RESEARCH ARTICLE

European Journal of Business and Management Research
www.ejbmr.org

Service Innovation and Performance in Micro, Small, and Medium-Sized Organizations

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ABSTRACT

While service innovations, new or significantly improved services, are essential to the continued prosperity of micro, small, and medium-sized enterprises (MSMEs), the magnitude of the relationship between service innovation performance (SIP) and organizational performance (OP) for these distinct groups is unknown. This is because they are commonly assumed to be homogeneous and studied together as a single group, obscuring any meaningful or significant differences between them. In addition to providing clarity regarding the SIP-OP relationship for MSMEs, this study also examines how firm size, firm age, and customer profile impact its strength for these organizations. Hypotheses are tested with data collected from 802 Irish service MSMEs using Partial Least Squares Structural Equation Modelling (PLS-SEM) and multigroup analysis.

Keywords: Customer Profile; Firm Size; Micro, Small, and Medium-Sized Enterprises; Organizational Performance; Service innovation.

Submitted : June 14, 2022

Published : July 11, 2022

ISSN: 2507-1076

DOI: 10.24018/ejbmr.2022.7.4.1510

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I. INTRODUCTION

In order to remain competitive and achieve growth and profitability, organizations in the service sector must continuously innovate and adapt in response to changes in customer demands (Yang, 2007; Thakur & Hale, 2013). This is particularly true for micro, small, and medium-sized enterprises (MSMEs), those with fewer than 250 employees, who due to their size and resource constraints, face continuous pressure from larger rivals (McDermott and Prajogo, 2012; Sok *et al.*, 2013; Kolagar *et al.*, 2021). It is for this reason, that service innovation is understood as essential to the very survival of these organizations (Tsai & Wang, 2017; Witell *et al.*, 2017).

Surprisingly then, because service innovation is recognized by both scholars and practitioners as a topic that merits attention, in the context of MSMEs, it remains relatively unexplored (McAdam *et al.*, 2004). In fact, a shocking contrast can be observed when comparing the sparse literature in this area to the extensive body of empirical research examining service innovation by manufacturers or investigations of innovations of this type in the context of larger organizations (Grawe *et al.*, 2009; Feng *et al.*, 2020). The consequence of this disparity is that there is confusion about the impact of service innovation on organizational performance (Prajogo & Oke, 2016) for micro, small, and medium-sized enterprises (McAdam *et al.*, 2004; Tajeddini *et al.*, 2020) and the potential impact of firm age (Baregheh *et al.*, 2016) or the profile of customers (Gök & Peker, 2016; Biemans & Griffin, 2018) on this relationship remains unknown for these groups. Not only does this hinder theory development, but it increases the difficulty of decisions by managers when evaluating how investments of time and effort into service innovation-related activities will contribute to performance (Lin, 2013; Feng *et al.*, 2020).

In this study, we respond to these gaps in the research and, for the first time, offer empirical insights into these relationships. The research provides greater detail and granularity than any study has done to date by discriminating between micro, small, and medium-sized enterprises and reporting the results of multigroup analyses that compare and contrast results.

Our hypotheses are tested with data from 802 MSMEs based in the Republic of Ireland (491 micro, 233 small, and 78 medium). Micro organizations have 1-9 employees, small have 10-49, and medium-sized enterprises have between 50-249 (European Commission, 2005) and, based on the literature, it is anticipated that there will be differences between each of these size groupings in their characteristics and approaches to service innovation (Cagliano *et al.*, 2001; McAdam *et al.*, 2004). Partial Least Squares structural equation modelling (PLS-SEM) was used to analyze collected data and test the hypotheses, with MICOM (Measurement Invariance of Composite Models) and multigroup analyses applied to investigate whether differences in the hypothesized relationships between the size groupings could be identified.

The results of the study are of interest to managers and make a novel and meaningful contribution to service innovation research. They emphasize the importance of service innovation performance to the overall performance of examined organizations and provide some clarification regarding the magnitude of examined relationships in the context of MSMEs. Additionally, they suggest that there is no significant difference in the strength of the SIP-OP relationship between smaller organizations and that it is

neither affected by the age of organizations or their customer profile.

