
Article:
Ozdemir, S., Fernandez de Arroyabe, J.C., Sena, V. et al. (1 more author) (2023) Stakeholder diversity and collaborative innovation: integrating the resource-based view with stakeholder theory. Journal of Business Research, 164. 113955. ISSN 0148-2963

https://doi.org/10.1016/j.jbusres.2023.113955

Journal of Business Research 164 (2023) 113955

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

Stakeholder diversity and collaborative innovation: Integrating the resource-based view with stakeholder theory

Sena Ozdemir [a,*], Juan Carlos Fernandez de Arroyabe [b], Vania Sena [c], Suraksha Gupta [d]

[a] Lancaster University Management School, Department of Marketing, Bailrigg, Lancaster LA1 4YX, United Kingdom
[b] Essex Business School, University of Essex, Elmer Approach, Southend-on-Sea SS1 1LW, United Kingdom
[c] University of Sheffield, Management School, Conduit Rd, Sheffield S10 1FL, United Kingdom
[d] Newcastle University Business School, 5 Barrack Rd, Newcastle Upon Tyne NE1 4SE, United Kingdom

ARTICLE INFO

Keywords:
Stakeholder Theory
Resource-Based View
Knowledge-Based View
Inter-Organisational Collaborations
Innovation Development

ABSTRACT

This paper uses Stakeholder Theory to build on the Resource-Based View (RBV) of the firm – and its extension, the Knowledge-Based View (KBV) – and theoretically and empirically assesses how a choice of stakeholders with a diverse set of interests and motives affects the development of collaborative innovation. Theoretically, the paper discusses how collaborating with stakeholders with diverse motives and interests affects the development of diverse types of innovations; and whether and how a focal organisation's access to diverse information sources may influence the behaviour of different types of collaborators. The empirical analysis is based on Spanish Technological Innovation Panel (2015–2016) data. The results show that collaborations with secondary (primary) stakeholders are typically associated with the likelihood of developing eco-innovations (product and process innovations) and increased demand for skilled workers. We also find that access to diverse information sources is associated with the likelihood of collaborating with primary stakeholders only.

1. Introduction

In the current business environment, collaborations with a range of stakeholders allow organisations to access information and knowledge, reduce costs and risks and increase their opportunities to develop new products and services quickly (Ozdemir, Kandemir, & Eng, 2017; Rindfleisch & Moorman, 2003; Thomas, 2013; Xu, Wu, & Cavusgil, 2013). Furthermore, from an operational perspective, inter-organisational collaborations reduce the time and effort needed to gather the new and critical resources necessary for innovation (Molina-Morales & Martínez-Fernández, 2010). As a result, stakeholders can use inter-organizational resources efficiently and better compete in dynamic business contexts (Ozdemir, Kandemir, Eng, & Gupta, 2019).

Usually, innovating organisations tend to develop several innovations simultaneously. For instance, in the semiconductor and electronics sectors, organisations such as the Panasonic Corporation, Toshiba, Sony, Micron Technology, Motorola and Mitsubishi Electric may work on many research projects simultaneously and tend to collaborate with a variety of stakeholders with different goals and orientations. While some authors have highlighted the benefits of collaborating with several stakeholders such as suppliers or competitors (Cui and O'Connor, 2012; Martinez, Zouaghi and Garcia, 2019; van Beers and Zand, 2014; Wutz and Dutta, 2014), an obvious question to address is whether the choice of a specific type of stakeholder has any bearing on the successful development of collaborative innovation. The literature is unclear on this point;[1] and yet, this is an important question considering the variety of stakeholders with which a focal organisation can collaborate.

Inter-organisational collaborations have been extensively researched (Park, Mezias and Song, 2004; Zhao and Priporass, 2017; Pereira and Bamel, 2021). Theoretically, the Resource-Based View (RBV) and its extension – the Knowledge-Based View (KBV) – have been used to explain *why* organisations start inter-organisational collaborations. The main argument is that inter-organisational collaborations allow organisations to access resources they would not have access to otherwise; in other words, inter-organisational collaborations allow the pooling of resources that may eventually create value for the focal organisation (Das and Teng, 2000; Pereira and Bamel, 2021).

* Corresponding author.
E-mail addresses: s.ozdemir@lancaster.ac.uk (S. Ozdemir), jcfern@essex.ac.uk (J. Carlos Fernandez de Arroyabe), v.sena@sheffield.ac.uk (V. Sena), suraksha.gupta@ncl.ac.uk (S. Gupta).

[1] Belderbos et al. (2018) have argued that this lack of clarity is due to the geographic dispersion of studies and the diversity of data used in the empirical literature.

https://doi.org/10.1016/j.jbusres.2023.113955
Received 31 December 2020; Received in revised form 5 April 2023; Accepted 13 April 2023
Available online 3 May 2023

While the RBV and KBV have been pivotal in shaping our understanding of inter-organisational collaborations' benefits to organisations, several authors have pointed out that these theories suffer from several limitations. First, Kim (2017) and Lin, Yang and Arya (2009) have argued that the RBV and KBV are limited in their capability to explain how organisations choose a collaborator. These theories emphasise that the choice of collaborator mainly depends on the type and complementarity of the resources exchanged between the potential collaborator and the focal organisation (Lioukas et al., 2016; Das and Teng, 2000). For instance, previous studies grounded in RBV and KBV theories have suggested that vertical collaborators (customers and suppliers) provide access to non-redundant and complementary resources, thus enabling the development of more innovative products than in the case of collaborations with horizontal collaborators (competitors) – which grant access to redundant and similar resources (Ozdemir et al., 2017; Rindfleisch and Moorman, 2001, 2003). However, some studies have suggested that in the context of innovation development, resource diversity and ambidexterity matter for the novelty of the innovation itself (Cui and O'Connor, 2012; Martinez et al., 2019; van Beers and Zand, 2014; Wutz and Dutta, 2014); in turn, diversity and ambidexterity can be achieved by collaborating with both horizontal and vertical collaborators (Cui and O'Connor, 2012; Wassmer, Li and Madhok, 2017). Besides these empirical inconsistencies, the RBV and KBV theories do not explicitly consider that organisations work on many innovation projects simultaneously and that not all collaborators can successfully contribute to each innovation project. As a result, Kim (2017) points out that it is crucial to identify what type of collaborator is most appropriate for each type of innovation and how organisations can achieve resource diversity effectively when collaborating with a variety of stakeholders in the context of collaborative innovation. On the one hand, resource diversity may often be limiting for organisations due to the often negative impact of core resources or capabilities on other resources and capabilities (Teng and Cummings, 2002). On the other hand, organisations may not be able to exploit the benefits of the resources attained through inter-organisational collaborations for innovation due to the challenges of simultaneously managing multiple stakeholder relationships and diverse types of stakeholders, which it is necessary to consider from an RBV and KBV perspective (Jiang et al., 2019).

Second, RBV and KBV fail to consider that potential collaborators may have different motives, values and objectives that are not necessarily aligned with those of the focal organisation. In other words, RBV and KBV theories tend to have a narrow focus on the importance of attaining and generating economic rents through the accumulation or integration of resources and, by doing so, they cannot explain whether and how different types of stakeholders with various interests and motives can be equally beneficial to the focal organisation in the context of inter-organisational collaborations, e.g. those which generate financial and/or non-financial returns. This is important to understand as previous studies show that having different goals and motives may have a negative influence on organisational performance (Achrol and Etzel, 2003), which is particularly evident in collaborations between profit organisations with market or commercial logic and non-profit organisations with social or community logic, whose primary performance aim is either financial for the former or non-financial for the latter (Di Domenico, Tracey and Haugh, 2009).

Against this background, the purpose of this paper is twofold. First, it analyses how collaborating with multiple stakeholders, which have diverse interests and motives, affects the development of different types of innovation. To do so, the study extends the RBV and KBV with Stakeholder Theory. As a result, it mitigates the theoretical limitations of previous studies, which have not emphasized how the interests and motives of different types of stakeholders may affect the development of collaborative innovation. Second, the paper seeks to understand whether and how a focal organisation's access to diverse information sources may influence the effectiveness of collaborations with different types of stakeholders (within and outside the supply chain) in the innovation production process. In this way, the study will be able to find evidence of the extent to which having access to a diverse range of external information sources may facilitate the effectiveness of resource utilization when managing multiple stakeholder collaborators of different types. The study also brings a new perspective to RBV and KBV by ascertaining whether access to external and diversified knowledge through a range of collaborators may eventually influence other stakeholders' behaviour.

The main contribution of the paper is the development of a new theoretical framework that complements the RBV and KBV with Stakeholder Theory, which explicitly considers the interests and motives of diverse stakeholders and how they affect organisational outcomes (Dong and Glaister, 2006; Cummings and Holmberg, 2012). Our starting point is that for inter-organisational collaborations to be successful, resource pooling needs to be supported by alignment of the interests and motives of collaborators to those of the focal organization. We argue that besides access to resources, as claimed by the RBV and KBV, in line with Stakeholder Theory, stakeholders' interests and motives as well as the values supporting their sharing of resources drive inter-organisational linkages and collaborative innovation outcomes.[2]

By complementing the RBV and KBV with a stakeholder approach, and thus taking various stakeholder interests and motives into consideration, this study also addresses certain empirical inconsistencies regarding the type of inter-organisational resources that may be necessary to produce different types of innovation (e.g. Un & Asakawa, 2015; Fitjar & Rodríguez-Pose, 2013; Medda, 2020; Nieto & Santamaría, 2010). In addition, the focus on the impact of inter-organisational collaboration on firm-level employment growth has been limited despite the importance of this indicator for policy and managerial reasons (Hessels & Parker, 2013). Studies which have examined the resource and organisational performance relationship in an inter-organisational collaboration context have predominantly focused on the implications of resources on hard organisational performance measures, such as sales, market share, market value and profitability (e.g. Zheng, Liu and George, 2010; de Guimarães et al., 2016). This study also addresses this research gap by studying how different types of stakeholder interactions, driven by various stakeholder interests and motives for resource endowment decisions, may impact on the employment growth of a focal organisation (Pereira et al., 2020; Rangus & Slavec, 2017). Understanding how employees or internal stakeholders of organisations may be influenced by the utilisation of resources in inter-organisational stakeholder collaborations will help in the assessment of whether the normative tenet of the RBV and KBV as regards the resource and organisational performance relationship can be extended to a soft organisational performance measure such as employment growth.

