

Corporate social responsibility and innovation: a comparative study

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Abstract

Purpose – The purpose of this study was to examine how firms' corporate social responsibility (CSR) strategies affect their innovation performance via two mediating variables, employee involvement and supplier collaboration, and compare how this mechanism works in the service and manufacturing industries.

Design/methodology/approach – The conceptual model was built on stakeholder theory, the resource-based view (RBV) and service-dominant logic (SDL). Based on survey data from 686 service firms and 1,646 manufacturing firms, the hypothesized relationships were tested using structural equation modeling (SEM).

Findings – The empirical results showed that CSR positively affected service innovation and product innovation in service firms and manufacturing firms, respectively, and that these effects were positively mediated by employee involvement and supplier collaboration. However, compared with manufacturing firms, the effect of CSR on innovation performance was greater for service firms. Supplier collaboration and employee involvement also played a stronger role in service firms when mediating the relationship between CSR and innovation performance.

Originality/value – By analyzing and validating the direct and indirect effects of CSR on innovation performance in both the service and manufacturing industries, this study addressed the strategic benefit of CSR and extended research focused on the financial benefits of CSR. Therefore, its findings contribute to our understanding of sustainability and innovation issues. From a theoretical perspective, this study extended the RBV, SDL and stakeholder theory to the context of the CSR-innovation relationship, and showed that firms could align CSR and innovation initiatives to achieve strategic synergy. It also revealed the similarities and differences between service and manufacturing firms regarding the mechanism through which CSR affects innovation.

Keywords Corporate social responsibility, Service innovation, Manufacturing innovation, Resource-based view, Service-dominant logic, Stakeholder theory

Paper type Research paper

1. Introduction

Over the last few decades, corporate social responsibility (CSR) has attracted global attention and academic investigation. Further, stakeholders have made increased sustainability awareness the status quo (Hengst *et al.*, 2020). Based on this, integrating responsible social actions into a firm's strategy is likely to enhance its competitive advantage (Herrera, 2015). A firm's CSR orientation should play a key role in promoting its long-term and sustainable growth in the dynamic environment (Martinez-Conesa, 2017) and be treated as a strategic priority for integrating social and environmental goals into organizational activities (Baumgartner, 2014). It should also be a firm's strategic priority to improve the overall quality of life in society and cultivate benign relationships with employees, customers, suppliers, shareholders, creditors, communities and other stakeholders (Hillman and Keim, 2001).

CSR has been well studied in the literature, both theoretically and empirically. Much research has examined its outcomes, with a recent shift in focus from accounting and financial outcomes (e.g., Mcguire *et al.*, 1988; McWilliams and Siegel, 2000) to non-financial and social outcomes (e.g., Gomulya and Boeker, 2014; Jones *et al.*, 2014; Petrenko *et al.*, 2016).



The more recent literature has suggested that CSR can create added value in terms of innovation (e.g., [Husted and Allen, 2007](#)). [Herrera \(2015\)](#), for example, proposed a preliminary framework for corporate social innovation, relying on case studies to describe how firms' CSR considerations (e.g., footprint, stakeholders and strategy) contribute to their process or product innovations through institutional elements (e.g., stakeholder engagement, sustainability and organization). However, there has been a dearth of empirical research on whether CSR affects service and manufacturing firms differently, especially when it comes to its effects on innovation performance. This has created a research gap that calls for further understanding of the strategic decision-making underpinning CSR implementation and its associated benefits in terms of future development. Indeed, as an important corporate strategic consideration, CSR is related to the issue of corporate vitality. With corporate vitality, firms can develop the foresight to act on future environmental uncertainty ([Rohrbeck et al., 2015](#)) and enhance their innovation capacity ([Rohrbeck and Gemunden, 2011](#)).

From another perspective, some research has portrayed CSR as deficient, and merely a matter of internal decision-making, whereas empirical investigations have generally focused on firms' internal socially responsible practices ([Arend, 2014](#); [Walker et al., 2014](#)). Today we live in a networked environment, and CSR issues should be analyzed in an open-system environment rather than one that is internally focused or closed ([Santana et al., 2009](#); [Hengst et al., 2020](#)). Specifically, in addition to internal environmental practices and processes, firms are advised to integrate network partners, such as suppliers, into their integrative processes directed at systemically shared sustainability goals ([Wang et al., 2018](#)). CSR research integrating both internal processes and external integrative processes is thus called for. This study investigates the mechanism through which CSR strategies affect innovation performance. It is based on a large sample of both manufacturing and service firms. Several studies have suggested that CSR has a "strategic" role to play in creating value for firms. We expand on this insight by empirically substantiating the role of CSR in stimulating innovation in both manufacturing and service firms. We also compare the influencing mechanisms respectively.

From a theoretical perspective, this study enriches and extends service-dominant logic (SDL), stakeholder theory and the resource-based view (RBV) by applying them to the context of the CSR-innovation relationship. Both sides of this relationship are important to firms' long-term success. Specifically, this study reveals the similarities and differences between service and manufacturing firms in terms of the mechanism through which CSR affects innovation. Practically, our findings will help service and manufacturing firms to allocate limited resources in more efficient ways.