The paper is organized as follows. In the next section, we overview the literature on the relationship between SIP and OP and discuss organizational characteristics that could impact this relationship, prior to presenting our research hypotheses. The research methodology is then outlined, while the following section tests the research hypotheses and presents the results. The final section discusses these results and suggests implications and limitations of this research, before potentially fruitful research directions are proposed, and the article concludes.

A. Theoretical Background and Hypotheses

Our study builds upon a growing body of empirical research that examines the relationship between service innovation performance and organizational performance (Feng *et al.*, 2020).

Previously, this relationship has been examined in the context of Chinese tourism firms (Lin, 2013), the Chinese electronics industry (Grawe *et al.*, 2009), large organizations in Taiwan (Cheng & Krumwiede, 2012), and small and medium-sized enterprises in Australia (McDermott and Prajogo, 2012). Though the consensus view suggests that there is a strong, positive relationship between these variables (Marosi, 2013; Sok *et al.*, 2013; Thakur & Hale, 2013; Ogunnaike *et al.*, 2014; Khan and Naeem, 2018), to our best knowledge, its distinct magnitude has not yet been separately reported for micro, small, and medium-sized organizations. This is despite the view of Pett *et al.* (2012) and others (Cagliano *et al.*, 2001; McAdam *et al.*, 2004), which suggests that there are meaningful and significant differences between the subgroups of organizations typically classified as sm.

Service innovation performance describes an organization's ability to introduce new or significantly improved services (Lin, 2013). It is generally regarded as providing them with various benefits, including attracting new customers, increasing satisfaction and loyalty, reducing operational costs, entering new markets, and, ultimately, increasing profitability, enhancing competitiveness, and improving overall performance (Oke, 2007; Grawe *et al.*, 2009; Ordanini & Parasuraman, 2011; Grawe *et al.*, 2015; Tajeddini *et al.*, 2020). Consequently, service innovation performance is a central concern for the management of service organizations that must develop new services in response to changes in customer demands and the actions of competitors (Toivonen & Tuominen, 2009).

Den Hertog *et al.* (2010, p. 494) define service innovations as a "new service experience or service solution that consists of one or several of the following dimensions: new service concept, new customer interaction, new value system/business partners, new revenue model, new organizational or technological service delivery system". Accordingly, service innovation performance represents the frequency and quality with which organizations create value for their customers through these experiences or solutions (Thakur & Hale, 2013). It is commonly regarded as a multidimensional phenomenon that captures new service concepts, technologies, customer interfaces, or service delivery systems (Chen *et al.*, 2011; Lin, 2013). Though similar to a related term, new service development performance, it is distinct from it by ignoring the architectural elements through which new services are developed (Storey & Kelly, 2001) and is often assessed with measures similar to those used for product innovation performance (Avlonitis *et al.*, 2001; Cheng & Krumwiede, 2012). As services are intangible and technological know-how is not necessarily generated or acquired, this means patents, R&D expenditure, or similar traditional measures of innovation performance, are not appropriate (Hipp & Grupp, 2005; Liao & Rice, 2010).

Organizational performance is a broad phenomenon that encompasses achievements by a firm in terms of market operations, growth, and profitability over a period of time (Feng *et al.*, 2020). While there has been no unified definition or understanding of this concept to date, often it is divided by scholars into categories of financial and non-financial performance (Glaister & Buckley, 1998). However, to ensure this phenomenon is sufficiently captured, some authors recommend measures that assess both financial and market performance (Li & Atuahene-Gima, 2001; Hooley *et al.*, 2005).

As both theoretical and empirical studies suggest that SIP has a positive influence on OP (Avlonitis *et al.*, 2001; Nijssen *et al.*, 2006; Grawe *et al.*, 2009; Cheng and Krumwiede, 2012; Khan & Naeem, 2018), our first hypothesis is that:

Hypothesis 1. Service innovation performance positively affects the performance of MSMEs.

