 2008; Gelade and Young, 2005) and to assess the relevance of the SPC in light of some unique environmental characteristics which may not be shared across other industries.

An example of this is the variable nature of consumer response to a purchases such as service offer. For example, given the choice, some customers may view vehicle servicing as a "grudge purchase" and only do so under obligation (i.e. to preserve

new-vehicle warranty coverage), a desire to maintain resale value or via an attitude of risk mitigation (i.e. reduced risk of vehicle breakdown). Others may be neutral, and some may be positively disposed to servicing their vehicle. While this is similar to the service provided by dentists or tax agents, for example, it may not be the case for services such as airline travel, hotels or movie theatres which generally provide greater hedonic value.

To examine the inherent time lags associated with the tracking of service performance, the study utilises panel data sourced directly from the franchisor – collated as part of the reporting requirements in the dealers' franchise agreement. Further, the study draws on both objective and perceptual measures, linking customer satisfaction and loyalty to various firm metrics at the individual dealership level. Accordingly, the data originated from two different sources: accounting and statistical data drawn directly from each dealership's management system, and from customer satisfaction surveys and service customer loyalty reports collected by the franchisor. The items for measuring latent constructs, including the results of confirmatory factor analysis, are provided in Appendix 1

The dealerships form part of a franchise network and range in size and geographic location (see Table 1). Of an initial 218 individual franchisee sets, a total of 38 franchisees (representing 10% of the brand's sales volume) were found to have missing data. This was due to one or more of the following reasons: incomplete financial downloads; inadequate customer responses resulting in invalid customer feedback; change in dealer status (e.g. dealership opened/closed during sample period); branch consolidation; loss of franchise. This resulted in a final sample of 180 dealers, representing 90% of sales volume for the brand. With data being collected over four discrete financial years, the final data set consisted of 720 firm-year observations.

Customer survey data and loyalty reports were collected in relation to 3,513,163 individual service interactions completed by the 180 dealers over the four year period. Total service interactions during the period includes both new and retained customers, but excludes repairs completed under warranty and at no cost to the customer. Post-service customer surveys were conducted via telephone, with customers contacted 25 days after their service interaction. Survey questions focus on behavioural and observable conditions experienced by customers during the service process. While the response rate varies across dealers, the average survey response rate for the franchise network was 39%. Customer survey data were aggregated at the dealer level, with the average (mean) annual value computed for each survey item to correspond with the financial year reporting period.

Table 1. Dealership characteristics

Dealership characteristics		**Mean**	**Minimum**	**Maximum**
Number of service employees		23.5	0.4	93.5
Annual retail repair orders		4,880	1,099	24,847
Annual service revenue (000's)		$2,551	$325	$13,613
Location				
Metro	*48.30%*			
Rural	*51.70%*			

Customer loyalty was evaluated using service retention data at the dealer level. Service retention data is tracked based on unique vehicle identification numbers (VINs), which is used to record the vehicle service history over the ownership period. Service retention data was collected for the first four paid service interactions, measured as the percentage of customers returning to service their vehicle at the dealership. Accordingly, customer retention data utilised in this study includes the percentage of customers returning to the dealer for their first, second, third or fourth paid service per annum, for each of the four discrete financial years.

Measures

Operational inputs. Following Kamakura *et al.* (2002), resource investments in operational inputs may be classified as either personnel (variable) or equipment and resources (fixed). Operational variable inputs in an automotive retail service environment include two primary components, namely, the provision and sale of labour (i.e. technical inputs), and the provision of front- and back-office functions designed to support the service delivery process (i.e. non-technical inputs). For this study, operational variable costs were defined as:

- total cost of technicians and apprentices labour per retail repair order; and
- total cost of non-technical (support) service staff per retail repair order[1].

In addition, a third operational input is included, namely, the total operating fixed expenses (inclusive of rent, administration, marketing and utilities, but excluding non-technical staff costs) per retail repair order.

Productivity. Employee productivity is assessed using an objective measure of workshop productivity (i.e. overall operational productivity), as a measure of how effectively process-related inputs are transformed into economic results and customer value (Grönroos and Ojasalo, 2004; Singh, 2000). Specifically, productivity is calculated as the total number of hours worked on retail repair orders or jobs, divided by total workshop hours available[2].

Attribute performance perceptions. The use of customer satisfaction metrics for attribute performance perceptions is well documented and utilised in the services literature (Silvestro and Cross, 2000; Pritchard and Silvestro, 2005; Gelade and Young, 2005; Larivière, 2008). This study evaluated two distinct performance attribute aspects that contribute to overall customer satisfaction: *perception of service quality* (technical aspects) and *perception of the service experience* (non-technical aspects). Both attributes are assessed via a post-service customer survey, which incorporates both objective and perceptual performance measures. Perceived service quality is measured using four items, comprising two perceptual measures (i.e. overall satisfaction with the service or work performed, and satisfaction with the condition the vehicle was returned in), and two objective measures (i.e. fix right first time, and vehicle delivered on time or at the time promised). Perceived service experience is also measured using four items, including overall satisfaction with the Service Advisor, satisfaction with their willingness to assist, their knowledge, and explanation of the work performed. Perceptual evaluations of service quality and experience were measured on 5-point scales, ranging from “completely dissatisfied” to “completely satisfied”, while objective measures were measured on a 2-point dichotomous scale (yes/no).

Behavioural intentions. Following Kamakura *et al.* (2002), an overall behavioural intention rating is included which is measured using a perceptual survey item evaluating customers' willingness to recommend the service outlet (Ewing, 2000; Yee *et al.*, 2011). The item is measured on a 5-point scale, ranging from "extremely likely" to "not likely at all".

Customer retention. Following Towler *et al.* (2011), this study adopts an objective measure of automotive service customer retention. However, this study extends the approach taken by Towler *et al.* (2011) and acknowledges that customer perceptions and intentions may impact customer retention and profitability in both current and future time periods (Larivière, 2008). This is particularly the case in the automotive retail environment where service interactions may be six to nine months apart. Accordingly, customer retention includes four items: retention at the first and second paid service, which occur in the same time-period as the initial operational inputs, and retention at the third and fourth paid service, which are lagged items measured in the following time period (t + 1).

Organisational profitability. Both absolute and relative measures of profitability have been included in previous SPC research. Relative profitability metrics have been favoured over absolute measures due to the benefits associated with benchmarking across the franchise network and the ability to compare relative profitability with relative input measures (Silvestro and Cross, 2000; Pritchard and Silvestro, 2005). In this study, profitability is operationalised as operating profit margin (i.e. operating profit as a percentage of annual sales) measured at the dealership level.