The remainder of the paper is organized as follows. In the next section, a literature review provides the theoretical background for the research. It is followed by a set of hypotheses based on the theoretical framework. The research methodology section describes the proposed study and research method. Thereafter, the empirical results are analyzed. Finally, the results are presented and discussed, the managerial implications are explained and future research opportunities are suggested.

2. Theoretical background and literature review

2.1 CSR and firm performance

CSR can be viewed from many perspectives, such as social performance, business ethics, and corporate governance ([Carroll, 1979](#); [Freeman and Evan, 1990](#)). Firms can maintain their existing ties and create new ones by implementing CSR activities. For example, CSR can be a bridge that connects firms with environmental organizations, government and other social communities through environmental protection initiatives ([Sharma and Vredenburg, 1998](#)). In terms of performance implications, at one time there was a debate over whether firms should benefit financially from implementing CSR (e.g., [Cochran and Wood, 1984](#); [Mcguire](#)

et al., 1988; Pava and Krausz, 1996; Russo and Fouts, 1997). However, more recent studies have extended the focus from financial to non-financial performance, such as customer satisfaction (Luo and Bhattacharya, 2006), firm reputation (McWilliams and Siegel, 2011) and executive compensation (Berrone and Gomez-Mejia, 2009). All of these eventually contribute to a firm's financial performance. Studies have also suggested that innovation, in which new solutions are found to meet the needs of the market and new or existing customers, is the missing link in transforming strategic CSR considerations into financial performance (Rachel *et al.*, 2015; Martinez-Conesa *et al.*, 2017). To explain this, they have asserted that firms must apply corporate responsibility principles to their products and practices (McWilliams and Siegel, 2001; Bansal, 2005).

Strategic management studies have argued that CSR can provide opportunities for innovation. According to them, this can be achieved by leveraging social, environmental or sustainability drivers to cultivate ways to develop new products and services through differentiation strategies (Luo and Du, 2015). However, we still do not fully understand how the mechanisms affect service industries and manufacturing industries differently. Further, the previous literature has indicated that CSR may influence innovation performance directly rather than indirectly (Zhu *et al.*, 2019). From a theoretical perspective, sound mediators must therefore be proposed and tested empirically. This study takes the position that CSR can strengthen engagement and collaboration between internal and external resources, which in turn can lead to service and manufacturing innovation.

2.2 Service versus manufacturing innovation

Traditionally, due to the dominance of manufacturing, most of the innovation literature has focused on product innovation. However, in recent decades, the service sector's share of GDP has been rising in most developed and emerging economies, stimulated by accelerating technological advances. Service innovation has thus been identified as a research priority in service science (Ostrom *et al.*, 2015; Wang *et al.*, 2015). Obviously, it is inappropriate to apply a research framework for manufacturing innovation to service innovation. Service has special characteristics, including intangibility, co-production with customers, heterogeneity, simultaneity and perishability (Fitzsimmons and Fitzsimmons, 2000).

Several studies have compared manufacturing and service innovation. One stream of research has examined the development process, comparing the new service development (NSD) process and the new product development (NPD) process (Drejer, 2004). Two different views have emerged from this discussion: assimilation and demarcation. Supporters of the assimilation approach have viewed service from the product or manufacturing perspective. They have applied concepts and frameworks used in the manufacturing context to the service context and underscored their similarity. In general, both successful NSD and NPD firms emphasize the courage needed to innovate, the well-organized structure needed to facilitate innovation, and the need for sufficient resource allocation as the factors driving innovation (e.g., Brown and Eisenhardt, 1995; Griffin, 1997; Tidd and Bodley, 2002). Researchers following a demarcated approach have addressed the specific differences between services and goods and suggested that they should be studied separately (Gallouj and Weinstein, 1997; Djellal and Gallouj, 2001; Menor *et al.*, 2002). To summarize, there are both similarities and differences between service and manufacturing innovation. However, due to the exploratory nature of previous studies and/or their use of limited samples with insufficient analyses, more rigorous empirical studies are needed to advance this area of research.

CSR and innovation are both important to service or manufacturing firms' long-term success. Although a few studies have compared service innovation and manufacturing innovation (Ettlie and Rosenthal, 2011), the interplay between CSR and innovation in service industries versus manufacturing industries requires further empirical investigation and comparison.

2.3 *Connecting stakeholder theory with the RBV and SDL*

Stakeholder theory has been the theory most commonly used to explain economic issues that are relevant to firms' CSR activities. In terms of factors that create added value, [Freeman and Reed \(1983\)](#) pointed out that managers should pay attention not only to shareholder profits but also to relationships with other stakeholders, such as employees, suppliers, customers, government institutions and other social communities. [Donaldson and Preston \(1995\)](#) extended this theory and used it to direct the structure and operations of corporations. They argued that when stakeholders find that the key characteristics of their organization are consistent with their self-identification, they are more likely to remain with the organization. It has been pointed out that the relationship between stakeholders and organizations can be analyzed from the perspective of management, stakeholders or both ([Sachs and Maurer, 2009](#); [Miles, 2017](#)). In this study, we examined CSR by focusing on the relationship between two representative groups of stakeholders: internal stakeholders (i.e., employees) and external stakeholders (i.e., suppliers).