The empirical implications of our theoretical framework have been tested with a sample of 12,849 companies from the Spanish Technological Innovation Panel (2015–2016), which is the Spanish version of the EU Community Innovation Survey.[3] This database is very useful for several reasons. First, it includes a wide portfolio of innovation outputs, such as product, process, employment and eco-innovation. Second, this database has been widely used, and therefore the results can be

[2] For instance, Dowling and Pfeffer (1975) highlighted the importance of legitimacy, which refers to the level of social acceptability bestowed upon a set of activities or actors.

[3] The Community Innovation Survey (CIS) harmonises the study of innovations in European companies, using the same questionnaire. Each country is responsible for data collection. This database is extended to Europe, but Latin American and Asian countries also incorporate this questionnaire to harmonise innovation research in companies (Eurostat, 2021).Eurostat (2021). Community Innovation Survey. Eurostat. https://ec.europa.eu/eurostat/web/microdata/community-innovation-survey.

generalised to other research settings.

The paper is structured as follows. In section 2 the background theory is reviewed, while in section 3 the theoretical argument is developed. Constructs and econometric models are illustrated in Section 4. In section 5 the results are presented, while in Section 6 the key findings and implications for theory, practice and research are discussed. Finally, in Section 7 some concluding remarks are offered.

2. Theoretical background

2.1. From the RBV and KBV to an institutional perspective of Inter-Organisational collaboration

The RBV sees firms (or organisations more generally) as bundles of resources (Pereira and Bamel, 2021; Chahal et al., 2020), i.e. strengths or assets that may be tangible or intangible, being able to create a competitive advantage (Barney, 1991). The RBV view has been extended to focus on specific resources such as knowledge (KBV), which has the same properties as other resources in terms of generating comparative advantage.

Traditionally, the RBV and KBV have been used extensively to explain why companies enter into inter-organisational collaborations. In addition, Grant and Baden-Fuller (2004), and Lavie (2006) pointed out that RBV has been applied to the study of strategic alliances. In this context, strategic collaborations arise when organisations are in a vulnerable strategic position and need access to the resources that collaboration may bring (for example, see Das and Teng, 2000). According to Lavie (2006) and Eisenhardt and Schoonhoven (1996), alliances can generate a competitive advantage if the alliance's resources are heterogeneous and imperfectly mobile. The heterogeneity of resources involves that not all organisations in the alliance possess the same resources, while imperfect mobility implies that resources are less valuable to users rather than to the owners of the resources. Thus, a main feature from a resource-based perspective is that competitive advantage rises from owned resources or access through company collaborations. For its part, KBV justifies alliances as a mechanism for transmitting, especially, tacit knowledge (Lavie, 2006).

However, the RBV and KBV have been criticised for not explaining how collaborators are chosen (Kim, 2017; Lin, Ho and Shen, 2019). To understand why this is the case, it is worth starting from the fact that, following Nielsen (2003), Dong and Glaister (2006) and Cummings and Holmberg (2012), two types of criteria are used to choose partners: task-related and partner-related. First, task-related discusses the skills, resources and capabilities of inter-organisational partners that are necessary to achieve the target goals of inter-organisational collaboration. Second, partner-related criteria are the organisational characteristics, norms, culture and shared goals of inter-organisational partners. While the RBV and KBV suggest that task-related criteria matter when choosing a partner (Kim, 2017; Das and Teng, 2003), partner-related criteria are typically neglected by the RBV and KBV as they do not consider the motives and interests of partners. In addition, RBV and KBV theories, with their robust importance on economic rationality, concentrate on the resource bundles and tend to avoid the process of interaction between organisations. However, Baum and Oliver (1991) and Lin et al. (2009) suggest that social resources (in terms of common motives) can support and supplement financial and physical resources. Therefore, in line with Kim (2017) and Caputo et al. (2019), we suggest the importance of integrating RBV and KBV with other theories which show that the most suitable partner is derived not only exclusively from the resources shared but also aspects such as stakeholder interests and motives which are essential when choosing the most appropriate collaborator.

2.2. Stakeholder theory

Stakeholders are often described as 'any group or individual who can affect or is affected by achieving the organisation's objectives' (Freeman, 1984, p. 46). They comprise diverse types of actors who are connected to an organisation either internally (such as its shareholders, investors and employees) or externally (such as its customers, competitors, unions and suppliers) (Freeman, 1984; Greenley & Foxall, 1997; Schneper & Guillén, 2004). Stakeholder Theory posits that different interests characterise diverse stakeholders as every stakeholder has their individual and distinctive bunch of expectations, needs and values (Freeman, 1984; Greenley & Foxall, 1997). In this context, stakeholder goals, due to their wide variety of origins, are often in conflict with each other, and therefore this increases the need to balance the interests of various stakeholders (Driessen & Hillebrand, 2013).

According to the instrumental approach of Stakeholder Theory, stakeholders display greater support for the achievement of an organisation's goals (such as new products and performance) if they are aligned with its interests and motives (Donaldson & Preston, 1995; Greenley & Foxall, 1997; Jones, Harrison and Felps, 2018).[4] In addition, the normative approach suggests that stakeholders act based on some underlying moral and ethical principles (Donaldson & Preston, 1995). Bridoux and Stoelhorst (2014) build on these views by categorising stakeholders as 'self-regarding' and 'reciprocal'. While self-regarding stakeholders are inclined to be only concerned with their own interests and pay-offs, reciprocators tend to act fairly and avoid unfair behaviours towards others, even though it is costly to do so (Bridoux & Stoelhorst, 2014). A similar categorisation is proposed by Phillips, Freeman, and Wicks (2003), who suggest that 'normative' stakeholders are bound up with moral obligation to each other (e.g. investors, employees, supply chain actors), whereas 'derivative' stakeholders have no direct moral obligation and can either harm or benefit the organisation (e.g. competitors, actors outside the supply chain). As such, in inter-organisational stakeholder relationships, while a focal organisation may meet the interests of its stakeholders even at the expense of its own, it may also attempt to engage in a win–win or win-lose relationship in its favour (Bourne & Walker, 2005). However, it is also widely agreed that developing mutually beneficial relationships is essential to build trust among collaborators and generate competitive advantage through inter-organisational collaboration (Kull, Mena and Korschun, 2016; Rindfleisch & Moorman, 2001).

Stakeholders are also classified as 'primary' and 'secondary' stakeholders: the former are crucial for an organisation's survival or existence (e.g. suppliers and customers), while the latter are portrayed as not as essential for its survival or existence (e.g. universities, research centres and competitors) (Clarkson, 1995). In this sense, primary stakeholders, who are regarded to be salient by managers in the context of their power and legitimacy, are widely agreed to play a more direct role in organisations than secondary stakeholders (Miles, 2017; Mitchell, Agle, & Wood, 1997). This is because secondary stakeholders either do not control resources that are very important to the focal organisation or only influence the organisation (and are involved in its operations) indirectly via other stakeholders that have a direct business interest and engagement with the organisation (Shubham, Charan and Murty, 2018; Sharma & Henriques, 2005; Su & Tsang, 2015). Consistent to our view, Hult et al.'s (2011) study suggests that compared to secondary stakeholders, primary stakeholders have a direct relationship with the focal organisation, e.g. through a supply chain. On the other hand, secondary stakeholders are more loosely connected to the focal organisation because they are more likely to operate outside the organisation's closely-knit supply chain, compared with primary stakeholders who operate within the organisation's supply chain (Chung & Crawford, 2016; Torres, Bijmolt, Tribóc, & Verhoef, 2012).

[4] Instrumental Stakeholder Theory assumes that stakeholder relationships are 'governed by the core hypothesis of IST that developing stakeholder the norms of traditional ethics such as fairness, trustworthiness, loyalty, and respect generates improved financial performance' (Jones et al., 2018).

In addition, it is suggested that in a relational context, secondary stakeholders often have difficulties in clearly articulating their positions (so-called 'stakeholder ambiguity') (Hall & Vredenburg, 2005). For example, in innovation collaborations, secondary stakeholders with market-based interests (including competitors) may face a dilemma that requires them to choose between cooperation and competition (Landkammer & Sassenberg, 2016). Likewise, secondary stakeholders (such as universities and research centres) with non-market interests and long-term academic research goals often have different objectives from those of private sector organisations with shorter-term goals (Bercovitz & Feldman, 2007; Ozdemir et al., 2017). Hence, in collaborations with secondary stakeholders, there is a risk of having conflicting stakeholder objectives, motives and interests, and ambiguity in expectations.