Controls. A number of covariates are included in the model to control for relevant dealership-level characteristics affecting investment and performance. Specifically, two time-varying controls, namely number of employees and facility size, and one time-invariant control, facility location. Facility size is operationalised as the natural log of Total Service Sales Revenue. Facility location is a dichotomous variable with dealerships located in metro (versus rural) regions being associated with higher levels of competition. Descriptive statistics are presented in Table 1.

Methodology

The linkages outlined in the conceptual model were tested using SEM, which consists of a set of multivariate procedures that allows simultaneous analysis of multiple relationships between directly observable and/or un-observable (latent) variables (Shook *et al.*, 2004; Steenkamp and Baumgartner, 2000; Baumgartner and Homburg, 1996). The use of SEM is appropriate for this study as it allows for the estimation of multiple and interrelated dependent relationships between variables, as predicted in the SPC, whilst also providing for the holistic evaluation of overall model fit (Kamakura *et al.*, 2002). In addition, while prior studies have advocated for the use of OLS for estimating non-linear relationships (Larivière, 2008), more recent advances in SEM techniques also provide for the estimation of latent interactions and non-linearity (Marsh *et al.*, 2004; Marsh *et al.*, 2007; Lin *et al.*, 2010).

The study adopts a two-step approach to SEM analysis advocated by Anderson and Gerbing (1988), whereby the measurement model is assessed prior to evaluating the conceptual model. Given the study draws on panel data with repeated measures

observed over four periods, a general panel model with lagged dependent variables is specified and error terms of dependent variables are allowed to covary to account for potential autoregressive effects (Bollen and Brand, 2010). Data were analysed using AMOS 25.0, with the default maximum likelihood estimation technique.[3

Assessment of the measurement model

Assessment of the measurement model involves two steps: First, a first-order confirmatory factor analysis (CFA) model is developed for each theoretical latent construct to assess both single-item and measurement scale reliability (Kline, 2010). Second, a full-model CFA incorporating both directly observed and latent constructs is used to compare the overall measurement theory against reality as represented by the sample data (Anderson and Gerbing, 1988; Hair *et al.*, 2010; Kline, 2010). The latent variable *customer retention* is specified as a first-order construct, with *service perception* specified as a second-order construct with two latent indicators representing *service quality* and *service experience* respectively.

The factor loadings and measurement model statistics supporting the reliability and validity of the measurement scales are reported in Appendix 1. As recommended by Anderson and Gerbing (1988), path loadings of each indicator on the focal latent construct were statistically significant ($p < 0.01$), and the majority of loadings exceed the general threshold of 0.7. Two indicators do fall below 0.7 (*Fix Right First Time* = 0.644; *Vehicle Delivered On Time* = 0.617); however, they do not meet the criteria for automatic removal as they exceed 0.5 and their deletion does not result in an improvement in composite reliability. The CFA measurement model demonstrates acceptable fit based on the statistical criteria adopted for this study[4].

A multi-trait matrix is used to demonstrate the reliability as well as both convergent and discriminant validity of the latent variables. The “reliability diagonal” of the multi-trait matrix presented in Table 2 shows that the composite reliability (CR) coefficient for all composite measures exceeds the recommended cut-off of 0.70 (Fornell and Larcker, 1981). The convergent validity of each construct was assessed using first-order CFA for each construct, except *Service Perception* where a second-order CFA model encompassing the two first-order traits *Service Quality* and *Service Experience* was evaluated. Table 2 demonstrates that average variance extracted (AVE) for each composite measure exceeds 0.50, and further that the CR for each latent construct is greater than its AVE (Fornell and Larcker, 1981; Hair *et al.*, 2010), thus indicating that convergent validity was supported by the data in this study. Further, the AVE estimates for each pair of latent constructs are greater than the square of the correlation estimate between the two constructs (Fornell and Larcker, 1981; Hair *et al.*, 2010) and CR values in the reliability diagonal are higher than the correlations that occupy the same row and column (Churchill, 1979). Therefore, discriminant validity could be ascertained for all theoretically distinct measures.

Data analysis and results

Evaluation of the conceptual model described in Figure 1 includes the assessment of the level of significance of each path in the proposed structural model, as well as the overall goodness-of-fit of the entire model against the fit statistics outlined above. Table 3 outlines the test of the linear effects between the proposed linkages in the extended SPC.

Table 2. Multi-trait matrix

	AVE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Tech inputs	*N/A*	*N/A*	0.078	0.126	0.012	0.041	0.028	0.000	0.073
(2) Non-tech inputs	*N/A*	0.280***	*N/A*	0.529	0.024	0.094	0.094	0.012	0.095
(3) Operational expenses	*N/A*	0.355***	0.727***	*N/A*	0.007	0.149	0.130	0.052	0.166
(4) Productivity	*N/A*	0.109**	−0.156***	−0.086**	*N/A*	0.000	0.000	0.001	0.001
(5) Service perception	*0.939*	−0.202***	−0.306***	−0.386***	0.000	*0.968*	0.891	0.009	0.204
(6) Customer intention	*N/A*	−0.167***	−0.307***	−0.361***	0.013	0.944***	*N/A*	0.009	0.181
(7) Customer retention	*0.811*	−0.271***	−0.309***	−0.407***	0.026	0.452***	0.425***	0.030	*0.945*
(8) Organisational profit	*N/A*	−0.006	−0.109**	−0.228**	0.027	0.097**	0.095**	*N/A*	0.174***

Notes:

The first column reports the average variance extracted (AVE), where applicable, for each latent construct. For the remainder of the table, the diagonal of the matrix (in bold) presents the composite reliability (CR) for each latent construct, calculated using factor loadings and error variances obtained during CFA analysis. Values below the reliability diagonal comprise the bivariate correlation coefficients and level of significance (***; **; * significant at *p*-value < 0.01, < 0.05, < 0.10; two-tailed), whereas values above the reliability diagonal present the square of the correlation estimate between these two constructs