The RBV, which was proposed by [Wernerfelt \(1984\)](#) and extended by [Barney \(1991\)](#), emphasizes the importance of intangible resources and capacities and treats them as the most important source of business success. The main idea of the RBV is that only if resources (and capabilities) are valuable, rare, inimitable and non-substitutable they can help firms build a sustainable competitive advantage ([Wernerfelt, 2016](#)). Resources and capabilities are used by firms to develop and implement their strategies. The RBV has often been used to study innovation in both the manufacturing and service industries (e.g., [Froehle and Roth, 2007](#)). In the RBV context, innovation is recognized as playing a central role in creating value and sustaining firms' competitive advantages ([Baregheh et al., 2009](#)). Due to the difficulty of patenting service, service innovation is not easy to sustain. The RBV also helps to explain CSR and sustainability issues. For example, [Hart \(1995\)](#) assessed environmental social responsibility as a resource or dynamic capability that leads to a sustained competitive advantage.

From the RBV perspective, "resources" can refer to anything in a firm that can demonstrate its core competitiveness, including both tangible and intangible assets. In this study, we use two key firm resources from stakeholders to study the underlying mechanism through which CSR affects innovation performance: internal employee involvement and external supplier collaboration. Employee involvement has been confirmed as an effective way for firms to obtain competitive advantages and react quickly to the rapidly changing market (e.g., [Huselid, 1995](#); [Bayraktar et al., 2017](#)). Supplier collaboration has also been suggested as a key source of competitive advantage ([Wang et al., 2016a, b](#)). Organizations can improve inter-firm operations by cooperating with suppliers, developing collaborative processes and sharing information and knowledge ([Flynn et al., 2010](#)).

[Arnould \(2008\)](#) contended that there is a need to link resource-based theories with SDL because SDL can be used to examine the relationship between inter-firm value-creating processes and organizational resources. From the SDL perspective, service plays the central role in any economic or non-economic exchange ([Vargo and Lusch, 2004, 2008](#)). SDL represents a new mindset for a unified understanding of the purpose and nature of organizations, markets and society. [Vargo and Lusch \(2011, 2018\)](#) advocated for value creation by integrating resources from all actors in the ecosystem, rather than the traditional linear and dyadic transactions between producers and consumers. In general, SDL advances a framework that can provide building blocks for macro theories, and it embraces multiple stakeholders ([Frow and Payne, 2011](#); [Lusch and Webster, 2011](#)). The latter represent the actors in the service ecosystem, and to some extent, this offers better insight into social sustainability and innovation issues ([Vargo and Lusch, 2017](#)). In this study, SDL was used to compare the service and manufacturing industries and specifically to explain how their service and product innovations, respectively, were driven by CSR. It should be noted that

service providers, rather than manufacturers, might depend more on SDL than on a goods-dominant logic (Vargo and Lusch, 2004; Wang *et al.*, 2016a, b).

3. Research framework and hypotheses

Based on stakeholder theory and the RBV, we used two key firm resources from stakeholders to explore the underlying mechanism through which CSR strategies affect innovation performance: internal employee involvement and external supplier collaboration. We also examined how CSR influences service and manufacturing innovation performance differently by building up unique firm resources. The conceptual model is shown in Figure 1. CSR was defined as “the subset of corporate responsibilities that deals with a company’s voluntary/discretionary relationships with its societal and community stakeholders” (Waddock, 2004, p. 10). Employee involvement was defined as the extent to which employees actively participate in strategy implementation and work process optimization. “Supplier collaboration” referred to the extent to which suppliers are involved in product- or service-related improvements (Koufteros *et al.*, 2007; Wang *et al.*, 2016a, b). “Service innovation” (or “product innovation”) referred to the newness and creativity of the service (or product) provided by a service provider (or manufacturer).

3.1 The relationship between CSR and innovation performance

The relationship between CSR and corporate performance has been widely studied (e.g., Ingram and Frazier, 1980; Waddock and Graves, 1997). However, the results have been somewhat mixed. Ray *et al.* (2004) explained that due to the many latent variables that can affect corporate performance, it is difficult to effectively study the impact of CSR. Innovation performance is a crucial aspect of corporate performance, and it plays a central role in creating a firm’s value and sustainable competitive advantage. As such, there is a need to examine the effect of CSR on innovation performance, which ultimately contributes to firm performance. This could help to clarify and substantiate the effects of CSR on firm performance. Practically, firms must implement CSR strategies for their new products and services that address both customers’ unmet needs and stakeholders’ social and environmental concerns.