Incentivising stakeholders to make organisation-specific resource investments is an essential issue for the RBV of the organisation, which positions unique and inimitable resources as enablers of superior organisational performance (Hoskisson, Gambeta, Green, & Li, 2018). However, the RBV approach tends to explain collaborations and their outcomes based on stakeholder resources without considering stakeholder values, objectives and interests (e.g. self-regard and reciprocity) (e.g. Miles, 2017; Weitzner & Darroch, 2010). In stakeholder relationships, reciprocity is central to stakeholder value creation and a significant factor in incentivising a stakeholder's resource commitment (Miles, 1997). If this is the case, stakeholders with diverging interests, motives and objectives will not commit to a course of action that would be desirable from the standpoint of the partner organisations only (Rowley & Moldoveanu, 2003). This implies that stakeholders' resources (e.g. their complementary, diverse, distinctive resources) may not suffice for the success of inter-organisational collaborations unless there is support from stakeholders with compatible interests (Jap & Anderson, 2003; Polzer, Mannix, & Neale, 1998).

In line with this view, this study assumes that regardless of the resources owned, primary stakeholders such as suppliers and customers – who are driven by market-based interests – are more likely to support the development of commercially driven innovations than secondary stakeholders whose interests are not compatible with the market-based interests of a commercially oriented focal organisation. Several authors have highlighted this issue. For example, Miyata (2000) suggests that since universities are not delicate to market or business tendencies or trends, they should not be expected to produce commercially viable innovations. Equally, Di Gregorio and Shane (2003) highlight that universities are not interested in the commercialisation of research unless sponsored research funding is available from industry sources. So, in the context of collaborations with secondary stakeholders with non-market-based interests, there is a need for industry-based funding to incentivise the development of commercially viable innovations (Ozdemir et al., 2017). In other words, the direct or indirect involvement of primary stakeholders with chiefly market-based interests or commercial needs is needed.

Furthermore, we do not argue that an organisation must only collaborate with stakeholders to co-innovate. Indeed, a focal organisation's competitive advantage also depends on its access to information from many stakeholders (Sanou et al., 2016). Access to a range of information sources can enhance a focal organisation's knowledge (i.e. resource) base and resource alignment to gain greater salience and legitimacy among stakeholders, and the capability to manage multiple stakeholders (Gulati, 1999; Mitchell, Agle, & Wood, 1997; Koka & Prescott, 2002). Specifically, an organisation may have access to information from a small or large number of external stakeholders (Ferreras-Méndez et al., 2015). The breadth of an external information search relates to the exploration of information with distant elements outside an organisation's current knowledge (i.e. resource) domain (Katila, 2002; Katila & Ahuja, 2002; Troilo et al., 2014), while the depth of an external information search is associated with an organisation's information search in the realm of its existing knowledge (i.e. resource) domain (Katila, 2002; Katila & Ahuja, 2002). Thus, while the breadth of an external information search is relevant to exploring new knowledge, its depth is relevant to exploiting existing knowledge (March 1991; Katila, 2002). Importantly, both the depth and breadth of an external information search and access improve innovation performance (Ardito and Petruzzelli, 2017; Ardito et al., 2020; Kobarg et al., 2019), although Chiang and Hung's (2010) and Stanko and Henard's (2017) studies show that breadth matters more than depth for the development of radical innovations. So, an information search among a broad range of stakeholders gives a focal organisation an informational (or resource) advantage by providing access to more unique knowledge resources in the innovation development and production process. Importantly, an organisation that has access to information from various stakeholders can complement knowledge gaps that primary stakeholders have (Kang, 2013). As a result, we argue that access to information from many sources can increase the likelihood that collaboration with primary stakeholders will lead to high-value innovation that generates an increase in the demand for skilled workers (Miles, 2017; Mitchell, Agle, & Wood, 1997).

3. Hypotheses

3.1. Inter-Organisational collaborations and product innovation

Product innovation includes implementing or commercialising a good and an intangible service with improved performance characteristics, introduced for business and consumer markets (Doran & Ryan, 2016; Li & Atuahene-Gima, 2001; Pan & Li, 2016). It includes inventions, design, R&D, and the patent and trademark attainment (Pan & Li, 2016). In terms of the role of inter-organisational collaborations in the development of product innovations, the literature is inconclusive. On the one hand, some studies have observed that collaborations with stakeholders such as universities and research centres are more likely to generate product innovations by providing novel and unique resources and knowledge (e.g. Aschhoff & Schmidt, 2008; Fritsch & Franke, 2004) than collaborations with suppliers and customers. On the other hand, some studies have highlighted that suppliers and customers matter for product innovation, given their ongoing informal and formal knowledge exchanges (Fitjar & Rodríguez-Pose, 2013).

New-to-the-market product innovations constitute a key revenue stream for profit-oriented primary stakeholders within the supply chain. Therefore, suppliers have to be innovative and strongly connected to the needs of their customers (Kang & Kang, 2010). Collaborations formed with suppliers will diminish the risk and time of innovation development by facilitating access to specialised knowledge resources (Jajja et al., 2017; Fossas-Olalla et al., 2015; Lau, Tang and Yam, 2010). Similarly, customers may support product innovation by sharing knowledge about their needs and product requirements (Cui & Wu, 2017; 2016). In this way, organisations can anticipate emerging market needs earlier than their competitors, lower the risk of producing products and services with defects, and improve their responses to emerging opportunities (Carbonell et al., 2009; Anning-Dorson, 2018).

Studies on innovation have shown that only about 10 per cent of all product innovations are radical, and these are mainly developed through the deployment of non-redundant knowledge resources. A significant majority, about 90 per cent of them, include incremental changes by using mainly redundant knowledge resources (Kim, Kumar and Kumar, 2012). Although previous research suggests that ambidextrous innovations involving both radical and incremental changes can be launched successfully (Harmancioglu, Sääksjärvi and Hultink, 2020), it is widely agreed that radical innovations are more likely to fail than incremental ones (Chiesa and Frattini, 2011).

From an RBV perspective, in an inter-organisational context, the development of product innovations with ambidextrous changes requires complementary knowledge and resources from collaborating partners, while radical innovation needs access to non-redundant (inter-industry) knowledge and resources[5] for experimentation and discovery (Wuyts, Dutta and Stremersch, 2004). As suppliers and customers have both shared and diverse industry operations, they hold both the intra- and inter-industry knowledge required for the successful development of product innovations with ambidexterity (Hess & Rothaermel, 2011; Rindfleisch & Moorman, 2003; Vanhaverbeke et al., 2009; Ozdemir et al., 2017). However, universities and research institutions operating in different industries provide non-redundant knowledge and resources required for radical product innovations (Todtling et al., 2009; Ozdemir et al., 2017). From a stakeholder perspective, aligned interests (e.g. the commercial interests of for-profit organisations) diminish the risks of stakeholder conflicts, while from an RBV point of view similar knowledge bases and resources reduce communication costs. In contrast, the use of non-redundant knowledge and resources reduces the ability to share and utilise knowledge among collaborating parties (Cronin & Weingart, 2007), which may increase stakeholder conflict and undermine the likelihood of successfully developing product innovations. As a result, we expect suppliers and customers to be more likely to collaborate with the focal firm to develop product innovations, rather than with universities and research centres.

Hence:

Hypothesis 1. *Collaborations with primary stakeholders* (*suppliers and customers*) *are more likely to be associated with product innovation development than collaborations with secondary stakeholders* (*universities and research centres*).

3.2. Inter-Organisational collaborations and process innovation

Process innovation often refers to the changes in systems or processes new to the industry (Bigoness & Perreault, 1981; Ettlie & Reza, 1992; Kahn, 2018; Pan & Li, 2016). It may also be related to implementing new or significantly improved delivery systems (Kahn, 2018; Pan & Li, 2016). The difference between product innovation and process innovation is that, while the former has an external focus associated with certain features of a new product, the latter is concerned with the improvement of a manufacturing process (Aliasghar et al., 2019; Kahn, 2018). However, Simms et al. (2021) suggest that those process innovations are dependent on the development of successful product innovations over time.

Collaborations with suppliers provide a range of benefits for process innovations by improving processes and costs (Pilav-Velić & Marjanovic, 2016). Particularly, collaborations with suppliers enable the identification and development of new technologies as underlying mechanisms to improve or transform existing processes (Reichstein & Salter, 2006). In addition, organisations often establish long-term relations with a limited number of suppliers to improve existing processes (Un & Asakawa, 2015). Importantly, resolving potential problems early in the development of process innovations is required to lower their costs, and gather and process information and knowledge from suppliers (Simms et al., 2021). Terjesen and Patel (2017) also suggest that intensive interactions with suppliers give detailed and implementable knowledge on and resources for new technologies, and thereby generate the recombinations of new knowledge and resources essential for process innovations (Sjödin, Eriksson, & Frishammar, 2011).

Furthermore, process innovations can benefit from customer involvement in order to access information on their current needs and gain insights into their future requirements (Ashok, Day and Narula, 2018). Collaborations with customers can improve operating efficiency and performance, assets utilisation and inventory management (Ashok et al., 2018; Bauer & Leker, 2013; Doran & Ryan, 2016; Krolikowski & Yuan, 2017). Additionally, since process innovations are closely intertwined with downstream products, they require the adoption of complementary downstream process innovations that need to be based on customer requirements (Maine, Lubik, & Garnsey, 2012).

While some research has shown the positive effect of collaborating with universities on process innovations (Nieto & Santamaría, 2010; Santamaria & Surroca, 2011; Segarra-Blasco & Arauzo-Carod, 2008), there are some studies that show that this effect is stronger when collaborating with suppliers (Fitjar & Rodríguez-Pose, 2013; Nieto & Santamaría, 2010; O'Connor, Doran and McCarthy, 2021; Santamaria & Surroca, 2011; Segarra-Blasco & Arauzo-Carod, 2008) and customers (Nieto & Santamaría, 2010; O'Connor et al., 2021; Santamaria & Surroca, 2011; Segarra-Blasco & Arauzo-Carod, 2008). The findings of these studies are also consistent with the research by Barra, Maietta and Zotti, (2019), which found that academic excellence and resources – including academic research and scholarship – are the least important for process innovations among all other types of innovations.