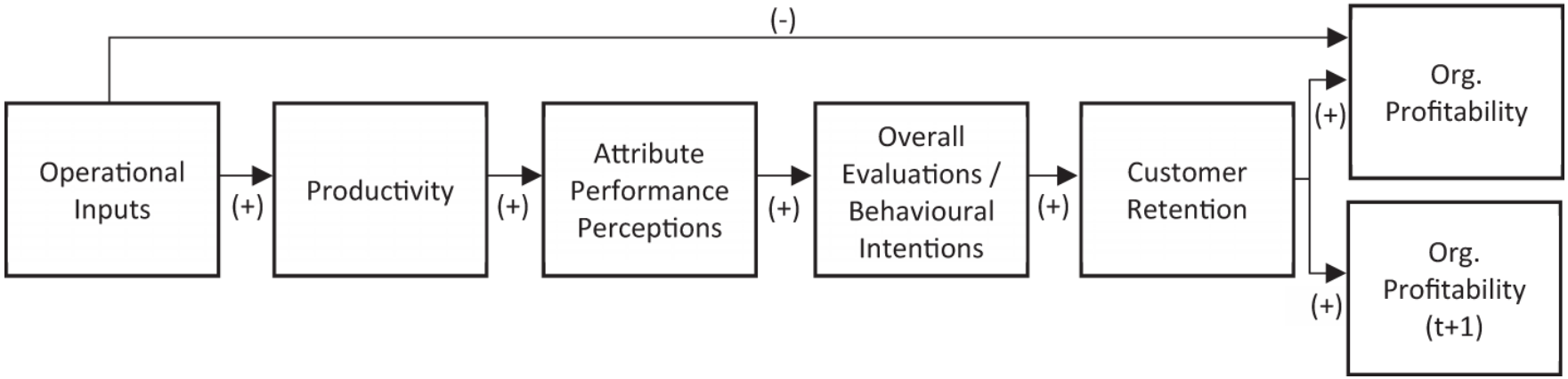


Figure 1. Revised service-profit chain conceptualization

Table 3. Results for the linear effects model

Dependent variables:	Productivity	Service perception	Customer intention	Customer retention	Profitability	Profitability (t + 1)
Independent variables:						
Tech inputs	0.192***	--	--	--	−0.077**	--
Non-tech inputs	−0.182***	--	--	--	0.032	--
Operational expenses	0.015	--	--	--	−0.139***	--
Productivity	--	−0.012	--	--	--	--
Service perception	--	--	0.939***	--	--	--
Customer intention	--	--	--	0.391***	--	--
Customer retention	--	--	--	--	0.119**	0.074
Controls:						
No. of employees	−0.230**	−0.045	0.011	0.371***	−0.044	0.010
Facility size	0.223*	−0.376***	−0.048	−0.336***	0.053	−0.028
Facility location	−0.110**	0.063	0.056**	−0.328***	−0.100*	−0.123**

Notes:
Model fit statistics: χ^2 = 554.1 (df = 171, p = 0.000) CFI = 0.964; TLI = 0.951; RMSEA = 0.064 (0.059–0.071). Standardised coefficients and levels of significance reported; ***; **; * significant at p-value < 0.01, < 0.05, < 0.10 (n = 540)

Non-linear and asymmetric effects were assessed via the inclusion of quadratic and cubic terms for each focal construct in the conceptual model. For observed variables, items were mean centered prior to computing their product terms (Dalal and Zickar, 2012; Iacobucci *et al.*, 2016). For latent variables, the double-mean centered unconstrained approach to latent interactions, using the matched-pair strategy for forming product indicators was adopted (Marsh *et al.*, 2004; Marsh *et al.*, 2007; Lin *et al.*, 2010). Following the specification of the general polynomial structural model, model trimming is used to derive a parsimonious, well-fitting model. The results of the trimmed model are presented in Table 4.

Taken together with the results of the general linear model, the findings reveal that several links within the revised SPC also comprise asymmetric and non-linear effects. To aid interpretation, the relationships were plotted and presented in Figure 2.

The results in Table 3 indicate a positive, significant relationship between operational variable technical inputs and productivity ($p < 0.01$). This finding provides additional evidence of the critical linkage between internal service variables and productivity outcomes in the service profit chain, identified by Hong *et al.* (2013) and Hogreve *et al.* (2017) as statistically significant. Thus, the findings support the significance of sustaining an effective service climate through service-oriented human resources and leadership practices that enhance employee skills and translate into superior performance outcomes.

A significant, negative relationship is observed between operational variable non-technical inputs and productivity ($p < 0.01$). This suggests that the provision of front and back-office functions designed to support the service delivery process does not directly contribute to workshop productivity and may in fact lower productivity. An alternate explanation is that increased investment in operational variable non-technical inputs may not increase workshop productivity, but still contribute to customer perceptions of service quality. However, alternate model specifications (not tabulated) also indicate a significant negative path for both direct and partially mediated effects of operational variable non-technical inputs on perceptions of service performance ($\beta = -0.174$, $p < 0.01$).

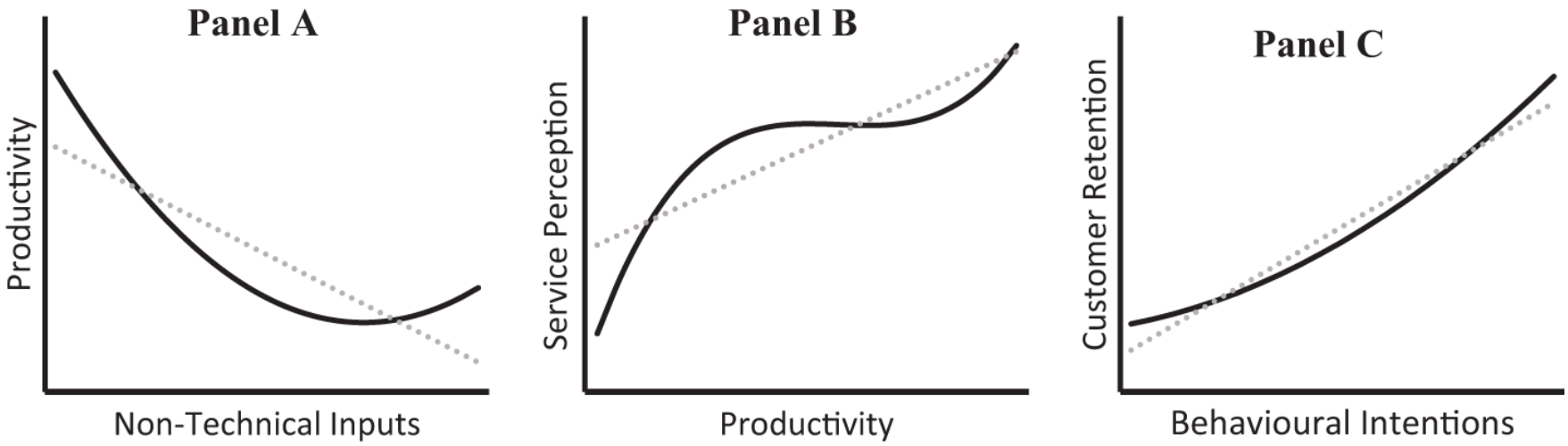
The results in Table 4 suggest that the negative relationship between operational variable non-technical inputs and productivity is not necessarily absolute. As illustrated in Panel A of Figure 2, the positive and significant quadratic term ($\beta = 0.154$; $p < 0.01$) suggests a concave negative marginal product curve. While the finding is still inconsistent with the predicted relationship, it suggests that lower levels of investment in non-technical staff inputs have a proportionally greater negative effect on productivity, relative to higher levels of investment.