McWilliams and Siegel (2001) studied the link between CSR and R&D expenditure, treating CSR as an organizational strategy and operating practice to deal with a firm’s numerous stakeholders. They found that by considering and meeting the concerns and expectations of various stakeholders, CSR programs enabled the firm to establish good and deep relationships with its stakeholders, including customers, investors, public institutions and employees (Sen *et al.*, 2006; Luo and Du, 2015). This in turn facilitated the exchange of rich information and complex knowledge (Surroca *et al.*, 2010). The opportunity to acquire,

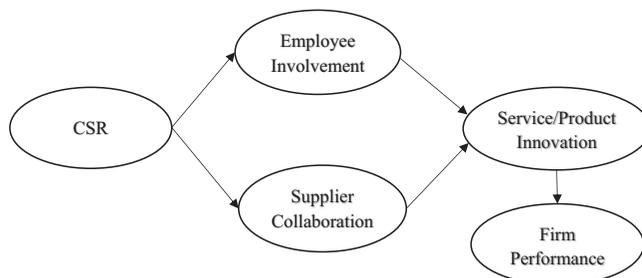


Figure 1.
The conceptual model

explore and utilize diverse knowledge and information internally and externally, and the recombination of diverse information and knowledge, contributes to the creation of innovation. From this perspective, CSR strategies have the potential to drive innovation. Thus, we hypothesized as follows:

- H1.* There is a positive relationship between CSR and innovation performance in service and manufacturing firms.

Employees, as the main internal stakeholders of firms, are the firms' backbone, creating value for them. They are both the recipients of and contributors to CSR activities (Roeck and Maon, 2018). Hogg and Terry (2000) observed that being recognized by their firm is an important component of employees' social identity. There is a significant correlation between a firm's commitment to CSR and its employees' organizational identity. Chong (2009) found that when a firm engages in social responsibility activities, especially when they involve employees, it strengthens the latter's sense of belonging to and identifying within the company. As Brammer *et al.* (2007, p. 1705), explained, "beneficial actions directed at employees create a reason for employees to reciprocate with their attitudes and their behaviors."

Employee involvement has been defined by four attributes: (1) there is an information-shared climate throughout the firm; (2) managers empower employees to make decisions about their own field; (3) employees receive necessary and sufficient training to advance their further career opportunities and (4) employees are rewarded for activities involving information sharing, the decision-making process and training that positively affects the firm's innovation performance (Dachler and Wilpert, 1978; Sashkin, 1984; Guzzo *et al.*, 1985; Harrison, 1985; Ledford and Lawler, 1994; Randolph, 1995). Different employees master different functional knowledge and information. Employee involvement connects firms' functional departments and promotes the sharing of knowledge and information (Droge *et al.*, 2004). Exchanging and summarizing internal knowledge can increase the amount and variety of information available for innovation, reducing much of the uncertainty and equivocality in the innovation process. As such, we hypothesized as follows:

- H2.* Employee involvement positively mediates the relationship between CSR and the innovation of offerings in service and manufacturing firms.

Supplier collaboration refers to the degree to which suppliers are involved and participate in the key activities related to a firm's product development. Supplier collaboration is a valuable and irreplaceable resource that is not easy to imitate, and it creates a sustainable competitive advantage for firms (Barney, 1991). A greater degree of supplier collaboration means that suppliers actively and deeply participate in the technical assessment and commercial evaluation of customer firms' new product development. From the supplier perspective, such efforts often require them to "open their books," disclose their core technical information and share their own cost allocation methods with firms (Peterson *et al.*, 2005). These activities expose suppliers to opportunistic behavior, such as knowledge leakage by customer firms. Thus, before deciding to cooperate, suppliers must evaluate firms and select those that have values and beliefs that are well matched to their own.

A firm's CSR activities are usually associated with a favorable reputation. Arguably, this reduces concern over opportunistic behavior, motivating suppliers to contribute their core resources and engage deeply in the firm's operations. A firm's reputation represents a general judgment of it over time and signals suppliers' perceptions of its credibility, reliability, responsibility and trustworthiness. Such judgment is also derived from the collective recognition of the firm's ability to satisfy the interests of its stakeholders (Sen *et al.*, 2006; Luo and Du, 2015). As such, having a CSR strategy should demonstrate that a firm is a trustworthy, reliable and responsible partner. Suppliers should be more willing to share information with it and cooperate in its product design and development. Many studies have

found that cooperating with suppliers can improve a firm's innovation performance (e.g., [Tu et al., 2014](#)). Therefore, we hypothesized as follows:

- H3.* Supplier collaboration positively mediates the relationship between CSR and the innovativeness of offerings in service and manufacturing firms.

3.2 The comparison between service and manufacturing innovation

Drawing on the previous literature, it is unclear whether service and manufacturing firms are equivalent in terms of the effect of CSR on innovation performance and its underlying mechanism. [Casado et al. \(2014\)](#) suggested that the total effect of CSR on firm performance is greater for service firms than product-based firms. Due to the specific nature of service, investors react more positively to the CSR activities of service firms.