It is also reasonable to assume that various contextual factors affect the strength of the relationship between service innovation performance and OP (Chen *et al.*, 2016; Feng *et al.*, 2020).

Therefore, though the relationship between SIP and OP may be strong for micro, small, and medium-sized enterprises, it is unclear whether the magnitude or strength of this relationship is equal across various firm sizes (Oke *et al.*, 2007). Indeed, McDermott and Prajogo (2012) question why SMEs of all sizes are regarded as identical when small firms of 20 employees will operate in a less formal way, and have greater financial constraints, than organizations of 200.

Though this controversial topic has some received attention in the literature, results have been mixed (Stock *et al.*, 2002; Avermaete *et al.*, 2003; Gök & Peker, 2016). On one side of this debate is the view that larger organizations, with their more abundant resources and staff, are better able to generate and accumulate knowledge and capabilities to enhance their innovation and overall performance (Tsai & Huang, 2020). However, they are regarded as more bureaucratic and less flexible than their smaller rivals (Wolff and Pett, 2006). The opposite position maintains that, because fewer organizational layers are involved in the innovative activities of smaller organizations (Pett *et al.*, 2012), they are more flexible and nimble, and able to quickly adapt and affect change through innovations (McDermott & Prajogo, 2012). Nevertheless, they are regarded as lacking important business or managerial skills, financial resources, or access to markets (Edwards *et al.*, 2005; Rippa *et al.*, 2016; Sharma, 2018).

Though a clear-cut finding has not emerged in this debate, the general view is inclined towards a positive relationship between size and innovation (Damanpour, 1992; Camisón-Zornoza *et al.*, 2004; Tether, 2005; McDermott & Prajogo, 2012).

Therefore, it appears that the SIP-OP relationship will be stronger for larger organizations that have a greater number of slack resources to dedicate to innovation projects and are more likely to be able to exploit economies of scale or scope (Oke *et al.*, 2007; Tsai & Huang, 2020). We hypothesize that:

Hypothesis 2. There is a stronger positive relationship between service innovation performance and organizational performance for medium-sized organizations than there is for those that are micro or small.

As the literature suggests that older organizations enjoy greater success at service innovation than their younger rivals (Cefis, 2005; Sapprasert, 2007), it can be reasoned that the effect of SIP on OP may be contingent upon the age of service firms. Calantone *et al.* (2002) describe the importance of market information to the generation of innovative ideas and believe that older organizations have an advantage over younger firms due to their experience in selecting and employing useful information from customers, suppliers, or other stakeholders. Additionally, older organizations tend to have a greater abundance of resources (Galende and de la Fuente, 2003) and more established processes, routines, and structures to support innovation (Sapprasert, 2007; Laforet, 2013).

Drawing on the above and following the same logic, we argue that firm age moderates the influence of SIP on OP for MSMEs. That is, that SIP has a direct effect on OP, but its strength is dependent on the age of an organization. We hypothesize that:

Hypothesis 3. Firm age strengthens the positive effect of service innovation performance on organizational performance.

The question of whether customer profile affects the service innovation performance or organizational performance of businesses is one that is relatively unexplored and studies to date have offered mixed findings (Gök & Peker, 2016; Foltean *et al.*, 2019; Asipi & Duraković, 2020; Feng *et al.*, 2020).

Regarding the SIP-OP relationship in the Business-to-Business (B2B) context, Martínez-Caro *et al.* (2020) describe highly complex buying processes, that often involve multiple stakeholders, from a small number of customer firms. B2B organizations form close ties and long-term relationships with these customers and coproduce services with them (Chuang, 2020), allowing for extensive customization and high margins to be generated through value pricing and low development costs (Bozic & Ozretic-Dosen, 2015; Dotzel & Shankar, 2019; Carmona-Lavado *et al.*, 2020). By contrast, Business-to-Consumer (B2C) services are standardized and offer organizations greater scale (Silverang, 2015). They are characterized by large numbers of potential customers, with whom organizations have a weak relationship, and the average lifetime value of customers is lower than for B2B firms (Dotzel & Shankar, 2019; Groza *et al.*, 2021).