The results in Table 3 also fail to support the link between operational fixed inputs and productivity. This suggests that increasing investments in workshop capacity, resources and infrastructure, is not directly related to employee outcomes. Specifically, greater investments in facilities, utilities and marketing do not translate into gains in employee productivity, perhaps pointing to other factors such as underlying processes, training and motivation, which potentially play a more important role.

Table 4. Results for the non-linear and asymmetric effects model

Dependent variables:	Productivity	Service perception	Customer intention	Customer retention	Profitability	Profitability (t + 1)
Independent variables:						
Tech inputs	0.172***	--	--	--	0.079**	--
Non-tech inputs	−0.279***	--	--	--	0.046	--
Non-tech inputs^2	0.154***	--	--	--	--	--
Operational expenses	−0.004	--	--	--	−0.148***	--
Productivity	--	−0.080*	--	--	--	--
Productivity^2	--	−0.101	--	--	--	--
Productivity^3	--	0.205**	--	--	--	--
Service perception	--	--	0.939***	--	--	--
Customer intention	--	--	--	0.412***	--	--
Customer intention^2	--	--	--	0.069*	--	--
Customer retention	--	--	--	--	0.100**	0.051
Controls:						
No. of employees	−0.202**	−0.026	0.011	0.469***	−0.088	0.039
Facility size	0.249**	−0.386***	−0.048	−0.375***	0.096	−0.055
Facility location	−0.108**	0.063	0.056**	−0.316***	−0.122**	−0.131**

Notes:
Model fit statistics: χ^2 = 1349.4 (df = 335, p = 0.000); CFI = 0.931; TLI = 0.911; RMSEA = 0.075 (0.071–0.079). Standardised coefficients and levels of significance are reported; ***; **; * significant at p-value < 0.01, < 0.05, < 0.10 (n = 540)



Notes: Panel A plots the nonlinear relationship between operational variable non-technical inputs and productivity, which indicates a concave negative marginal product curve. Panel B plots the asymmetric relationship between productivity and service perception, which indicates that the impact of negative performance on customer satisfaction is greater than the equal amount of positive performance. Panel C plots the nonlinear relationship between customers' overall evaluations and customer retention, which indicates increasing returns of customer intent on customer retention. The dotted line represents a linear approximation of the nonlinear relationship

Figure 2. Non-linear and asymmetric effects in the SPC

Initial evaluation of the linear effects model (Table 3) failed to support the link between productivity and perceptions of service performance ($\beta = -0.012$; $p = 0.771$), suggesting the relationship between attribute performance inputs and customer satisfaction may be more complex in nature. Indeed, results presented in Table 4 suggests that failure to find empirical support for this link was due to the linear estimation. The extended findings indicate that though the linear and quadratic terms were not significant, the cubic trend was positive and significant ($\beta = 0.205$; $p < 0.05$). Plotting the findings in Panel B of Figure 2 reveals a negative asymmetric relationship between productivity and service perception, which indicates that the impact of negative performance on customer satisfaction is greater than the equal amount of positive performance. This finding is consistent with the form of fit conceptualised by Anderson and Mittal (2000), who observe that changes in the negative-performance domain have greater impact on customer satisfaction than changes in the positive-performance domain. [5] This implies that focusing on attributes for which customers are experiencing negative performance first, and then allocate resources to maximising performance on attributes for which customers are experiencing positive performance can be far more consequential for improving customer satisfaction.

Perceptions of service performance, which was conceptualised as a higher-order construct comprising customer perceptions of both service quality and of the service experience, was found to have a strong, positive impact on customers' overall behavioural intentions ($p < 0.01$). This is an expected result, as firms who meet and exceed customer expectations in terms of service quality and who deliver outstanding frontline service would anticipate positive overall customer evaluations, and higher levels of customer willingness to recommend.

The results in Table 3 indicate a positive and significant relationship between overall customer evaluations and customer retention ($p < 0.01$). In addition, a positive quadratic term is observed in Table 4 ($\beta = 0.164$; $p < 0.10$), which indicates increasing marginal returns of customer intent on customer retention. That is, customers who are less willing to recommend are relatively less likely to be repeat purchasers than those who indicate higher levels of willingness. This finding is consistent with Mittal and Kamakura (2001), who also observe increasing returns on the satisfaction-behaviour link on the repurchase decision in the automotive industry. That is, somewhat dissatisfied customers are just as likely to defect as completely dissatisfied customers (Anderson and Mittal, 2000).

The relationship between customer retention and organisational profitability was positive ($p < 0.05$). This supports the essential notion of the SPC (Heskett *et al.*, 1994; Kamakura *et al.*, 2002), that firms with higher levels of customer retention benefit from higher levels of profitability (Hallowell, 1996; Reinartz *et al.*, 2005). However, the initial findings do not support a positive relationship is between customer retention and a lagged measure of organisational profitability after controlling for facility size and location.

Additional analysis was conducted to further explore the linkage between customer retention and organisational profitability. The results of multi-group analysis (not tabulated) suggests that facility location may moderate the relationship. Specifically, for dealerships located in metro regions, customer retention is positively related to

both current (β = 0.218, p < 0.01) and lagged (β = 0.123, p < 0.057) measures of organisational profitability. This suggests that metro located automotive service departments may perceive organisational performance benefits predicted by the SPC in both current and future time periods (Evanschitzky *et al.*, 2012).

Lastly, the direct relationships between operational variable technical and non-technical inputs, operational fixed inputs and organisational profitability were included in the conceptual model, to ensure that the potential positive *and* negative impact of service expenditure and investment was included in the analysis. The fact that operational inputs serve as a negative offset on profitability was a key contribution of Kamakura *et al.*'s (2002) SPC conceptualisation. This study, however, found mixed relationships between these constructs. Although expected to be negative, the relationship between operational variable technical inputs and organisational performance was observed to be positive and significant (p = 0.016). Similarly, no support was found for the notion that the greater a service firm's operational variable non-technical inputs, the lower its profitability.