In contrast, Robin and Schubert's (2013) and Medda's (2020) studies demonstrate that collaborations with universities and other research institutions have no significant effect on process innovations. Fitjar and Rodríguez-Pose's (2013) study also reported a similar finding. Along the same lines, Aliasghar et al. (2019) show that while knowledge searches by stakeholders such as suppliers and customers are associated with process innovation, knowledge searches by universities and other research institutions are not. Finally, Terjesen and Patel (2017) also observe that the breadth of external information searches is negatively related to process innovations, meaning that collaborating with universities and other research institutions with a wide range of resources and knowledge domains may increase search costs.

One of the major barriers to collaborations for innovation development between industry and universities and other research institutions is related to their conflicting interests in terms of disputes over patent rights (Perkmann & Salter, 2012). This issue becomes more critical for process innovations that are often not patentable (Damanpour & Gopalakrishnan, 2001). Thus, the problems in patenting process innovations may either prevent or create dysfunctional conflicts between organisations with different interests. In contrast, the links along the supply chain (and the alignment of interests) enhance the mutual interests of stakeholders operating within this chain (such as suppliers and customers) and their role in developing process innovations. In line with these views, Robin and Schubert (2013) suggest that proactively exchanging ideas, knowledge and resources with suppliers and customers constitutes an effective strategy for improving a production process, thus developing process innovations.

Therefore:

Hypothesis 2. *Collaborations with primary stakeholders* (*suppliers and customers*) *are more likely to be associated with the development of process innovation than collaborations with secondary stakeholders* (*universities and research centres*).

3.3. Inter-Organisational collaborations and Eco-Innovation

Eco-innovation includes innovative processes, services and products that reduce environmental risk and improve environmental sustainability (Kemp & Pearson, 2007; Triguero, Moreno-Mondéjar, and Davia, 2013). Eco-innovation has high fixed costs and may produce a financial return in the long term (Arroyave, Sáez-Martínez and González-Moreno, 2020). Environmental pressures may originate from several stakeholders of different types, including regulatory stakeholders (i.e. governments and trade associations), customer stakeholders (e.g. customers in the market and employees as internal customers), community

[5] Non-redundant knowledge refers to the type of knowledge beyond the realm of an organisation's existing knowledge base and know-how (Rindfleisch and Moorman, 2003; Ozdemir et al., 2017).

stakeholders (e.g. community groups, environmentalists and other lobbyists) and the media (Roscoe, Cousins, & Lamming, 2016; Doran & Ryan, 2016; Henriques & Sadorsky, 1999).

There is a consensus in the literature that eco-innovations require more multidisciplinary knowledge than other types of innovations (Bocken et al., 2014; Triguero, Cuerva and Álvarez-Aledo, 2017). Compared with supply-chain stakeholders such as supplier and customer organisations, universities and other research institutions have access to interdisciplinary knowledge and resources (Ávilaa et al., 2017); hence, collaborations with these stakeholders may help organisations develop eco-innovations (Dangelico & Pontrandolfo, 2015). This view is supported by previous empirical research noting that entrepreneurs collaborating with universities and other research institutions are active in developing eco-innovations (Triguero et al., 2013; Arroyabe et al., 2020). These stakeholders provide significant support by reducing the initial risks and costs associated with developing eco-innovations for commercial organisations (Hansen & Klewitz, 2012). With the support of government-based initiatives,[6] universities and research centres, which are primarily driven by non-market-based interests, are expected to display proactive innovation measures to support the development of eco-innovations. However, such support is expected to be less important for supply-chain stakeholders such as suppliers and customers, who are more likely to be motivated and interested to make the most of their investments in commercial innovations that fulfil their primary objectives through market-based returns.

Hence:

Hypothesis 3. *Collaborations with secondary stakeholders* (*universities and research centres*) *are more likely to be associated with the development of eco-innovations than collaborations with primary stakeholders* (*suppliers and customers*).

3.4. Inter-Organisational collaborations and the impact on employment

Empirical evidence has examined the role of inter-organisational collaborations in supporting the production of innovations with both commercial (i.e. financial) and non-commercial (i.e. social and environmental) returns (e.g. Aliasghar et al., 2019; Kang & Kang, 2010; Ozdemir et al., 2017; Triguero et al., 2017). However, the literature has not focused on the impact that these collaborations have, for example, on organisation-level employment growth, despite the importance of this indicator for policy and managerial reasons (Rangus & Slavec, 2017). Successful product and process innovations tend to impact positively on business turnover and eventually enhance business growth (proxied by employment). The literature on high growth has highlighted the relationship between high growth (proxied by employment growth) and innovation (NESTA, 2009; Holzl, 2009; Mason et al., 2009). We suggest that innovation resulting from inter-organisational collaborations may trigger employment growth, but whether it increases the demand for skilled workers will depend on the type of stakeholders involved in the collaboration.

In collaborations with primary stakeholders such as suppliers and customers, organisations tend to develop innovations that mostly result from the recombination of similar knowledge bases. This type of innovation may have some market value but may not be able to generate competitive advantage in the long run; in turn, it may lead to turnover growth, but the impact on employment may not be very large or sustainable (Rindfleisch & Moorman, 2001; 2003; Ozdemir et al., 2017; Ozdemir et al., 2019). In the case of primary stakeholders, the predominant objective of collaborations is to create new business opportunities and revenue streams for the focal organisation, which may not necessarily translate into increasing demand for skilled workers. For example, close collaborations with suppliers can reduce operational costs (including labour costs) and mark-up prices of new offerings; typically, this is achieved through innovations that reduce the share of labour (skilled or not) in the final output. In the case of collaborations with customers, organisations innovate to boost customer satisfaction and sales growth, and there is no evidence that this leads to increasing demand for skilled workers. In addition, these benefits are also likely to be overshadowed by high transaction costs, such as those of monitoring, which may reduce the cash flow needed to support the demand for labour (Piboonrungroj & Disney, 2015). For example, shared suppliers and customers may lead to conflicts of interest in collaborative engagements, thus hindering new job creation opportunities.

In the case of secondary stakeholders, particularly those with non-market-based interests such as universities and research centres, collaboration may lead to innovations that can increase the demand for graduate workers. The characteristics of these organisations imply that they tend to collaborate with firms that hire a large proportion of highly skilled workers. For instance, universities need to advance scientific knowledge creation, application and learning (Baldini, Grimaldi and Sobrero, 2006; Eriksson & Forslund, 2014). This can only be achieved by collaborating with firms with a workforce whose skills match the university's offering. In addition, graduate recruitment is a key performance measure for all universities and hinges on graduate employability, education and research quality (Bercovitz & Feldman, 2007; Ozdemir et al., 2017; Eriksson & Forslund, 2014; Sena & Ozdemir, 2020). Particularly for small businesses and start-ups, collaborations with stakeholders such as universities and research centres can provide a range of benefits, such as receiving business incubation support, establishing networks with venture capitalists and receiving externally funded business consultancy support. All of this can help them recruit skilled employees and contribute to their employment growth (Rothaermel & Ku, 2008). Zucker, Darby, and Armstrong's (2002) study also shows that universities support employment growth among collaborating organisations.

As a result:

Hypothesis 4. *Collaborations with secondary stakeholders* (*universities and research centres*) *rather than primary stakeholders* (*suppliers and customers*) *are more likely to be associated with employment growth in the focal firm*.

3.5. The impact of having access to diversified information sources on Inter-Organisational collaborations

In the context of inter-organisational relationships, access to information is a critical driver of profitability; and from an RBV perspective, organisations with access to such vital resources may be more competitive (Williams & Moore, 2007; Zhang & Hartley, 2018). While a search for a greater breadth of information can provide access to a wider range of diversified knowledge, the depth of an information search gives access to a limited range of knowledge and enables the development of less innovative solutions (Chiang & Hung, 2010). However, in the context of inter-organisational collaborations, access to heterogeneous knowledge through multiple direct ties with diverse sources of information may provide an advantage (Potter & Paulraj, 2021).

From a stakeholder perspective, diverse stakeholders can enhance an organisation's knowledge base through knowledge-sharing or transfer (Kang, 2013; Mitchell et al., 1997). We would expect the focal organisation to use this advantage to complement the knowledge sourced from its primary stakeholders in the supply chain (Miles, 2017; Mitchell et al., 1997), regardless of the innovation type under development. When organisations have access to more diverse information sources, they can more easily create opportunities for new recombinations of knowledge

[6] The importance of universities and other research institutions in the development of eco-innovations can be shown by government-backed initiatives such as the European Innovation Partnerships as part of the EcoAP programme, whose objective is to enhance eco-innovation by facilitating collaborations between public and private stakeholders (Triguero et al., 2013).

that may lead to high-value innovation (Lawler & Yoon, 1998). In this case, access to new information through a diverse range of stakeholders enables access to broadened resource and learning benefits, and increases the value of the resulting innovation (Jiang, Tao and Santoro, 2010). Indeed, organisations can enrich their knowledge bases with diverse and unfamiliar knowledge domains, as well as deeper knowledge elements in existing knowledge domains (Wuyts & Dutta, 2014), and it has been shown that access to a greater range of information sources allows organisations to develop high-value innovations (Faems et al., 2010).

Primary stakeholders tend to have knowledge bases that are often quite close to those of the focal organisations, and this leads to the production of innovations that may be new to the innovator but not necessarily to the industry (Darnall, Henriques, & Sadorsky, 2010). However, if the focal organisation has access to a diverse range of information sources, it can offset this limitation of collaborating with primary stakeholders and eventually produce high-value innovations that may create new employment opportunities. Thus:

Hypothesis 5. *In the context of inter-organisational collaborations, the impact of primary stakeholders on the development of* (*a*) *product innovation*, (*b*) *process innovation*, (*c*) *eco-innovation and* (*d*) *skilled employment growth is larger than the impact of secondary stakeholders* (*universities, research institutions and centres*) *when the focal organisation has access to a variety of information sources*.