As the literature regards B2B organizations as having fewer and more important customers who are closely involved in innovative activities (Trif *et al.*, 2019), allowing organizations to achieve higher sales performance and market success (Dotzel & Shankar, 2019), it can be reasoned that the effect of SIP on OP will be higher for them compared to competitors with other customer profiles. We argue that the relationship between SIP and OP will be stronger for B2B organizations than other customer profiles and posit that:

Hypothesis 4. There is a stronger positive relationship between service innovation performance and organizational performance for B2B organizations than there is for those classified as either B2C or Other.

Fig. 1 presents the structure of the research model and outlines the examined relationships.

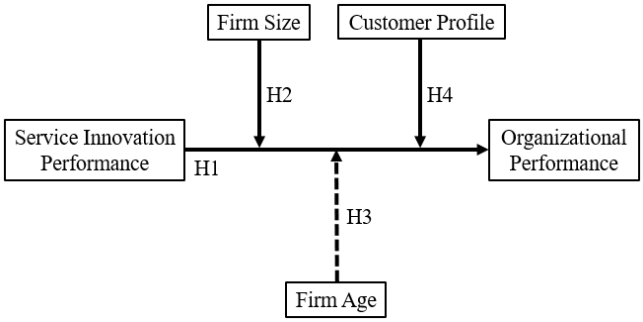

Fig. 1. Conceptual Model.

II. Methodology

A. Sample and Data Collection

Data were collected from micro, small, and medium-sized for-profit Irish service organizations in order to test the foregoing hypotheses. Their classification was according to current guidelines from the European Union (European Commission, 2005) which regards micro organizations as those with fewer than 10 employees; small enterprises as organizations with 11-49 employees; and medium-sized as those with between 50-249 and an annual turnover below €50 million. Consequently, the criteria for an organization to participate in this study was that: (i) the organization is a service business (ii) that has between 1-249 employees and an annual turnover that is not in excess of €50 million. Informants were any representative of an organization with knowledge of their service innovation activities and performance.

The questionnaire used in this study was pretested prior to large-scale data collection to ensure its quality and the clarity and comprehensibility of all questions and instructions by respondents. To achieve this, it was first reviewed by 11 academic researchers with expertise in both services research and survey design, prior to feedback being sought from a convenience sample of 11 practitioners, similar to the intended respondents. Based on the comments and suggestions received through this exercise, minor modifications were made to the wording of some instructions.

Because there was no sampling frame, or complete list of Irish micro, small, and medium-sized enterprises that included contact information, in order to collect data, the email addresses of 19,892 organizations were drawn from the database of a research group situated at Waterford Institute of Technology, Ireland. Though this database was not ideal; as it did not contain information about the size of organizations, their principal activities, or whether they were in business at the time of the study; it was deemed a useful and cost-effective resource that allowed for the collection of data from a variety of different service industries. All data were collected using SurveyMonkey. This is an online tool for

survey development and administration that enables personalized email messages to be sent to contacts which contain a unique and single-use link to a survey questionnaire. All data were collected over a 24-day period, during which five waves of personalized emails were sent to non-respondents and partial respondents, including a link permitting a single response from each recipient. All emails assured recipients of the anonymity and confidentiality of their responses to the survey and, to attenuate social desirability, that no answer was either correct or incorrect. Of the initial 19,892 emails that were sent to recruit respondents, 2,143 could not be delivered. This may have been due to messages from SurveyMonkey being blocked or that the email account was closed. Following this, a total of four reminders were sent, resulting in 1,962 responses, a rate of 9.86%, and comparable to other quantitative service industry research (Neghina *et al.*, 2017; Su & Kunkel, 2019).

Of the responses obtained, all were excluded where informants had indicated that their business was not a service organization, had in excess of 249 employees, or turnover of more than €50 million. As a result, the final sample was reduced to 802 organizations, for an actual response rate of 4.03%. Missing data were not a concern as SurveyMonkey was configured so as to prevent any questionnaires with unanswered questions from being submitted. An examination of the data revealed no evidence of suspicious response patterns, or 'straight lining', or of any of the questionnaires being completed at an implausible speed (Hair *et al.*, 2016; Vandenplas *et al.*, 2018). Of the usable responses, 61.2% were from micro-organizations, 29.1% from small organizations, and 9.7% from those that were medium-sized, across 30 industries.