However, the findings indicate that greater expenditure and investment in operational fixed expenses (such as rent, administration, marketing and utilities) is directly associated with lower organisational profitability (p < 0.01). These results are anticipated in the context of the SPC, as many of these items pertain to "sunk costs" which have little immediate relation to the customers' experience proposition. Further, profitability by its very nature is acknowledged as an open concept, influenced by a wide range of internal and external factors (Epstein *et al.*, 2000). This includes issues such as market forces, corporate culture, competitive landscape and employee engagement. The findings presented as part of the extended SPC reinforce the complexity of these causal factors and the challenge of establishing a single explanatory system.

Discussion

Consistent with Hong *et al.* (2013) and Hogreve *et al.* (2017), the findings of this study confirm most of the links proposed in the revised SPC model, with the following exceptions: Firstly, this study does not find support for the links between operational variable non-technical inputs or operational fixed inputs and productivity. This suggests that greater investment in front and back-office functions designed to support the service delivery process, or in workshop capacity, resources and infrastructure, does not directly contribute to workshop productivity. The findings concerning the direct impact of operational investments on profitability, a key contribution of the Kamakura *et al.* (2002) framework, are also mixed. Consistent with Kamakura *et al.* (2002) a direct negative relationship is observed between operational fixed investments and organisational profitability. However, the findings do not support a direct negative impact of service personnel investments on profitability. Rather, a positive link is observed between increased investments in technical labour and profitability.

Based on recommendations by Hogreve *et al.* (2017), analysis was conducted to empirically examine whether non-linear or asymmetric effects exist between the various linkages in the extended SPC (Anderson and Mittal, 2000; Agustin and Singh, 2005; Matzler *et al.*, 2004; Mittal *et al.*, 1998). The findings indicate non-linear, asymmetric relations between three of the linkages examined in the

conceptual model, namely between variable non-technical inputs and productivity, productivity and service perceptions, and between customer intentions and customer retention.

The impact of productivity on customer's perceptions of service quality and the service experience is an important finding in the context of this study. In contrast to Hogreve *et al.* (2017), initial analysis failed to detect a direct link between these two constructs. However, findings for the expanded model indicate a *negative* asymmetric effect of operational productivity on service perceptions. That is, customer's evaluations of service performance are more sensitive to negative performance (dissatisfaction) than positive performance (satisfaction) (Kahneman and Tversky, 1979).

Furthermore, the *positive* asymmetric effect between overall evaluations and customer retention suggests that a service department that nudges customers from "highly unlikely" to "somewhat unlikely to recommend" is unlikely to perceive an appreciable increase in customer retention. However, ratcheting a "somewhat unlikely" customer up to "somewhat likely to recommend" is expected to produce a more marked improvement in retention. These findings are consistent with the form of fit conceptualised by Anderson and Mittal (2000), which highlights the complex nature of the linkages within the SPC and indicates that "those failing to account for these characteristics may not find empirical support for expected linkages and/or incorrectly prioritise efforts to improve performance attributes" (p.108).

The assessment of the impact of time on service performance and customer retention also extends the extant SPC literature by explicitly modelling multi-period performance (Evanschitzky *et al.*, 2012; Larivière, 2008). This study acknowledges that customer perceptions and intentions may not directly impact customer retention and profitability in the same time period. Accordingly, consistent with service interactions in the automotive service industry, customer retention is modelled using two objective measures from the same time-period as the initial operational inputs, as well as two lagged items measured in the following time period (i.e. reflecting four consecutive service periods).

Finally, the revised SPC framework also accounts for potential lagged effects on organisational performance. The findings indicate that the while there is a positive link between customer retention and profitability in the same time period, the effect of client retention on future profitability may depend on additional moderating factors, such as facility location. This finding is significant, as it provides additional support for the notion of the SPC as a dynamic model to aid managerial decision-making (Pasupathy and Triantis, 2007), but also highlights the complexity of evaluating the impact of investments in service performance on organisational performance over time.

Managerial implications

The concepts espoused in the SPC, specifically those related to improving organisational performance, have important managerial applications. In the context of automotive service departments, this study provides guidance for managers at both retail and franchisor level seeking to deploy service resources or looking to

enhance service quality, customer satisfaction and customer retention through the refinement of service processes.

At the retail level, the findings of this study provide a deeper appreciation of the relationships between key service performance metrics in order to shape customer interactions. For example, the relationships between technical and non-technical service inputs and productivity reinforce the importance of finding a balance between deploying resources which drive productivity (i.e. technical inputs), and those that put it under pressure (i.e. non-technical inputs). Managers seeking to deliver a better customer experience may consider investing in additional front and back-office functions designed to support the service delivery process. However, this study finds that investment in non-technical support personnel does not contribute to either workshop productivity or improvements in customer's perceptions of service quality or experience. This implication also extends to investments in facilities, utilities and marketing, which do also not contribute to productivity gains.

The positive relationships that were found to exist between customer perceptions of service performance and behaviour, and between customer retention and profitability should provide encouragement to firms who take customer satisfaction and the delivery of high levels of service quality seriously. The notion that customers vote with their feet is an important intuitive truism, supported by this study.

These implications are extended at a franchisor level. Management tasked with over-arching network development responsibilities are able to draw on the extended SPC as a means of comparing one service outlet to another, and to apply it as a template for balanced service outlet health. In specific terms this relates to: the deployment of technical and non-technical resources; the deployment of strategies which focus on enhancing customer perceptions and service quality; the driving of service retention, and the maximisation of organisational profitability. The extended SPC and the findings of this study also serve to inform the inputs of existing customer feedback mechanisms, such as customer satisfaction surveys, and the need to continue to seek feedback on the service experience, service quality and willingness to recommend, as they have a direct bearing on the organisational profitability of their franchisees.

For example, asymmetric and non-linear relationships observed between overall evaluations and customer retention suggests that somewhat dissatisfied customers are just as likely as completely dissatisfied customers to defect (Anderson and Mittal, 2000). These findings suggest that firms should focus on delivering high quality service experiences that leave customers feeling satisfied or completely satisfied. Ambivalence appears to be a less than ideal outcome, creating an environment where firms spend valuable time and resources on customers who are less likely to recommend the firm to others, and who are prone to defection. An important part of this is for firms to focus on hygiene factors and on getting the basics right, eliminating the things that irritate or do not meet customer expectations.

Limitations and directions for future research

The results of this study must be interpreted in light of several potential limitations. First, a single franchise network was selected to avoid cross-brand contamination, and maintain consistency in the measurement of service performance across both

financial and customer dimensions. Hence, the results reflect the market performance of that brand and not of the industry as a whole.

Second, franchise automotive dealers operate within the bounds of a prime market area allocation (PMA). This franchisor-allocated trading area sets the boundaries against which dealer targets are set, marketing takes place, and customer bases are nurtured. As Cox and Mason (2009) point out, franchising is intrinsically a geographic business model. In the case of this study, assumptions are made regarding the extent to which dealerships can actively work to keep their service customers. The metrics held out for customer retention in particular do not differentiate between customers within or outside of the PMA, and do not reflect changes to the PMA over the four-year time period assessed.