4. Research methodology

For this research, the data is obtained from the Spanish Community Innovation Survey (PITEC). This database is harmonized for all the countries of the European Union. In fact, the objective is to analyse the innovation management of companies. For this, the content of the questionnaire contains data both on the description of the companies and on the management of innovation, with special emphasis on the drivers that facilitate innovation in companies. In this study, we will use the years 2015 (t-1) and 2016 (t) as the reference period. The database provides us with a sample of 12,849 Spanish companies.

4.1. Measures

4.1.1. Measures: Dependent variables

Our performance measures refer to 2016 (t). The first variable is product innovation; the questionnaire proxies product innovation with three dummy variables: i) the company has launched a product innovation in a reference period; ii) the company has launched an innovation in goods in a reference period; and iii) the company has developed innovation in services in a reference period. The second performance measure is process innovation in the company. In this case, the questionnaire proxies process innovation with three variables: i) process innovation in manufacturing methods has been developed; ii) process innovation in logistical systems has been developed; and iii) process innovation in support activities has been developed to improve the production process (for example, maintenance and IT operations). The PITEC questionnaire captures eco-innovation, as innovation activities aimed at sustainability and environmental improvement in the company: i) the eco-innovation has as its objective to reduce the energy consumed in the company; ii) the eco-innovation tries to reduce the environmental impact of the companies; iii) the eco-innovation improves the health and safety in the company; and iv) the eco-innovation has as objective the compliance with regulatory and standards in the environmental fields. All three innovation (product/ process and eco-innovation) variables range between 1 and 4: a value of 4 indicates that the organisation has innovated more than once in the reference period. In contrast, 1 indicates that the organisation has not innovated in the reference period.

Finally, the questionnaire includes the influence of *innovation on employment* in terms of *employment growth*. More specifically, it asks whether employment has increased or stayed the same following the launch of new products, processes or eco-innovations. In addition, it also asks whether the number of skilled workers has increased following the launch of innovation.

4.1.2. Measures: Independent variables

The reference period for independent variables is 2015 (t-1). Regarding cooperation, the PITEC questionnaire considers inter-organisational collaboration as a Likert variable, investigating the amplitude and degree of the cooperation agreements in the innovation process. The values range between 1 (does not cooperate) and 4 (if the company uses cooperation agreements extensively).

Primary Stakeholders are calculated using two variables: (i) suppliers and (ii) clients. This variable was designed as a cumulative index of both variables (Arranz et al., 2021), its resulting range being between 1 and 8 (correlation 0.801). The second independent variable is *Secondary Stakeholders*, which includes two typologies of partners: (i) universities and (ii) research centres. As previously, the variable is measured as a cumulative index ranging between 1 and 8 (correlation: 0.772).

The next independent variable is the *source of information*. The questionnaire differentiates among external information sources: First, the information sources come from the supply chain (suppliers, customers, competitors). The second information source is in the function of the typology of agents (consultants and commercial laboratories; universities; public research; technological centres). The last information source is for the origin of information (conferences, trade fairs; journals; professional and industry associations). Factor analysis has been used to combine the variables, and the resulting index measures the intensity of information sources ranging between 1 and 4 (Cronbach's alpha: 0.979).

4.1.3. Control variables

Organisation Size. This variable is measured by the number of employees. Previous empirical studies have found that the size of the organisation moderates the relationship between the propensity to innovate and the type of collaborators (Vaona and Pianta, 2008; Shefer and Frenkel, 2005).

Manufacturing/Services. The second control variable establishes the distinction between the manufacturing and services sector, creating a dummy variable with values 0 (manufacturing) and 1 (service).

Technology Intensity. We use as a third control variable the technology intensity, which is measured as internal R&D expenditure in relation to the number of staff.

International Activities. The fourth control variable measures the international activities of the organization. For this, we consider that the level of internationalization is based on the geographic scope of the market, considering four areas such as local, national, European Union, and other foreign countries.

Group. The last control variable measures whether the company belongs to an organization, creating a dummy variable, 0 if the organization does not belong to a group and 1 if it does.

4.2. Econometric Model

Table 1 shows the correlation values of all variables. To test Hypotheses 1–4, we use several regression models (see Table 2) where the dependent variable varies across the different specifications. Models 1–4 show the relationship between product innovation (Cronbach's alpha: 0.725), the two independent variables (Primary Stakeholders; Secondary Stakeholders) and the five control variables. Models 5–8 (Table 2) focus on process innovation (Cronbach's alpha: 0.718), while Models 9–12 (Table 2) analyse employment growth (Cronbach's alpha: 0.880). Lastly, in Models 13–16 (Table 2), the dependent variable is eco-innovation (Cronbach's alpha: 0.917).

To test Hypothesis 5, we use the regression models presented in Table 5. In the four models shown in Table 5, we have used the previous

Table 1
Correlations.

PRIMARYCOOP	1										
SECONDARYCOOP	0.095*	1									
MANUFSERVICES	0.017	0.050*	1								
INTERNATIONALISATIONLEVEL	0.139**	0.194**	-0.276**	1							
INNOVATIONINTENSITY	0.142**	0.110**	0.091**	-0.025	1						
GROUP	0.103**	0.159**	0.062*	0.186**	0.182**	1					
SIZE	0.109**	0.077**	0.173**	-0.123**	-0.021*	0.132**	1				
PRODUCTINNOVATION	0.165**	0.171**	-0.096**	0.198**	0.108**	0.046**	-0.006	1			
PROCESSINNOVATION	0.197**	0.148**	-0.112**	0.102**	0.018	0.106**	0.039**	0.214**	1		
ECO-INNOVATION	0.190**	0.181**	-0.192**	0.149**	0.061**	0.089**	0.040**	0.286**	0.212**	1	
EMPLOYMENT GROWTH	0.163**	0.199**	-0.035**	0.097**	0.122**	0.013	0.001	0.145**	0.143**	0.175**	1

*p < 0.05, **p < 0.01.

four dependent variables (product, process, employment growth, eco-innovation). Moreover, as independent variables, we will use the indicator of usage of information sources, types of stakeholders, and their interactions.

5. Analysis and results

To validate our empirical study, firstly, we tested the *questionnaire and responses*, intending to rule out the existence of common method variance (CMV) and common method bias (CMB). Using Podsakoff et al. (2003) method, the results show seven distinct factors that accounted for 68.92% of the variance, explaining the first factor accounted for 17.23% variance. This result shows that our empirical study is robust, not showing CMB and CMV. Secondly, we tested the robustness of the *regression analysis*, ruling out the existence of collinearity problems (see Tables 2 and 5), and autocorrelation problems (Durbin-Watson Test). Our results show the robustness of our analyses.

As for *product innovation*, Models 2 and 3 (Table 2) show a positive regression coefficient between product innovation and the variables for primary (ß= 0.255; p < 0.001) and secondary stakeholders (ß= 0.110; p < 0.001). Our results corroborate previous hypotheses on ambidexterity (Bercovitz and Feldman, 2007; Ozdemir et al., 2017; Bustinza et al., 2019). As for *process innovation*, Table 2 (Models 6 and 7) shows a positive relationship between process innovation and primary stakeholder (ß= 0.189; p < 0.001) and secondary stakeholder collaborations (ß= 0.076; p < 0.05). The results corroborate the literature, which highlights the role of suppliers (Ashok et al., 2018; Bauer & Leker, 2013; Doran & Ryan, 2016; Krolikowski & Yuan, 2017) and customers (Krolikowski & Yuan, 2017) in process innovation. Regarding *eco-innovation*, Models 10 and 11 (Table 2) confirm a positive result of eco-innovations and primary (ß= 0.152; p < 0.001) and secondary stakeholders (ß= 0.207; p < 0.001). Lastly, Models 14 and 15 (Table 2) also indicate a positive regression coefficient between the impact on *employment growth* and primary (ß= 0.114; p < 0.001) and secondary stakeholders (ß= 0.195; p < 0.001).

We checked the *robustness of these results*, testing the existence of endogeneity between the independent variables. To do this, we conducted a complementary analysis using a structural equations model. In Table 3, we show the results of structural equation estimations, showing the existence of a significant relationship between the independent and dependent variables, corroborating the regression analysis (Tables 2 and 5).

Regarding Hypothesis 1, which compares the comparative roles of primary and secondary stakeholders in developing product innovations, we developed a critical test (Liu, Luo and Liu, 2009). Firstly, it compared whether primary stakeholder cooperation (or collaboration) had a greater impact than secondary stakeholder cooperation on product innovation. Then, it obtained the variance of product innovation objectives corresponding a primary stakeholder cooperation by getting the adjusted R2 of models (Models 4 and 3) in Table 2: ΔR2Model4-Model3 = R2Model4- R2Model3 = 0.178–0.138 = 0.040. Secondly, we calculated ΔR^2Model4-Model2, the proportion of variance explained by secondary stakeholder cooperation: ΔR2Model4-Model2 = R2Model4-R2Model2 = 0.178–0.154 = 0.024. To check which of the two types of stakeholder collaboration had a larger impact on product innovation, we compared ΔR2Model4-Model2 and ΔR2Model4-Model3; since ΔR2Model4-Model2 > ΔR2Mode4-Model3, we can conclude that primary stakeholder collaboration has a greater effect on product innovation or the commercialisation of product innovations than secondary stakeholder collaboration. Thus, Hypothesis 1 is accepted.