To confirm that the sample sizes were sufficiently large for the micro, small, and medium groups, the inverse square root and gamma-exponential methods recommended by Kock and Hadaya (2018) were utilized. This is because the ten-times rule, typically used when evaluating sample size, is increasingly becoming regarded as inappropriate for studies that utilize PLS-SEM (Kock & Hadaya, 2018). The minimum absolute significant path coefficients were 0.380, 0.384, and 0.449 for the micro, small, and medium-sized groups, respectively. A significance level of 0.05 and an 80% power level were tested for each of the groups. The results of the sample size estimation were 45, 44, and 34 for the inverse square root method and 32, 31, and 20 for the gamma-exponential method for the micro, small, and medium groups, respectively. Hence, the actual size of the samples for each of the groups, 491, 233, and 78, could be deemed sufficient. In addition, post hoc power tests of the three samples were conducted using G*Power 3.1 software. The power index for the micro, small, and medium groups was 0.9999999, 0.9991594, and 0.8660140, respectively, exceeding the recommended threshold of .80 advanced by Cohen (1988; 1992).

As cross-sectional, single respondent data was used for this study, it was necessary to be aware of the potential impact of common method bias (CMB) and to minimize it to the greatest extent possible. Both *ex ante* and *ex post* control procedures were applied to account for its influence where, *ex ante*, the questionnaire opened with the statement that there were no correct or incorrect answers, meaning that respondents should answer honestly, and an assurance that their response would remain anonymous and confidential (Podsakoff *et al.*, 2003). *Ex post*, CMB was accounted for using Harman's one-factor or single-factor test (MacKenzie & Podsakoff, 2012) which showed that the first factor in the unrotated solution accounted for 34.522% of the variance in the micro sample, 38.058% in the small sample, and 40.209% in the medium sample. Together, these measures suggested that common method bias did not represent a concern with these data and was not a threat to this study (Podsakoff and Organ, 1986).

B. Measures

We adopted existing, validated multi-item scales for all latent variables in our research. The responses to the items relied on five-point scales ranging from 1 (strongly disagree) to 5 (strongly agree) for the service innovation performance scale and 1 (considerably worse) to 5 (considerably better) for the organizational performance scale. Firm age (FA) and customer profile (CP) were measured using categorical variables. The FA question asked respondents how long their organization had been in operation. Response options were '1-2 years'; '3-5 years'; '6-10 years'; '11-20 years'; and 'More than 20 years'. The question for CP asked respondents which of the following options best described their organization: 'B2B. Our services are predominantly sold to other businesses'; 'B2C. Our services are predominantly sold to consumers'; or 'Our services are predominantly sold to government agencies or others neither classified as a business or consumer'.

Service innovation performance. Six items measuring service innovation performance were adopted from Chen *et al.* (2011). These items attempted to capture various aspects of service innovation, including services that are new to the market or an organization, new delivery processes, service modifications, or service line extensions (Chen *et al.*, 2011). Unfortunately, for the medium group, two of the items had weak loadings (0.386, 0.574), and the construct's Average Variance Extracted (AVE) value (0.438) was below the recommended threshold of 0.5. Following the sequential deletion of both items, all loadings and reliability indices were above the advised threshold levels. The modified four-item scale was deemed to have retained sufficient construct validity and was, therefore, usable for structural analysis. It was used for analyses across each of the groups to ensure comparability.

Organizational performance. The 9-item scale used to measure organizational performance was adopted from Li and Atuahene-Gima (2001). It has five financial and four market performance measures.

C. Data Analysis

PLS-SEM was used to analyze the data and test hypotheses. All analyses were performed using SmartPLS version 3.3.2 (Ringle *et al.*, 2021). The partial least squares (PLS) approach was chosen in favor of covariance-based SEM, as PLS is well suited to causal-predictive analyses (Evermann & Tate, 2016; Chin *et al.*, 2020; Hair and Sarstedt, 2021), is robust when data are nonnormally distributed (Hair *et al.*, 2016), and has been widely applied in several recent services-related studies (Bartsch *et al.*, 2021; Odekerken-Schröder *et al.*, 2021).