Innovation performance relies on the close collaboration between networks of stakeholders to create an atmosphere of knowledge sharing ([Luo and Du, 2015](#)). However, stakeholders' responses and their degree of involvement in a firm's processes depend on their perceptions and judgment of the firm. In manufacturing firms, tangible products are more easily inspected for compliance with objective quality standards. In contrast, intangible services provided by service firms (such as experience and credence services in which the characteristics cannot be assessed prior to purchase or use) are more difficult to evaluate due to the specific nature of service ([Zeithaml, 1981](#)). As such, stakeholders are faced with great uncertainty about service outcomes, which impedes their evaluation of service firms. In this context, proactive CSR initiatives are more important to service firms wanting to build a good reputation and a responsible image ([Barnett and Hoffman, 2008](#)). These traits help to eliminate confusion and diminish the risk of information asymmetry among stakeholders ([Siegel and Vitaliano, 2007](#)). In turn, they facilitate information sharing and knowledge exchange. This eventually motivates stakeholders to become more deeply involved in the businesses processes of service firms and to facilitate the integration of internal and external knowledge to promote service innovation. Therefore, we hypothesized as follows:

- H4.* The positive effect of CSR on innovation is stronger in service firms than in manufacturing firms.

From the perspective of SDL, service is inherently relationship-oriented ([Vargo and Lusch, 2004, 2008](#)). Employees in service firms are more engaged in their work processes than employees in manufacturing firms. Employee involvement in manufacturing firms usually has established guidelines and routines to follow and the work performance can be more easily evaluated (e.g., [Swink, 1999](#)). Alternatively, in service firms, employees, especially frontline employees are expected to behave more flexibly. Not only do they need to perform operational tasks efficiently and thoroughly ([Lovell and Wirtz, 2011](#)) but they must also think outside the box. They must generate new ideas to improve service quality and have the experience to satisfy customers and other stakeholders ([Coelho and Augusto, 2010](#); [Dong et al., 2015](#)). Service innovation frequently stems from the creativity of service employees. For example, a Chinese chain restaurant called Haidilao showed that over 90 percent of its innovative service ideas were generated by its frontline employees ([Geng et al., 2018](#)). In this regard, employees in service firms are more likely to transform CSR initiatives into innovation performance. We thus proposed the following hypothesis:

- H5.* The mediation effect of employee involvement in the relationship between CSR and innovation is stronger in service firms than in manufacturing firms.

In the same vein, supplier collaboration has been found to have a stronger positive effect on the innovativeness of offerings in service firms than in manufacturing firms ([Wang et al., 2016a, b](#)). This is in line with the RBV and SDL, according to which service firms attach more

importance to value co-creation (Ordanini and Parasuraman, 2011) and seek closer connections with suppliers to implement more proactive CSR strategies. In contrast, in manufacturing firms, supplier collaboration tends to be more standardized, and there are better practices and evaluation standards for product innovation (e.g., Shin *et al.*, 2000; Swink, 2000). Although scholars have emphasized the importance of collaborating with suppliers, there has been no consensus on the best practices for involving suppliers in the innovation processes of service firms. This may also imply that in manufacturing firms, supplier collaboration is not a rare and imperfectly imitable resource (Barney, 1991), whereas it might be for service firms. Therefore, we hypothesized as follows:

- H6.* The mediation effect of supplier collaboration on the relationship between CSR and innovation is stronger in service firms than in manufacturing firms.

4. Research methodology

4.1 Measures

To ensure that the measurement items used in this study were applicable to both manufacturing and service firms, we reviewed previous research and interviewed scholars and practitioners in both the manufacturing and service industries. We also pilot-tested the questionnaire to determine whether the items were appropriate and relevant, and whether any important aspects were missing. Before we distributed our survey in mainland China, we translated all of the English scales into Chinese, and followed the steps advised by Flynn *et al.* (2010) to verify the translation. The list of our measurement items is provided in Appendix.

CSR is a construct that has been measured in many different ways. We used four items to measure CSR, adapted from previous research, including Carroll (1979): senior leaders' attitude; the corporate governance system; the mitigation of negative impacts; and senior leaders' support for and participation in CSR activities. Employee involvement was measured by a four-item scale developed in the previous research (Marchington *et al.*, 1991). Supplier collaboration was measured by four items adopted from Wang *et al.* (2016a, b). The creativity of services/products, their newness to the market, their impact on the industry and the involvement of new techniques were used to measure innovation performance in service and manufacturing firms. These were adapted from Cooper and Kleinschmidt (1993) and Swink (2000). For the items listed above, the responses were recorded on a 6-point Likert scale, with 1 representing a firm that does not engage in the activity at all (or "strongly disagree") and 6 representing a firm that engages in the activity to a great extent (or "strongly agree"). The use of a 6-point scale helped to eliminate the "neutral" opinion, due to the Chinese Confucian doctrine of the mean (Rainey, 2010).

Finally, to minimize the industry effect, firm performance was measured by a firm's financial performance related to its main products/services within the past three years, relative to its major competitors. Ketchen *et al.* (2007) also indicated the need to measure competitive advantage (instead of measuring performance directly). In this study, the respondents were asked to rate their firm's performance in financial areas relative to its major competitors on a 6-point scale, with 1 indicating that the firm was significantly worse than the competitor and 6 indicating that it was significantly better than the competitor.