To check Hypothesis 2, suggesting that primary stakeholders are more effective than secondary stakeholders in developing successful process innovations, we compared the explained variance for primary and secondary stakeholder collaborations (Models 6, 7 and 8). The results highlight that primary stakeholder collaboration has a higher effect on process innovation than secondary stakeholder collaboration. Our results extend previous studies, which have highlighted the role of the customer (Maine, Lubik, & Garnsey, 2012) and suppliers (Sjödin et al., 2011) in the development of both innovations (product and process innovations), and thus suggest that primary stakeholders with market-based interests are more important than secondary stakeholders with non-market-based interests for process innovation. Supply chain collaboration facilitates process innovation to improve efficiency (Kahn, 2018).

Moreover, to test Hypothesis 3, we analysed whether secondary stakeholders (universities and research centres) were more effective than primary stakeholders in developing eco-innovations. In line with the previous hypotheses, we compared the explained variance for primary and secondary stakeholder collaborations (Models 10, 11 and 12) and found that secondary stakeholder collaboration had a higher impact on eco-innovation than primary stakeholder collaboration. The results are in line with the research on environmental innovation. In this line, Borghesi et al. (2015) and Evans et al. (2017) noted that eco-innovations create environmental problems, which imply high fixed costs for private organisations (Dangelico, 2016; Tang et al., 2018). In this context, our results highlight the role of universities and research centres in reducing the fixed costs and risks in eco-innovations (Triguero et al., 2013).

Lastly, to test Hypothesis 4, suggesting that secondary stakeholders are more effective than primary stakeholders in developing innovation that impacts positively on employment growth, we compared the explained variance for primary and secondary stakeholder collaborations. We found that secondary stakeholder collaboration had a higher effect on employment growth than primary stakeholder collaboration (e.g. Wynarczyk & Watson, 2005). While collaborations with suppliers and customers may reduce the possibilities for new employment opportunities due to their commercial orientation and tendency to reduce unit labour costs, such inclinations are less likely in collaborations with stakeholders outside the supply chain, such as universities (Bercovitz & Feldman, 2007; Ozdemir et al., 2017). Our results for Hypotheses 2–4 also showed that consistent with the main tenet of Stakeholder Theory, aligned stakeholder interests are effective in the successful commercialisation of innovations and associated employment growth.

Table 2
Regression model.

Model	Product Innovation (t)				Process Innovation (t)				Eco-Innovations (t)				Employment Growth (t)				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	VIF
PRIMARY (t-1)		0.255***		0.161***		0.189***		0.138**		0.152***		0.093***		0.114***		0.107***	1.500
SECONDARY (t-1)			0.110***	0.095***			0.076*	0.041			0.207***	0.185***			0.195***	0.190***	1.672
MANUFACTURING/SERVICES (t-1)	-0.152***	-0.122***	-0.168**	-0.174***	-0.190**	-0.134**	-0.172***	-0.085***	-0.131***	-0.189***	-0.135***	-0.110***	0.129***	0.123***	0.131***	0.120***	1.190
INTERNATIONALISATION LEVEL (t-1)	0.103***	0.180**	0.131***	0.129**	0.010	0.024	0.011	0.072	0.124***	0.112**	0.109**	0.098*	0.009	0.005	0.018	0.021	1.318
INNOVATION INTENSITY (t-1)	0.118***	0.077***	0.050***	0.081***	0.039	-0.035**	0.029	0.025	0.145***	0.175***	0.112**	0.103**	0.023*	0.078*	0.057*	0.091*	1.008
GROUP (t-1)	0.002	0.017	0.008	0.015	0.135**	0.108***	0.124***	0.101***	0.184***	0.125***	0.156***	0.132**	0.017	0.005	0.009	0.010	1.024
SIZE (t-1)	0.110**	0.123***	0.116***	0.107**	0.124***	0.104*	0.075*	0.050*	0.118***	0.105***	0.122***	0.107***	0.123***	0.145***	0.109****	0.156***	1.117
Adjusted R Square	0.111	0.154	0.138	0.178	0.069	0.092	0.087	0.123	0.099	0.121	0.130	0.158	0.061	0.085	0.092	0.110	
Durbin-Watson	1.895	1.904	1.910	1.912	1.904	1.930	1.933	1.945	1.965	1.990	1.978	1.957	1.992	1.997	1.993	1.984	

*p < 0.05, **p < 0.01, *** p < 0.001.

In order to check the *robustness of our results*, we carried out a complementary second analysis with artificial neural networks (ANN).[7] With this analysis, we validated our results in light of possible indirect and non-linear effects among independent variables. Regarding the results of the simulation of the effect of stakeholders, Table 4 shows the normalised importance of the effect of each variable.[8] For example, we observe that the primary stakeholder variable (0.466 – 100% of normalised value) has a greater impact on product innovation than the secondary stakeholder variable (0.180 – 38.6% of normalised value).

Finally, we focus on Hypothesis 5 (see Table 5). While the variable for the usage of information sources and its interaction terms with primary stakeholders are significant, we observed that this is no longer the case for secondary stakeholders for any of our dependent variables. In line with previous works (Zahay, Griffin, and Fredericks, 2011), we see that information as a resource is essential for innovation performance (Williams and Moore, 2007). These results also confirm that access to heterogeneous knowledge through multiple direct ties with diverse sources of information may provide an advantage by granting access to a greater diversity of knowledge (Potter and Paulraj, 2021), which may incentivize primary stakeholders to collaborate with organisations having complementary knowledge and a central position for information-sharing (Hoskisson et al., 2018).

6. Discussion

6.1. Discussion of results

Our empirical results suggest that collaboration with primary stakeholders is more likely to lead to the development of process and product innovations than collaboration with secondary stakeholders (Table 2). Regarding Hypothesis 1, the results are in line with some previous findings (e.g. Aliasghar et al., 2019; Kahn, 2018; Schweitzer, Palmié, & Gassmann, 2018; Ozdemir et al., 2017), suggesting that collaborations with stakeholders along the supply chain are more positively associated with the likelihood of developing product innovations than collaborations with stakeholders operating outside the supply chain. From the perspective of the RBV, these results highlight that not all resources and information provided by collaborators are equivalent. In line with Carbonell et al. (2009) and Anning-Dorson (2018), we argue that information obtained along the supply chain allows organisations to anticipate the needs of emerging markets and increase the speed and efficiency of their responses to emerging opportunities. Similarly, our results reinforce the hypothesis of Cui & Wu (2017; 2016), highlighting the role of customers as a source of information and resources to support product innovation.

In contrast, collaboration with organisations that do not belong to the supply chain may provide only generic information, which, in line with Tichy (2004) and Lee, O'Brien and Sivaramakrishnan (2008), can increase the uncertainty associated with the innovation process. These arguments are in line with the stakeholder perspective, which explicitly considers the interests and motives of diverse stakeholders and how they affect organisational outcomes (Dong and Glaister, 2006; Cummings and Holmberg, 2012). Furthermore, consistent with Kang & Kang (2010), we can argue that the strong connection of suppliers with the needs of their customers increases the interest in collaboration since it will result in a reduction of risk (Jajja et al., 2017; Fossas-Olalla et al., 2015; Lau et al., 2010). Moreover, our results reinforce the arguments of Cronin and Weingart (2007), who point out that suppliers and customers share similar knowledge bases and resources, which will reduce communication costs between interested parties and facilitate the development of

[7] In order to design the ANN-MLP architecture, we follow Wang (2007), Arranz and Fernandez de Arroyabe (2010) and Arranz et al. (2021).

[8] About the relative importance index (ANN), it can revise Ibrahim et al. (2013).

Table 3
Structural equation model.

Variables	PRIMARY (t-1)	SECONDARY (t-1)	Product Innovation (t)	Process Innovation (t)	Employment Growth (t)	Eco-Innovations (t)
PRIMARY (t-1)	–	0.095	0.224***	0.195***	0.131***	0.117***
SECONDARY (t-1)	0.004	–	0.103***	0.097***	0.221***	0.199***

Robustness of SME Model (χ^2: 239; p: 97; GFI: 0.969; AGFI: 0.932; CFI: 0.984; RMR: 0.032; RMSEA: 0.011).
*p < 0.05, **p < 0.01, *** p < 0.001.

Table 4
Artificial Neural Network Simulation.

Variables (t-1)	Product Innovation (t)[1]		Process Innovation (t)[2]		Employment Growth (t)[3]		Eco-Innovation (t)[4]	
	Importance	Normalized Importance (%)	Importance	Normalized Importance (%)	Importance	Normalized Importance (%)	Importance	Normalized Importance (%)
PRIMARY (t-1)	0.466	100.0	0.326	100.0	0.197	81.7	0.159	47.4
SECONDARY (t-1)	0.180	38.6	0.123	37.7	0.241	100.0	0.335	100.0

[1] Simulation: ANN-MLP 2–2-1. Activation Function: Hyperbolic tangent and Identity. Robustness, Error: 17.3%.
[2] Simulation: ANN-MLP 2–2-1. Activation Function: Hyperbolic tangent and Identity. Robustness, Error: 18.0%.
[3] Simulation: ANN-MLP 2–2-1. Activation Function: Hyperbolic tangent and Identity. Robustness, Error: 15.8%.
[4] Simulation: ANN-MLP 2–2-1. Activation Function: Hyperbolic tangent and Identity. Robustness, Error: 19.0%.

Table 5
Regression Model.