III. Results

A best practice two-phase procedure (Henseler *et al.*, 2009; Götz *et al.*, 2010; Blommerde-Winters, 2022) was utilized to test the measurement and structural models for the micro, small, and medium groups prior to evaluating hypothesized relationships.

A. Measurement Model Evaluation

For each of the groups, all factor loadings were greater than 0.7 (Hair *et al.*, 2009), minimum composite reliability scores exceeded the recommended threshold (0.7) (Fornell and Larcker, 1981) as did those for Cronbach's α (0.7) (Cronbach and Meehl, 1955), AVE (0.5) (Götz *et al.*, 2010), and Dijkstra-Henseler's rho (ρA) (0.7) (Dijkstra and Henseler, 2015). Together these analyses provide evidence for all groups of satisfactory reliability and convergent validity at the construct level.

The heterotrait-monotrait (HTMT) approach was then used to test the discriminant validity of latent variables. Construct correlations for each of the groups were below the conservative threshold of 0.85 (Henseler *et al.*, 2015). Further, in accordance with guidance from Henseler *et al.* (2015), the HTMT confidence intervals were tested using the bootstrapping procedure with 5,000 samples. As none of the confidence intervals contained a 1 (see Table I), this supported the discriminant validity of all latent variables.

TABLE I: HTMT Ratio of Correlations

	Original Sample (O)	2.50%	97.50%
	Micro		
SIP → OP	0.462	0.359	0.565
	Small		
SIP → OP	0.438	0.300	0.581
	Medium		
SIP → OP	0.534	0.292	0.762

B. Structural Model Evaluation

Evaluations of a PLS structural model's quality should account for the following criteria: the variance inflation factor (VIF), the R^2 of the endogenous latent variable, PLSpredict Q^2 criterion, and the direction and significance of path coefficients (Götz *et al.*, 2010; Hair *et al.*, 2019).

VIF values were below 2 for each of the groups, indicating that there are no collinearity issues among the model's constructs. R^2 results were determined using the 5,000-resample bootstrapping procedure and are reported in Table II (Hair *et al.*, 2016).

TABLE II: R^2

Construct	R^2
Micro	
OP	0.144
Small	
OP	0.148
Medium	
OP	0.202

To examine the model's out-of-sample predictive power, the PLSpredict procedure with 10 folds and 10 repetitions was used. Shmueli *et al.* (2019) advise that when errors are distributed symmetrically, the predictive power assessment should be based on the root mean squared error (RMSE). For all of the indicators, the PLS-SEM analysis yielded identical or lower prediction errors in terms of RMSE when compared to the linear model (LM) generated by the PLSpredict algorithm, indicating that the model has high predictive power (Hair *et al.*, 2019; Shmueli *et al.*, 2019).

Table III shows the results of model relationships, including standardized coefficients, effect sizes, standard deviation, t-values, and significance.

TABLE III: Test of Structural Relationships for Main Model

Path	Path Coefficient (β)	Effect Size (f^2)	Standard Deviation	t-value	*p*-value
		Micro			
SIP → OP	0.380	0.169	0.039	9.731	0.000
		Small			
SIP → OP	0.384	0.173	0.056	6.824	0.000
		Medium			
SIP → OP	0.449	0.253	0.092	4.863	0.000

C. Hypothesis Tests

The bootstrapping results, presented in Table III, show that SIP has a positive effect on OP (Micro: β = 0.380, p = 0.000; Small: β = 0.384, p = 0.000; Medium: β = 0.449, p = 0.000) for each of the groups, supporting hypothesis H_1. The effect sizes (f^2) of these results, represent the strength of the influence of predictor variables. Cohen (1988) designates f^2 effect sizes of 0.02, 0.15, or 0.35 as small, medium, and large, respectively.