4.2 Sample and data collection

We conducted a nationwide survey across 14 provinces in China with the help of the China Association for Quality (CAQ). CAQ is a national non-profit organization under the administration of central authorities, and it is committed to economic and quality regulation. It had 19 sub-associations for different service and manufacturing industries including IT

and communication services, retail and wholesale, transportation and logistics, electronics and electrical, metal and mechanical, textiles and apparel, etc. A stratified sampling method was used to weight the sample by industry (manufacturing versus service). We distributed a questionnaire survey to one key informant from each of the 5,000 sample firms in China. Among the 2,675 questionnaires returned, 2,332 were useable. These included 686 service firms and 1,646 manufacturing firms. The industry distribution is shown in [Table I](#) and [Table II](#).

5. Results

We used the bootstrapping-based partial least squares (PLS) approach to SEM to analyze the data ([Peng and Lai, 2012](#); [Henseler et al., 2016](#)). Traditional testing methods, such as the causal steps strategy ([Baron and Kenny, 1986](#)) and the Sobel test approach ([Sobel, 1982](#)), were limited by the requirement of multivariate normality in both total and indirect effects. Bootstrapping-based PLS was considered to be a more suitable approach to testing the indirect and total effects of multiple mediators in the same model ([Preacher and Hayes, 2008](#)). We followed [Chin and Dibbern's \(2010\)](#) permutation-based multi-group invariance testing method and used pair-wise *t*-tests to compare the indirect/mediation effects in different groups. SmartPLS (version 3.2.8) was used to assess the measurement and structural models ([Ringle et al., 2015](#)). Bootstrap samples were derived from manufacturing and service datasets, respectively, to ensure bias-corrected comparison. Both the service and manufacturing data were permuted according to the random allocation process, and as a

Industry	<i>N</i>	<i>p</i> (%)
Business services	137	20
Retail and wholesale trade	108	15.7
Transportation and logistics	64	9.3
Real estate and property management	50	7.3
Hotel and catering	47	6.9
IT and communication services	33	4.8
Public utilities and services	25	3.6
Construction	22	3.2
Finance and insurance	17	2.5
Education and entertainment	13	1.9
Other	170	24.8

Table I.
Company profiles of
the service
firms (*N* = 686)

Industry	<i>N</i>	<i>p</i> (%)
Electronics and electrical	410	24.9
Metal, mechanical and engineering	335	20.4
Chemicals and petrochemicals	174	10.6
Textiles and apparel	166	10.1
Food, beverages and alcohol	131	8.0
Instruments and meters	48	2.9
Pharmaceutical and medical	43	2.6
Rubber and plastics	35	2.1
IT and communication devices	31	1.9
Wood and furniture	28	1.7
Publishing and printing	27	1.6
Other	218	13.2

Table II.
Company profiles of
the manufacturing
firms (*N* = 1646)

result, 5,000 bootstrap samples of service firms and 5,000 of manufacturing firms were generated (sample size $N = 686$ and $N = 1,646$ respectively). The path coefficients for the direct effects in the bootstrap samples were multiplied to obtain the coefficients of mediation and the indirect effects for manufacturing and service firms, respectively. Next, pair-wise t -tests were carried out to compare the magnitudes of the mediation effects between the two groups. By sorting the 5,000 values from low to high, the confidence intervals of the mediation effects were obtained.

5.1 Non-response bias and common method bias

To address the non-response bias, we conducted a t -test to compare the early and late (after several rounds of calls) responses for annual sales, physical assets, number of employees and the variables used in this study (Armstrong and Overton, 1977). The results showed no significant differences.

We used both program control and statistical control to minimize the impact of common method bias on the empirical test results. First, we followed Podsakoff *et al.* (2003) in arranging the adjacent variables in the conceptual model into different parts of the questionnaire and used different instructions. Second, the results of Harman's single-factor test showed that the number of extracted factors was four, and the variance contribution rate of the first factor was 27.84 percent, which did not explain the majority of the total variance. Third, following Podsakoff *et al.* (2003) and Liang *et al.* (2007), we compared two measurement models, one including all of the traits and the other adding a method factor. The results showed that the path coefficients were very subtle and insignificant, suggesting a low possibility of substantial common method bias.

5.2 Reliability and validity

We used rigorous procedures to develop and validate the instruments. Two commonly used methods were adopted in this study to test construct reliability. First, we conducted exploratory factor analysis (EFA) using both orthogonal and oblique rotations to ensure high loadings on the hypothesized factors and low loadings on the cross-loadings in the datasets. All of the items loaded onto the expected factors without significant cross-loadings. Second, the reliability of each construct was tested using Cronbach's alpha. The Cronbach's alpha values, shown in Table III, were over 0.8 for all of the constructs, indicating high reliability. Next, convergent validity and discriminant validity were tested. As shown in Table III, the composite reliability (CR) scores of all of the factors were greater than the threshold of 0.70, and the average variance extracted (AVE) for all of the constructs were satisfactory, being greater than the threshold of 0.50. Convergent validity was thus achieved. The results also provided strong evidence of discriminant validity by comparing the squared correlation between each pair of constructs (Table IV) and AVE.

5.3 Hypothesis testing results

The results of the hypothesis testing are summarized in Table V. For H1, a simple model with only two latent variables of CSR and service/product innovation was tested using service and manufacturing datasets, which means that CSR was positively related to service innovation and product innovation. The results showed that the direct effect was significantly positive. The path coefficient was 0.456 for the service dataset and 0.370 for the manufacturing dataset (both p -values less than 0.001, with $t = 13.903$ for service and $t = 15.91$ for manufacturing). Hence H1 was supported.