Third, the original SPC conceptualised by Heskett *et al.* (1994) references employee-based constructs (i.e. employee satisfaction and employee retention). While a number of SPC variants over the past 20 years have expanded on this interpretation (Dimitriades and Papalexandris, 2011; Gelade and Young, 2005; Pritchard and Silvestro, 2005), this study elects to extend the Kamakura *et al.* (2002) version of the model. The exclusion of employee-based constructs in SPC research is not unusual with Garland (2002), Larivière (2008) and Anderson *et al.* (2004), serving as examples. Nonetheless, the lack of employee-focused measures is seen as a limitation of this study, and additional investigation of the "satisfaction mirror" within retail and franchisee settings is warranted (Silvestro and Cross, 2000).

Finally, this research, while examining time lag effects within the SPC, does not account for the impact of one time period on another or the fact that organisational performance is, by its very nature, dynamic. The true dynamic nature of the SPC, as conceptualised by Pasupathy and Triantis (2007), has not been addressed and remains an issue which needs to be empirically tested.

Beyond addressing the limitations outlined above, there are a number of possible directions for future research arising from this study. First, replication studies would be useful in validating the results and providing further empirical assessment of the extended SPC model. Given that this study presents the findings for a single brand in the automotive service industry, it would be of interest to conduct a study with another brand. This would serve to confirm the findings and help establish industry benchmarks for driving service performance. Further, it would also be valuable to conduct an assessment in an alternative service context. A capacity model such as the hotel, airline or hospital would provide a useful cross-industry comparison.

Second, a number of constructs and indicators have been held out for scrutiny in the extended SPC. There is, however, merit in examining alternate metrics to assess their overall impact on the model. This could include a broadening of the input data to include aspects such as facilities and infrastructure; the addition of customer spend, share of wallet or customer lifetime value metrics under the banner of retention and loyalty; and the consideration of additional absolute and relative profitability measures, such as Return on Assets (ROA), Economic Value Added (EVA), and Earnings Before Interest, Tax, Depreciation and Amortisation (EBITDA).

Third, the impact of moderating effects on the extended SPC is worth exploring (Hogreve *et al.*, 2017). In this regard it is reasonable to expect that a number of factors not currently included in the model, could have a bearing on overall service performance. In particular, uncontrollable factors (Pasupathy and Triantis, 2007) such as market size, competition, affordability, economic climate and government legislation could play a role, and it is worth considering how they could be factored into the overall research design.

Notes

1. Cost of labour has previously been considered in various guises, including considerations of the number of staff at different levels of the organisation (Kamakura *et al.*, 2002) or the time taken to complete a task (Rust *et al.*, 1995).
2. This is a widely used measure of productivity in automotive service departments, used for performance benchmarking across the industry (Deloitte ProfitFocus, 2019).
3. Fit indices and relevant threshold values adopted are an insignificant χ^2 (Schumacker and Lomax, 2004), RMSEA < 0.08 but acceptable < 0.10 (Browne and Cudeck, 1993), and CFI and TLI > 0.95 but acceptable > 0.90 (Hu and Bentler, 1999).
4. χ^2 = 329.2 (df = 1110, p = 0.000) comparative fit index (CFI) = 0.974; Tucker–Lewis index (TLI) = 0.964; root mean square error of approximation (RMSEA) = 0.061 (0.053–0.068)
5. This finding is also consistent with prospect theory (Kahneman and Tversky, 1979), which differs from expected utility theory and assumes that losses and gains are valued differently, and that individuals tend to dislike losses more than an equivalent amount of gains.

References

Agustin, C. and Singh, J. (2005), "*Curvilinear effects of consumer loyalty determinants in relational exchanges*", Journal of Marketing Research, Vol. 42 No. 1, pp. 96-108.

Anderson, J. and Gerbing, D. (1988), "*Structural equation modelling in practice: a review and recommended two-step approach*", Psychological Bulletin, Vol. 103 No. 3, pp. 411-423.

Anderson, E.W. and Mittal, V. (2000), "*Strengthening the satisfaction-profit chain*", Journal of Service Research, Vol. 3 No. 2, pp. 107-120.

Anderson, E.W., Fornell, C. and Lehmann, D.R. (1994), "*Customer satisfaction, market share, and profitability: findings from Sweden*", Journal of Marketing, Vol. 58 No. 3, pp. 53-66.

Anderson, E.W., Fornell, C. and Rust, R.T. (1997), "*Customer satisfaction, productivity, and profitability: differences between goods and services*", Marketing Science, Vol. 16 No. 2, pp. 129-147.

Anderson, R.D., Mackey, R.D., Thompson, V.B. and Harrell, G. (2004), "*A Bayesian network estimation of the service-profit chain for transport service satisfaction*", Decision Sciences, Vol. 35 No. 4, pp. 665-689.

Baumgartner, H. and Homburg, C. (1996), "*Applications of structural equation modelling in marketing and consumer research: a review*", International Journal of Research in Marketing, Vol. 13 No. 2, pp. 139-161.

Bollen, K.A. and Brand, J.E. (2010), "*A general panel model with random and fixed effects: a structural equations approach*", Social Forces, Vol. 89 No. 1, pp. 1-34.

Browne, M. and Cudeck, R. (1993), "*Alternative ways of assessing model fit*", in Bollen K. and Long J. (Ed.), Testing Structural Equation Models, Sage Publications. Newbury Park, CA.

Carr, N.G. (1999), "*Marketing: the economics of customer satisfaction*", Harvard Business Review, Vol. 77 No. 2, pp. 15-18.

Churchill, G. Jr (1979), "*A paradigm for developing better measures of marketing constructs*", Journal of Marketing Research, Vol. 16 No. 1, pp. 64-73.

Coelho, P.S. and Vilares, M.J. (2010), "*Measuring the return of quality investments*", Total Quality Management and Business Excellence, Vol. 21 No. 1, pp. 21-42.

Cox, J. and Mason, C. (2009), "*Franchise network restructuring: Pressures, constraints and mechanisms*", Entrepreneurship and Regional Development, Vol. 21 Nos 5/6, pp. 503-527.

Dalal, D.K. and Zickar, M.J. (2012), "*Some common myths about centering predictor variables in moderated multiple regression and polynomial regression*", Organizational Research Methods, Vol. 15 No. 3, pp. 339-362.