Variables	Product Innovation (t)	Process Innovation (t)	Employee Innovation (t)	Environmental Innovation (t)
PRIMARY*INFORMATION	0.132***	0.103***	0.167***	0.189***
SECONDARY*INFORMATION	0.024	0.086	0.003	0.078
INFORMATION	0.204***	0.117**	0.171***	0.233***
MANUFACTURING/SERVICES (t-1)	-0.168***	-0.201***	-0.190***	-0.167***
INTERNATIONALISATIONLEVEL (t-1)	0.077**	0.053*	0.102**	0.004
INNOVATIONINTENSITY (t-1)	0.095***	0.123***	0.078*	0.087**
GROUP (t-1)	0.081	0.117**	0.085**	0.004
SIZE (t-1)	0.090**	0.134***	0.101**	0.158***
Adjusted R Square	0.120	0.139	0.175	0.113
Durbin-Watson	1.903	1.877	1.925	1.936

*p < 0.05, **p < 0.01, *** p < 0.001.

collaborative innovation.

As for Hypothesis 2, the results show that process innovation is more likely to be associated with collaboration with primary stakeholders than with secondary stakeholders, consistent with previous research (for example, Robin and Schubert (2013); Medda (2020); Fitjar & Rodríguez-Pose, 2013). From an RBV perspective, our results clarify the types of resources and knowledge most appropriate to develop collaborative process innovations. This is in line with Pilav-Velić and Marjanovic (2016) and Terjesen and Patel (2017) in the sense that collaboration with suppliers facilitates the identification and development of new technologies to improve or transform existing processes (Reichstein and Salter, 2006; Un and Asakawa, 2015). Our results confirm that process innovations can benefit from customer participation to access more specific information (Simms et al., 2021; Ashok et al., 2018). However, our results imply that the breadth of external information searches is negatively associated with process innovations, suggesting that collaboration with universities and research centres is less likely in the context of process innovations (Terjesen and Patel, 2017; Aliasghar et al., 2019; Barra et al., 2019). From a stakeholder perspective, the results emphasize the importance of linkages throughout the supply chain (and alignment of interests) which enhance the mutual interests of stakeholders operating within this chain (such as suppliers and customers) and their role in developing process innovations. Importantly, these findings also suggest that stakeholder interests matter in inter-organisational collaborations, in the sense that primary stakeholders with commercial logic are likely to provide more support for the development of product and process innovations with commercial ends as compared to secondary stakeholders with more non-profit orientations (Cummings and Holmberg, 2012). More specifically, the results extend some previous studies (Maine, Lubik, & Garnsey, 2012; Sjödin et al., 2011), and thus suggest that primary stakeholders with market-based interests are more important than secondary stakeholders with non-market-based interests for both types of innovation.

As for Hypothesis 3, we found that collaboration with secondary stakeholders (universities and research centres) is more conducive to developing eco-innovations than collaboration with primary stakeholders. The results are in line with the literature in the field, i.e. companies that collaborate with universities and other research institutions actively participate in the development of eco-innovations (Triguero et al., 2013; Arroyave et al., 2020). The characteristics of eco-innovation explain these differences compared to conventional innovation. Arranz et al. (2020) point out that most eco-innovations arise due to market regulations and the need for companies to adopt standards. Regulations and the adoption of standards require multidisciplinary resources and knowledge, unlike other innovations (Bocken et al., 2014; Triguero et al., 2017), due to the novelty of innovation. Compared to stakeholders

along the supply chain, such as suppliers and customers, universities and other research institutions have access to a variety of resources and interdisciplinary knowledge (Ávilaa et al., 2017); therefore, collaborations with these types of stakeholders can help companies to develop eco-innovations (Dangelico & Pontrandolfo, 2015). From a stakeholder perspective, our results confirm that supply-chain stakeholders, such as suppliers and customers, will have less interest in collaborating for eco-innovations and will prefer to invest in innovations that meet their core objectives.

As for Hypothesis 4, the results show that collaboration with secondary stakeholders can lead to growth in employment (e.g. Wynarczyk & Watson, 2005). This is because universities and research centres will prefer to collaborate with organisations with similar skills and stocks of human capital. As a result, innovation projects with these stakeholders will increase the demand for new workers, including skilled graduates or employees. This is quite different from the case of primary stakeholders whose main objective is to create new business opportunities and revenue streams for the focal organisation, which does not necessarily translate into a growing demand for skilled workers with recent knowledge and capability to innovate (Ozdemir et al., 2017; Ozdemir, et al., 2019). From an RBV perspective, collaboration with supply-chain stakeholders (suppliers and clients) generates resources and knowledge to develop innovations with some market value. In line with Ozdemir et al. (2017) and Ozdemir et al. (2019), close collaborations with suppliers can reduce operating costs (including labour costs) and prices, but with an uncertain impact on employment (Rindfleisch & Moorman, 2001; 2003; Ozdemir et al., 2017; Ozdemir et al., 2019). These results also support the main tenet of Stakeholder Theory by demonstrating that secondary stakeholders with more non-market-based interests and orientations are more likely to support the development of innovations with environmental and social impact as compared to primary stakeholders with primarily market-based interests (Cummings and Holmberg, 2012).

Finally, the findings for Hypothesis 5 (see Table 5) show that while the variable for the usage of information sources and its interaction terms with primary stakeholders are significant, this is no longer the case for secondary stakeholders. In line with previous works (Zahay, Griffin, and Fredericks, 2011), we see that information as a resource is essential for innovation performance and a source of competitive advantage (Williams and Moore, 2007). These results also confirm previous studies on stakeholder relationships, which found that primary stakeholders provide knowledge that may be new to the innovator but not necessarily to the industry (Darnall, Henriques, and Sadorsky, 2010). In addition, the findings suggest that when a focal organization gains an information advantage by accessing information from a greater variety of stakeholders, the organization and its primary stakeholders, which have a direct business interest within the supply chain, are more likely to exert a mutual influence on the development of collaborative innovations (Shubham et al., 2018; Sharma and Henriques, 2005; Su and Tsang, 2015).

6.2. General discussion

Our study has extended the RBV and KBV by explicitly considering the most appropriate stakeholder for each type of innovation (Eisenhardt and Schoonhoven, 1996; Barney, 2001; Grant and Baden-Fuller, 2004), given the fact that stakeholders may have various motives and reasons to collaborate in the first place. Classically, as Eisenhardt and Schoonhoven (1996) pointed out, cooperation facilitates the organisation's strategic position by granting access to the resources of other organisations which in turn enables cost and risk sharing between the cooperating parties (Grant and Baden-Fuller, 2004; Lavie, 2006). However, these theories do not explicitly consider the motives and interests of stakeholders and how they affect innovation outcomes (Sodhi, 2015; Lin et al., 2019); indeed, our view is that while cooperation may allow the focal organisation to have access to new resources, successful cooperation needs to take into account the fact that collaborators may do so for several reasons.

To better highlight our contribution to the literature, Table 6 summarises the relationship between the probability of collaborating with each type of stakeholder and the type of innovation developed according to the KBV (Row D), RBV (Row C), stakeholder theory (Row B) and our own theory as presented in the paper (Row A). The probability of collaborating is represented as a continuum, from collaborating exclusively with a primary stakeholder to exclusive collaboration with a secondary stakeholder, going through various combinations of both types of collaboration.

KBV theory highlights that knowledge accessed via collaborators may have different purposes (Table 6, Row C). Rothaermel and Deeds (2004) and Gupta et al. (2006) pointed out that the innovation process requires an ambidexterity perspective, requiring sufficient information and knowledge to allow the development of exploration and exploitation activities. In Table 6, Row D, we show that collaboration with primary and secondary stakeholders depends on the type of information (or knowledge) and innovation. RBV (or KBV) theory argues that the choice of stakeholders is determined by the type of resource and information (or knowledge) they can share. Thus, collaboration with primary stakeholders (suppliers and customers) allows organisations to access specific resources focused on improving production processes, reducing costs and lead times, developing a product and accessing market information. From the perspective of Stakeholder Theory, the market-based orientation of stakeholders matters for innovation. Primary stakeholders with market-based interests (such as suppliers and customers) have a prominent role in successfully developing product innovations and process innovations with commercial ends. In contrast, secondary stakeholders with non-market-based interests are effective in developing eco-innovations, which result in an environmental impact (Table 6, Row B).

Our contribution is in Row A. We argue that based on the position within the supply chain of the focal organisation, potential collaborators can be categorised into primary and secondary stakeholders. Each group will have different motivations to collaborate with the focal organisation, which will have a bearing on how successful innovation outcomes will be. Our study has shown that stakeholder interests are as important as stakeholder resources during the innovation development process. More specifically, the findings imply that primary stakeholders with market-based interests (such as suppliers and customers) play a more prominent role in the successful development of product innovations and process innovations. In contrast, secondary stakeholders with non-market-based interests are more effective in developing eco-innovations and supporting the demand for skilled workers. Indeed, this research has addressed theoretical and empirical inconsistencies concerning the implications of collaboration with several types of stakeholders for product and process innovations (e.g. Un & Asakawa, 2015; Fitjar & Rodríguez-Pose, 2013; Medda, 2020; Nieto & Santamaría, 2010). In addition, it has extended previous empirical research, which did not provide insights into the impact of collaborations with different types of stakeholders on organisation-level employment growth, despite the importance of this indicator (Rangus & Slavec, 2017). Importantly, our argument builds upon RBV and KBV theories which focus on the type of knowledge and resources pooled together with the type of collaboration. Indeed, collaborations with universities and research centres may lead to the exploitation of novel and non-redundant knowledge (Todtling et al., 2009; Ozdemir et al., 2017), while collaboration with suppliers and customers may lead to the pooling of redundant knowledge resources (Kim et al., 2012).