Then the full model, including two mediators (as shown in Figure 1), was tested. All of the direct effects in this model were significantly positive in both the service and manufacturing

Construct and items	Service dataset			Manufacturing dataset				AVE
	α	CR	Factor loading	α	CR	Factor loading	AVE	
CSR	0.847	0.897		0.685	0.841	0.893		0.677
CSR1			0.815				0.826	
CSR2			0.851				0.834	
CSR3			0.838				0.845	
CSR4			0.810				0.780	
Employee Involvement (EI)	0.877	0.915		0.730	0.869	0.911		0.719
EI1			0.864				0.823	
EI2			0.842				0.819	
EI3			0.850				0.848	
EI4			0.860				0.871	
Supplier Collaboration (SC)	0.881	0.918		0.737	0.852	0.901		0.694
SC1			0.859				0.822	
SC2			0.862				0.855	
SC3			0.864				0.865	
SC4			0.856				0.788	
Service/Product Innovation (SI/PI)	0.921	0.944		0.809	0.920	0.901		0.805
SI1/PI1			0.879				0.887	
SI2/PI2			0.914				0.904	
SI3/PI3			0.909				0.898	
SI4/PI4			0.885				0.899	
Financial Performance (FP)	0.955	0.964		0.816	0.953	0.962		0.809
FP1			0.879				0.878	
FP2			0.869				0.866	
FP3			0.904				0.907	
FP4			0.912				0.918	
FP5			0.928				0.910	
FP6			0.925				0.916	

Table III.
Construct reliability and validity

Service dataset	CSR	EI	SC	SI	FP
CSR	1				
EI	0.796	1			
SC	0.720	0.843	1		
SI	0.448	0.561	0.585	1	
FP	0.478	0.536	0.526	0.576	1
Manufacturing Dataset					
CSR	1				
EI	0.768	1			
SC	0.728	0.808	1		
PI	0.358	0.460	0.454	1	
FP	0.451	0.474	0.479	0.526	1

Table IV.
Correlation between the constructs

datasets, with the exception of the non-significant ($p > 0.05$ for both datasets, as $t = 0.896$ for service and $t = 1.448$ for manufacturing) direct effect from CSR to service/product innovation (path coefficient: -0.049 for service and -0.056 for manufacturing firms). In the full model, other than the non-significant direct effects from CSR to service/product innovation in both datasets, the path coefficients of CSR to employee involvement (0.797 for service and 0.768 for manufacturing) and supplier collaboration (0.716 for service and 0.728 for manufacturing)

Table V.
Results of the
hypothesis testing

Path in the structural model	Path coefficient		Percentile 95% CI		Outcome
	Simple model	Full model	Lower	Upper	
CSR→SI (H1s)	0.456***	-0.049			Supported
CSR→PI (H1m)	0.370***	-0.056			Supported
CSR→EI→SI (H2s)		0.797***; 0.282***	0.111	0.338	Supported
CSR→EI→PI (H2m)		0.768***; 0.298***	0.151	0.283	Supported
CSR→SC→SI (H3s)		0.716***; 0.394***	0.198	0.371	Supported
CSR→SC→PI (H3m)		0.728***; 0.253***	0.134	0.255	Supported
(CSR→SI/PI)s-m (H4)	0.083***				Supported
(CSR→EI→SI/PI)s-m (H5)		0.017***			Supported
(CSR→SC→SI/PI)s-m (H6)		0.088***			Supported
SI→FP (s)		0.576***			
PI→FP (m)		0.526***			

Note(s): * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

were all significantly positive ($p < 0.001$); employee involvement was positively related to service innovation (path coefficient: 0.282, $p < 0.001$) and product innovation (path coefficient: 0.298, $p < 0.001$), and supplier collaboration was also positively related to service innovation (path coefficient: 0.394, $p < 0.001$) and product innovation (path coefficient: 0.253, $p < 0.001$). This supported employee involvement and supplier collaboration as full mediators for both service and manufacturing firms. We also computed confidence intervals for each indirect effect through a numerical ordering of the bootstrapping results. None of the confidence intervals included 0. Therefore, the results, as shown in Table V, supported H2 and H3. This indicated that employee involvement and supplier collaboration positively mediated the relationship between CSR and the innovation of offerings in service and manufacturing firms respectively.

Next, manufacturing and service firms were compared. First, we found that the effect of CSR on service/product innovation was significantly different between manufacturing and service firms, and the effect in service firms was stronger than it was in manufacturing firms (the difference was 0.083, $p < 0.001$). Thus, H4 was supported. Second, by multiplying the two sets of 5,000 bootstrapped direct effects and conducting further pairwise t -tests, we found that the mediation effect of employee involvement was slightly stronger in service firms (difference = 0.017, $p < 0.001$) and the mediation effect of supplier collaboration was significantly stronger in service firms (difference = 0.088, $p < 0.001$). Thus, H5 and H6 were supported. Therefore, we can conclude that the mediation effects of employee involvement and supplier collaboration on the relationship between CSR and innovation were stronger in service firms than in manufacturing firms.