Next, the expected moderating effect of firm age on the relationship between SIP and organizational performance was tested for each of the groups. This required an extension to the basic structural model and, interaction models, including this variable, were generated and tested for each of the size groups using the recommended two-stage approach (Fassott *et al.*, 2016; Becker *et al.*, 2018). The results of this analysis are reported in Table IV. These reveal that the interaction term is not significant for any of the groups and that our hypothesis, that the age of an organization impacts the SIP-OP relationship, is not supported.

TABLE IV: Test of Structural Relationships for Interaction Model

Path	Path Coefficient (β)	Effect Size (f^2)	Standard Deviation	t-value	*p*-value
		Micro			
Interaction → OP	0.017	0.000	0.041	0.407	0.684
FA → OP	0.028	0.001	0.042	0.656	0.512
SIP → OP	0.379	0.168	0.040	9.558	0.000
		Small			
Interaction → OP	-0.127	0.018	0.066	1.917	0.055
FA → OP	0.098	0.011	0.059	1.648	0.099
SIP → OP	0.387	0.181	0.055	7.010	0.000
		Medium			
Interaction → OP	-0.148	0.034	0.085	1.740	0.082
FA → OP	-0.264	0.098	0.102	2.583	0.010
SIP → OP	0.414	0.240	0.088	4.684	0.000

To test H_2, this study used a permutation test for a multigroup analysis to detect the differences in the effect of SIP on OP for micro, small, and medium-sized organizations. A two-category approach was applied which resulted in three comparisons: micro-small, micro-medium, and small-medium. However, prior to evaluating differences in the magnitude of this effect between the size groupings, it was necessary to confirm measurement invariance (Sarstedt *et al.*, 2011b). In order to achieve this, the three-stage MICOM procedure advanced by Henseler *et al.* (2016) was used.

Initially, this procedure requires the establishment of configural invariance through confirmation that identical indicators were used across groups and that data were treated and analyzed in the same way across groups (Henseler *et al.*, 2016). As an identical questionnaire was used for all groups and uniform methods were used to prepare and analyze data, we could proceed to the next step and evaluate compositional invariance. For this, the results of permutation analysis in SmartPLS with 5,000 permutations were used. It is accepted that *c* values that are close to 1 provide evidence of compositional invariance between groups (Henseler *et al.*, 2016). As the permutation test results confirmed that none of the *c* values were significantly different from 1, this allowed us to conclude that there was compositional invariance for all measured constructs in our model. The final step of testing for measurement invariance across groups requires an examination of both the equality of mean values and variances across groups.

Though configural invariance and compositional invariance were confirmed in steps 1 and 2, respectively, because the third step revealed that not all means and variances for measures were equal, only partial measurement invariance was established (Henseler *et al.*, 2016). Nevertheless, partial measurement invariance permits the comparison of standardized path coefficients across groups, using multigroup analysis, to examine differences in their magnitude or signs.

While Table III illustrates that there is some contrast in the strength of corresponding path coefficients for the SIP-OP relationship between the micro, small, and medium groups, whether these differences are significant was calculated using SmartPLS Multi-Group Analysis (PLS-MGA), a non-parametric test that builds on bootstrapping results (Sarstedt *et al.*, 2011a). While H_2 predicted that there would be a significant difference in the effect of SIP on OP between the size groupings, where it would be stronger for medium-sized organizations than for those that are small or micro, this hypothesis was not supported.

Finally, a similar procedure was utilized to examine H_4 and whether there were differences in the effect of SIP on OP between organizations with the three categories of customer profile, B2B, B2C, and Other. A two-category approach was again applied with three comparisons: B2B-B2C, B2B-Other, and B2C-Other. Similarly, it was necessary to confirm measurement invariance using the three-stage MICOM (Henseler *et al.*, 2016). Configural invariance was confirmed and the results of a permutation analysis with 5,000 permutations ascertained compositional invariance. An examination of the equality of mean values and variances across groups indicated that partial measurement invariance could be established and that it was possible to compare standardized path coefficients across groups using multigroup analysis. Though Table III shows that there are differences in the magnitude of the SIP-OP relationship between groups, results of the PLS-MGA show that these differences are not significant between organizations with different customer profiles. Accordingly, H_4 was not supported.