Deloitte ProfitFocus (2019), "*KPI guide – service department*", Available at: www.eprofitfocus.com/help-support-centre/kpi-guide/service-department-kpis/

Dimitriades, Z.S. and Papalexandris, N. (2011), "*Test of a service profit chain model in the Greek banking sector*", EuroMed Journal of Business, Vol. 6 No. 2, pp. 142-154.

Epstein, M.J., Kumar, P. and Westbrook, R.A. (2000), "*The drivers of customer and corporate profitability: modelling, measuring and managing the causal relationships*", Advances in Management Accounting, Vol. 9, pp. 43-72.

Evanschitzky, H., Wangenheim, F.V. and Wünderlich, N.V. (2012), "*Perils of managing the service profit chain: the role of time lags and feedback loops*", Journal of Retailing, Vol. 88 No. 3, pp. 356-366.

Ewing, M.T. (2000), "*Brand and retailer loyalty: past behavior and future intentions*", Journal of Product and Brand Management, Vol. 9 No. 2, pp. 120-127.

Fornell, C.G. and Larcker, D.F. (1981), "*Evaluating structural equation models with unobservable variables and measurement error*", Journal of Marketing Research, Vol. 18 No. 1, pp. 39-50.

Garland, R. (2002), "*What influences customer profitability? Service-profit chain: non-financial drivers of customer profitability in personal retail banking*", Journal of Targeting, Measurement and Analysis for Marketing, Vol. 10 No. 3, pp. 233-248.

Gelade, G.A. and Young, S. (2005), "*Test of a service profit chain model in the retail banking sector*", Journal of Occupational and Organizational Psychology, Vol. 78 No. 1, pp. 1-22.

Grönroos, C. and Ojasalo, K. (2004), "*Service productivity towards a conceptualization of the transformation of inputs into economic results in services*", Journal of Business Research, Vol. 57 No. 4, pp. 414-423.

Grönroos, C. and Ojasalo, K. (2015), "*Service productivity as mutual learning*", International Journal of Quality and Service Sciences, Vol. 7 Nos 2/3, pp. 296-311.

Gupta, S., McLaughlin, E.W. and Gómez, M.I. (2007), "*Guest satisfaction and restaurant performance*", Cornell Hotel and Restaurant Administration Quarterly, Vol. 48 No. 3, pp. 284-298.

Hair, J.F., Jr, Black, W.C. and Babin, B.J., A., R.E. (2010), Multivariate Data Analysis, 7th Ed., Prentice Hall, Upper Saddle River, NJ.

Hallowell, R. (1996), "*The relationships of customer satisfaction, customer loyalty, and profitability: an empirical study*", International Journal of Service Industry Management, Vol. 7 No. 4, pp. 27-42.

Heskett, J.L., Jones, T.O., Loveman, G.W., Sasser, W.E., Jr. and Schlesinger, L.A. (1994), "*Putting the service-profit chain to work*", Harvard Business Review, Vol. 72 No. 2, pp. 164-174.

Hogreve, J., Iseke, A., Derfuss, K. and Eller, T. (2017), "*The service–profit chain: a meta-analytic test of a comprehensive theoretical framework*", Journal of Marketing, Vol. 81 No. 3, pp. 41-61.

Hong, K., Liao, H., Hu, J. and Jiang, K. (2013), "*Missing link in the service profit chain: a meta-analytic review of the antecedents, consequences, and moderators of service climate*", Journal of Applied Psychology, Vol. 98 No. 2, pp. 237-267.

Hu, L. and Bentler, P. (1999), "*Cut-off criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives*", Structural Equation Modeling: A Multidisciplinary Journal, Vol. 6 No. 1, pp. 1-55.

Iacobucci, D., Schneider, M.J., Popovich, D.L. and Bakamitsos, G.A. (2016), "*Mean centering helps alleviate "micro" but not 'macro' multicollinearity*", Behavior Research Methods, Vol. 48 No. 4, pp. 1308-1317.

Kahneman, D. and Tversky, A. (1979), "*Prospect theory: an analysis of decision under risk*", Econometrica, Vol. 47 No. 2, pp. 263-291.

Kamakura, W.A., Mittal, V., de Rose, F. and Mazzon, J.A. (2002), "*Assessing the service-profit chain*", Marketing Science, Vol. 21 No. 3, pp. 294-317.

Keh, H.T., Chu, S. and Xu, J. (2006), "*Efficiency, effectiveness and productivity of marketing in services*", European Journal of Operational Research, Vol. 170 No. 1, pp. 265-276.

Kimes, S.E. (2001), "*How product quality drives profitability: the experience at Holiday Inn*", The Cornell Hotel and Restaurant Administration Quarterly, Vol. 42 No. 3, pp. 25-28.

Kline, R. (2010), Principles and Practice of Structural Equation Modeling, 3rd Ed.: Guilford Publications, New York, NY.

Larivière, B. (2008), "*Linking perceptual and behavioral customer metrics to multiperiod customer profitability*", Journal of Service Research, Vol. 11 No. 1, pp. 3-21.

Lee, J., Patterson, P.G. and Ngo, L.V. (2017), "*In pursuit of service productivity and customer satisfaction: the role of resources*", European Journal of Marketing, Vol. 51 Nos 11/12, pp. 1836-1855.

Lin, G.-C., Wen, Z., Marsh, H.W. and Lin, H.-S. (2010), "*Structural equation models of latent interactions: clarification of orthogonalizing and double-mean-centering strategies*", Structural Equation Modeling: A Multidisciplinary Journal, Vol. 17 No. 3, pp. 374-391.

Marinova, D., Ye, J. and Singh, J. (2008), "*Do front-line mechanisms matter? Impact of quality and productivity orientations on unit revenue, efficiency, and customer satisfaction*", Journal of Marketing, Vol. 72 No. 2, pp. 28-45.

Maritz, P.A. and Nieman, G.H. (2008), "*Implementation of service profit chain initiatives in a franchise system*", Journal of Services Marketing, Vol. 22 No. 1, pp. 13-23.

Marsh, H.W., Wen, Z. and Hau, K.-T. (2004), "*Structural equation models of latent interactions*", Psychological Methods, Vol. 9 No. 3, pp. 275-300.

Marsh, H.W., Wen, Z., Hau, K.-T., Little, T.D., Bovaird, J.A. and Widaman, K.F. (2007), "*Unconstrained structural equation models of latent interactions: Contrasting residual- and mean-centered approaches*", Structural Equation Modeling: A Multidisciplinary Journal, Vol. 14 No. 4, pp. 570-580.