6. Discussion and conclusions

6.1 Major findings and implications

The empirical results showed that CSR had a significantly positive effect on both service innovation and product innovation through two mediating variables: employee involvement and supplier collaboration. This enriches our understanding of the underlying mechanism from CSR to innovation. Under stakeholder theory, employees and suppliers are two dominant stakeholders in firms—internal and external, respectively. Under the RBV, employee involvement and supplier collaboration are two important resources contributing to innovation and sustained competitive advantage. If firms want to successfully implement a CSR strategy and transform their initiatives into innovation performance, it is necessary to strengthen the internal resource of employee involvement and the external relationship with suppliers.

Between service firms and manufacturing firms, the difference in the direct effect from CSR to innovation performance indicated that the effect of CSR was more important to service firms. One explanation for this result is that the service firms in this study might have adopted more SDL than the manufacturing firms did (Vargo and Lusch, 2004). As firms adopting SDL inherently place more emphasis on relationships, it is easier for them to convert CSR initiatives into other positive outcomes. Service firms may also need to shoulder more social responsibility so that their stakeholders can reduce the uncertainty caused by information asymmetry and make appropriate assessments. This should eventually motivate stakeholders to become more deeply involved in the businesses of service firms, and facilitate the integration of internal and external knowledge to reduce the probability of innovation failure.

Finally, this study compared the mechanism through which CSR affects innovation and performance in the manufacturing and service industries. The mediation effects of employee involvement and supplier collaboration were significantly stronger in the service firms than in the manufacturing firms. One implication is that service-centered firms pay more attention to relationships and place more emphasis on value co-creation with their stakeholders. Thus, employee involvement and supplier collaboration may have more influence on service firms guided by SDL. The results are also consistent with the RBV, because when service firms build up relational assets through closer connections with suppliers and employees, they gain sustained competitive advantages by stimulating innovation.

This study contributes to our understanding of sustainability and innovation issues in both the service and manufacturing industries. From a theoretical perspective, it enriches and extends the RBV, SDL and stakeholder theory by applying them to the context of the CSR-innovation relationship, and it reveals the similarities and differences between service and manufacturing firms in terms of the mechanism through which CSR affects innovation and performance. These findings also have significant managerial implications because they can help service and manufacturing firms allocate limited resources more efficiently. Practitioners can benefit from CSR strategies by encouraging greater employee involvement and supplier collaboration. This in turn contributes to service or product innovation and firm performance. For service firms, employee involvement and supplier collaboration seem to be more effective and may deserve more resources compared to manufacturing firms.

6.2 Limitations and future research

Some limitations exist and should be pointed out for further research. First, although we studied two main mediators, employee involvement and supplier collaboration, there may be other factors that mediate the relationship between CSR and innovation performance. Future studies should investigate other factors, such as customers and shareholders. Second, the business of many firms today involves both manufactured products and services. Thus, it would be interesting to investigate how a CSR strategy affects innovation in products and services differently within the same firm. Finally, this study used cross-sectional data. It is necessary and would be interesting to use more recent longitudinal data to test whether the findings hold over time.

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Appendix

Measurement items

Corporate social responsibility

- CSR1: Senior leaders create an environment for the company to comply with laws and regulations and to be honest.
- CSR2: The corporate governance system ensures that management is responsible for the conduct of the company and secures the interests of shareholders and other stakeholders.
- CSR3: Senior leaders anticipate and take steps to reduce the potential negative impacts of products, services and operations on the public and the environment.
- CSR4: Senior leaders actively support and participate in community service, healthcare, education and environmental protection activities.

Employee involvement

- EI1: Employees' opinions on strategic plans and goals can be effectively communicated from the bottom up.
- EI2: The company encourages frontline employees to participate in process improvement.
- EI3: Employees often adjust unnecessary processes to optimize the production/service process.
- EI4: Based on evaluation of the relationship between employee rights, employee satisfaction, and key business results, our company determines the improvement focus of the work environment and employee support.

Supplier collaboration

- SC1. We maintain intensive communication with suppliers with regard to the key factors influencing product/service quality and changes in design.
- SC2. The company proactively requires suppliers to participate in our activities to improve the product/service quality.
- SC3. We often ask for our suppliers' ideas and opinions about product/service design.
- SC4. Suppliers often participate in our firm's projects during the product/service design stage.

Service (product) innovation

- SI1(PI1). The services (products) designed by our company are very creative.
- SI2(PI2). The services (products) designed by our company are often new to the market.
- SI3(PI3). The services (products) designed by our company have great impact on the industry.
- SI4(PI4). The services (products) designed by our company often involve new techniques.

Competitive financial performance

Please indicate the performance of your company's main products/services compared with your major competitors' during the past three years, with 1 indicating significantly worse than the competitor and 6 indicating significantly better than the competitor.

- FP1. Sales growth.
- FP2. Growth of market share.
- FP3. Return on investment (ROI).
- FP4. Growth of ROI.
- FP5. Return on sales (ROS).
- FP6. Growth of ROS.

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