IV. Discussion

A. Theoretical Contributions

This work makes several theoretical contributions to service innovation and small business literature by examining the effect of service innovation performance on organizational performance for MSMEs and how it is impacted by firm size, firm age, and customer profile.

First, it shows that there is no significant difference in the magnitude of the SIP-OP relationship for MSMEs of different sizes. Though it was expected that this relationship would be stronger for larger organizations with more abundant resources than their smaller rivals (Laforet, 2008), no significant differences between any of the groups were identified. Though this finding is somewhat contrary to Pett *et al.* (2012), it answers a call that they make for research that draws distinctions between MSMEs. They describe the assumption of homogeneity by researchers of the population of SMEs as insidious and believe that there are meaningful and significant differences within the subgroups (Pett *et al.*, 2012).

The study also makes a novel exploration of the moderating effect of firm age on the SIP-OP relationship for SMEs. To our best knowledge, this was the first time interaction of this type had been explored. Examining this relationship provided an interesting and unexpected result. While we anticipated that there would be a relation between the age of organizations and the strength of the SIP-OP relationship, this hypothesis was not supported. Our findings agree with Laforet and Tann (2006) who do not find any relationship between the age of organizations and their innovativeness.

Another theoretical contribution made by this research is its examination of the impact of customer profile on the SIP-OP relationship across the three categories of MSMEs examined (Carmona-Lavado *et al.*, 2020). Our results indicate that customer profile does not significantly impact the strength of this relationship. Though they appear to disagree somewhat with Dotzel and Shankar (2019), who find that B2B service innovations have a greater impact on firm value than B2C innovations, our study does not explicitly measure firm value and their results may be a consequence of the natural language processing methodology used, instead of a more traditional survey methodology.

Our examination of the SIP-OP relationship for micro, small, and medium-sized enterprises was generally consistent with previous research. Accordingly, our results suggest that SIP positively influences OP for each of the size groups and extends the literature base by providing the magnitude of this relationship for each of them (Feng *et al.*, 2020). In this way, it responds to calls for service innovation research in the context of MSMEs that discriminates between organizations of different sizes (McAdam *et al.*, 2004). Research of this type is novel as the majority of studies of this nature have been based on large organizations (Oke, 2007) and micro-enterprises are often excluded (Avermaete *et al.*, 2003). Though differences in the magnitude of the SIP-OP relationship were not significant across the three distinct groups of organizations, neither were they homogeneous. This finding is comparable to Cagliano *et al.* (2001) and Khan

et al. (2011), illustrating that links between key variables are not identical between smaller organizations.

B. Managerial Implications

Significant implications for managers emerge from the present study. It empirically demonstrates the extent to which service innovation efforts truly affect the overall performance of MSMEs of different sizes, informing decisions relating to the formation or implementation of competitive strategies focused on innovation. It also challenges the myth that organizations with certain characteristics will exhibit a stronger relationship between service innovation performance and their overall performance (Baregheh *et al.*, 2016).

C. Limitations and Future Research

This study has several limitations that provide opportunities for future research.

First, because cross-sectional, multisectoral data from Irish MSMEs were used, results are limited. Though they provide an interesting snapshot of examined variables at a single moment in time, potentially interesting directions for future research would be to collect richer longitudinal data or examine the same relationships and explore differences across groups with similar characteristics in other national contexts.

Though the sample of organizations used for this research was a cross-section of Irish SMEs, it was not drawn randomly. Therefore, because it was drawn from the databases of an academic research group, caution must be exercised in the generalization of results.

Finally, while this research offers an interesting examination of the relationship between service innovation performance and organizational performance between MSMEs, it does not account for different types of service innovations. Though outside the scope of this paper, future research could examine whether there are differences in the SIP-OP relationship across the size groups for organizations that introduce more radical service innovations, compared to those that focus on incremental innovations.

It is our hope that this study will stimulate new ideas and motivate research that can expand upon it.

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