Matzler, K., Bailom, F., Hinterhuber, H.H., Renzl, B. and Pichler, J. (2004), "*The asymmetric relationship between attribute-level performance and overall customer satisfaction: a reconsideration of the importance–performance analysis*", Industrial Marketing Management, Vol. 33 No. 4, pp. 271-277.

Mittal, V. and Kamakura, W.A. (2001), "*Satisfaction, repurchase intent, and repurchase behavior: Investigating the moderating effect of customer characteristics*", Journal of Marketing Research, Vol. 38 No. 1, pp. 131-142.

Mittal, V., Ross, W.T., Jr,. and Baldasare, P.M. (1998), "*The asymmetric impact of negative and positive attribute-level performance on overall satisfaction and repurchase intentions*", Journal of Marketing, Vol. 62 No. 1, pp. 33-47.

Myrden, S.E. and Kelloway, E.K. (2015), "*Leading to customer loyalty: a daily test of the service-profit chain*", Journal of Services Marketing, Vol. 29 No. 6/7, pp. 585-598.

Oliva, T.A., Oliver, R.L. and MacMillan, I.C. (1992), "*A catastrophe model for developing service satisfaction strategies*", Journal of Marketing, Vol. 56 No. 3, pp. 83-95.

Oliver, R.L. (1980), "*A cognitive model of the antecedents and consequences of satisfaction decisions*", Journal of Marketing Research, Vol. 17 No. 4, pp. 495-507.

Oliver, R.L. (1993), "*Cognitive, affective, and attribute bases of the satisfaction response*", Journal of Consumer Research, Vol. 20 No. 3, pp. 418-430.

Oliver, R.L. (1997), "*Customer satisfaction*", A Behavioral Perspective on the Consumer, McGraw-Hill. New York, NY.

Pasupathy, K.S. and Triantis, K.P. (2007), "*A framework to evaluate service operations: Dynamic service-profit chain*", Quality Management Journal, Vol. 14 No. 3, pp. 36-49.

Pritchard, M. and Silvestro, R. (2005), "*Applying the service profit chain to analyse retail performance – the case of the managerial strait-jacket?*", International Journal of Service Industry Management, Vol. 16 No. 4, pp. 337-356.

Reinartz, W.J., Thomas, J.S. and Kumar, V. (2005), "*Balancing acquisition and retention resources to maximize customer profitability*", Journal of Marketing, Vol. 69 No. 1, pp. 63-79.

Rucci, A.J., Kirn, S.P. and Quinn, R.T. (1998), "*The employee-customer-profit chain at Sears*", Harvard Business Review, Vol. 1, pp. 83-97.

Rust, R.T. and Huang, M.-H. (2012), "*Optimizing service productivity*", Journal of Marketing, Vol. 76 No. 2, pp. 47-66.

Rust, R.T., Lemon, K.N. and Zeithaml, V.A. (2004), "*Return on marketing: using customer equity to focus marketing strategy*", Journal of Marketing, Vol. 68 No. 1, pp. 109-127.

Rust, R.T., Moorman, C. and Dickson, P.R. (2002), "*Getting return on quality: revenue expansion, cost reduction or both?*", Journal of Marketing, Vol. 66 No. 4, pp. 7-24.

Rust, R.T., Zahorik, A.J. and Keiningham, T.L. (1995), "*Return on quality (ROQ): making service quality financially accountable*", Journal of Marketing, Vol. 59 No. 2, pp. 58-70.

Schumacker, R. and Lomax, R. (2004), A Beginner's Guide to Structural Equation Modelling, 2nd Ed.: Taylor and Francis, Mahwah, NJ.

Shook, C., Ketchen, D., Hult, G. and Kacmar, K. (2004), "*An assessment of the use of structural equation modeling in strategic management research*", Strategic Management Journal, Vol. 25 No. 4, pp. 397-404.

Silvestro, R. and Cross, S. (2000), "*Applying the service profit chain in a retail environment: challenging the satisfaction mirror*", International Journal of Service Industry Management, Vol. 11 No. 3, pp. 244-268.

Singh, J. (2000), "*Performance productivity and quality of frontline employees in service organizations*", Journal of Marketing, Vol. 64 No. 2, pp. 15-34.

Soteriou, A.C. and Zenios, S.A. (1999), "*Operations, quality, and profitability in the provision of banking services*", Management Science, Vol. 45 No. 9, pp. 1221-1238.

Steenkamp, J.B.E. and Baumgartner, H. (2000), "*On the use of structural equation models for marketing modeling*", International Journal of Research in Marketing, Vol. 17 Nos 2/3, pp. 195-202.

Towler, A., Lezotte, D.V. and Burke, M.J. (2011), "*The service climate-firm performance chain: the role of customer retention*", Human Resource Management, Vol. 50 No. 3, pp. 391-406.

Xu, Y. and van der Heijden, B. (2005), "*The employee factor in the service-profit chain framework: a study among service employees working within a leading Chinese securities firm*", Journal of International Consumer Marketing, Vol. 18 Nos 1/2, pp. 137-155.

Yee, R.Y., Yeung, A.L. and Cheng, T.E. (2011), "*The service-profit chain: an empirical analysis in high-contact service industries*", International Journal of Production Economics, Vol. 130 No. 2, pp. 236-245.

Appendix

Table A1. Factor loadings and measurement model statistics

Latent variable	Indicators	Factor loadings (std.)	Indicator reliability (SMC)	CR	AVE
Service perception	Service quality	0.985***	0.969	0.968	0.939
	Service experience	0.953***	0.908		
Service quality	Condition vehicle returned in	0.827***	0.684	0.821	0.538
	Fix right first time	0.644***	0.415		
	Vehicle delivered on time	0.617***	0.380		
	Satisfaction with service	0.821***	0.674		
Service experience	Explanation of work performed	0.873***	0.762	0.961	0.859
	Service advisors knowledge	0.953***	0.908		
	Satisfaction with service advisor	0.959***	0.920		
	Service advisors willingness to assist	0.920***	0.847		
Customer retention	Retention at first paid service	0.805***	0.647	0.945	0.811
	Retention at second paid service	0.915***	0.837		
	Retention at third paid service $_{(t+1)}$	0.977***	0.955		
	Retention at fourth paid service $_{(t+1)}$	0.896***	0.804		

Notes:
Full CFA model fit statistics: χ^2 = 329.2 (df = 1110, p = 0.000) CFI = 0.974; TLI = 0.964; RMSEA = 0.061 (0.053–0.068). Standardised coefficients and level of significance are reported; ***, **, *: significant at p value < 0.01, < 0.05, < 0.10. The remaining columns present the composite reliability (CR) for each latent construct, calculated using factor loadings and error variances obtained during CFA analysis, and average variance extracted (AVE) for each latent construct