Last, we extend the RBV and KBV by showing that access to a greater range of diverse information sources is not likely to influence secondary stakeholder collaborations. In this sense, access to a diverse range of information sources is more effective when collaborating with primary stakeholders, directly connected through the supply chain, than with secondary stakeholders that do not operate within it. Thus, the RBV has

Table 6
Framework in stakeholder's collaboration.

A	**Typology of Partners**	*Primary Stakeholders*	***Probability Collaboration***			*Secondary Stakeholders*
			Process Innovation	*Product Innovation*	*Eco-innovation*	
B	**Stakeholder Theory**	*Market-based interests*	*Probability Collaboration*			*Non-market-based interests.*
			Process Innovation	***Product Innovation***	***Eco-innovation***	
C	**RBV**	*Specific*	***Probability Collaboration***			*General*
			Process Innovation	***Product Innovation***	***Eco-innovation***	
D	**KBV**	*Exploitation*	***Probability Collaboration***			*Exploration*
			Process Innovation	***Product Innovation***	***Eco-innovation***	

been limited in specifying how resources may be effective in relationships with diverse stakeholders with varying interests and motives in their inter-organisational engagements. Indeed, until now, there has been a limited number of studies that have examined primary and secondary stakeholder influences within inter-organisational collaborations. Therefore, from the perspective of the RBV and KBV, it is important to consider how stakeholder interests and motives may affect innovation output.

6.3. Managerial implications

The study findings have a range of managerial implications for inter-organisational collaborations with diverse stakeholders. First, the findings reveal that when managers establish innovation collaborations, they need to consider the resource-based competencies and interests of their stakeholders. For the successful development of product innovations, it would be better for managers to prioritise collaborations with primary stakeholders with market-based interests, such as suppliers and customers operating within their supply chain. In this context, the priority for managers is to form collaborative engagements with these stakeholders, who have complementary resources and commercial interests aligned with them. Organisations can successfully co-develop product innovations through the exchange and sharing of complementary (or both intra- and inter-industry) knowledge (resources) with their suppliers and customers (Wuyts et al., 2004).

Our findings also reveal that primary stakeholders, including suppliers and customers, have more influence on process innovations than secondary stakeholders, including universities and research centres. Managers need to be aware that primary stakeholders operating within their supply chain are predominantly driven by market-based interests. Thus, they will be more likely to invest in resources that support their financial goals associated with process innovations. Of course, it can also be suggested that the development of process innovations is consistent with the resource-based competencies of various primary stakeholders within the supply chain, which can grant access to a variety of resource endowments for process innovations (Bauer & Leker, 2013). This is also in line with the view that process innovations require the adoption of complementary downstream process innovations and thus need the involvement of both upstream and downstream stakeholder organisations in the innovative production process (Maine, Lubik, & Garnsey, 2012).

On the other hand, managers need to be aware that in inter-organisational collaborations, secondary stakeholders, including universities and research centres, will help the introduction of eco-innovations and facilitate employment growth. Primary stakeholders within the supply chain may be less motivated to engage in costly eco-innovation than secondary stakeholders, predominantly driven by non-market-based interests. This implies that organisations can only benefit from collaborations with secondary stakeholders when their interests are compatible, and resources are complementary. Specifically, collaborating with secondary stakeholders with non-market-based interests and motives would be of value for developing and introducing innovations with environmental and social impact.

Furthermore, accessing information from various stakeholder sources is not likely to motivate primary and secondary stakeholders equally to support the development of different types of innovations. This seems to be very much grounded in the dependencies and power dynamics of stakeholders within and outside the supply chain. For example, managers from focal organisations can more easily pressurize primary stakeholders into supporting different types of innovations by exploiting their links with a wide range of stakeholders, which provide them with access to diverse information.

6.4. Limitations of the study and future research

This study has some limitations that suggest fruitful avenues for future research. First, a study could integrate wider aspects of Stakeholder Theory with the RBV and KBV by considering how specific types of stakeholders with different levels of urgency, legitimacy and salience may affect an organisation's innovation development process. Similarly, a study could focus on a focal organisation's resource advantage and consider its intra-organisational resource dependency on accessing information from stakeholder sources. In this context, future research can consider examining how the differences between an organisation's intra-organisational information resources and information attained through diversified stakeholder sources may affect its innovation production process. In addition, future research can study the moderating effects of resource advantage or other resource-based influences in inter-organisational stakeholder relationships from an innovation value chain perspective, e.g. the role of an organization's resource advantage to its stakeholders in knowledge sourcing, product development and commercialization. Furthermore, this research has examined a limited number of stakeholder types, such as suppliers, customers, universities and research centres. In future, therefore, studies can examine how more varieties of secondary stakeholders who do not necessarily engage in R&D, such as the media, local governments and customer advocate groups, may influence a focal organisation's innovation development process. Finally, future research can explore how market-based interests and goals drive stakeholders who operate outside an organisation's supply chain (e.g. in different innovation networks or eco-systems) may indirectly influence the organisation's innovation production process.

7. Conclusions

This paper has analysed how collaboration with stakeholders with diverse motives and interests affects the development of collaborative innovations. We have extended the RBV and KBV with Stakeholder Theory, and analysed how a focal organisation's access to diverse information sources may influence the production of innovation and the role of different types of stakeholders (within and outside the supply

chain) in the innovation production process.

The findings of this paper show that when collaborating with secondary stakeholders with non-market-based interests, including universities and research centres, who operate outside the supply chain, it is more likely to be backed for the achievement of non-market or non-profit goals such as gaining greater support for employment growth and successful development of eco-innovations. Likewise, primary stakeholders with mainly market-based interests, who operate within the supply chain, are likely to provide more support for the development of product and process innovations that promise commercial benefits. Interestingly, our results show that when a focal organisation has access to a greater range of diverse information sources, it can obtain stronger support from primary stakeholders to develop all types of innovations. Thus, the findings suggest that resource-based advantages such as informational advantage only incentivize primary stakeholders to invest in innovation development processes.

CRediT authorship contribution statement

Sena Ozdemir: Writing – review & editing, Writing – original draft, Conceptualization. **Juan Carlos Fernandez de Arroyabe: . Vania Sena:** Writing – review & editing, Writing – original draft, Methodology. **Suraksha Gupta:** Writing – original draft.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Achrol, R. S., & Etzel, M. J. (2003). The structure of reseller goals and performance in marketing channels. *Journal of the Academy of Marketing Science, 31*, 146–163. https://doi.org/10.1177/0092070302250899

Aliasghar, O., Rose, E. L., & Chetty, S. (2019). Where to search for process innovations? The mediating role of absorptive capacity and its impact on process innovation. *Industrial Marketing Management, 82*, 199–212. https://doi.org/10.1016/j.indmarman.2019.01.014

Anning-Dorson, T. (2018). Customer involvement capability and service organization performance: The mediating role of innovation. *Journal of Business Research, 86*, 269–280. https://doi.org/10.1016/j.jbusres.2017.07.015

Ardito, L., & Petruzzelli, A. M. (2017). Breadth of external knowledge sourcing and product innovation: The moderating role of strategic human resource practices. *European Management Journal, 35*, 261–272. https://doi.org/10.1016/j.emj.2017.01.005.

Ardito, L., Petruzzelli, A. M., Dezi, L., & Castellano, S. (2020). The influence of inbound open innovation on ambidexterity performance: Does it pay to source knowledge from supply chain stakeholders? *Journal of Business Research, 119*, 321–329. https://doi.org/10.1016/j.jbusres.2018.12.043

Arranz, N., Arguello, N. L., & Fernandez de Arroyabe, J. C. (2021). How do internal, market and institutional factors affect the development of eco-innovation in organizations? *Journal of Cleaner Production, 126692*. https://doi.org/10.1016/j.jclepro.2021.126692

Arranz, N., Arroyabe, M., Li, J., & Fernandez de Arroyabe, J. C. (2020). Innovation as a driver of eco-innovation in the firm: An approach from the dynamic capabilities theory. *Business Strategy and the Environment, 29*, 1494–1503. https://doi.org/10.1002/bse.2448

Arranz, N., & Fernandez de Arroyabe, J. C. (2010). Efficiency in technological networks, an approach from Artificial Neural Networks (ANN). *International Journal of Management Science and Engineering Management, 5*(6), 453–460. https://doi.org/10.1080/17509653.2010.10671137

Arroyave, J. J., Sáez-Martínez, F. J., & González-Moreno, A. (2020). Cooperation with universities in the development of eco-innovations and organizations' performance. *Frontiers in Psychology, 11*, 1–9. https://doi.org/10.1111/radm.12574

Aschhoff, B., & Schmidt, T. (2008). Empirical evidence on the success of R&D cooperation—Happy together? *Review of Industrial Organization, 33*, 41–62. https://doi.org/10.1007/s11151-008-9179-7

Ashok, M., Day, M., & Narula, R. (2018). Buyer (dis)satisfaction and process innovation: The case of information technology services provision. *Industrial Marketing Management, 68*, 132–144. https://doi.org/10.1016/j.indmarman.2017.10.004

Ávilaa, L. V., Filho, L. W., Brandli, L., Macgregor, C. J., Molthan-Hill, P., Özuyar, P. G., & Moreira, R. M. (2017). Barriers to innovation and sustainability at universities around the world. *Journal of Cleaner Production, 164*, 1268–1278. https://doi.org/10.1016/j.jclepro.2017.07.025

Baldini, N., Grimaldi, R., & Sobrero, M. (2006). Institutional changes and the commercialization of academic knowledge: A study of Italian universities' patenting activities between 1965 and 2002. *Research policy, 35*, 518–532. https://doi.org/10.1016/j.respol.2006.01.004

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1016/S0742-3322(00)17018-4

Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management, 27*, 643–650. https://doi.org/10.1016/S0149-2063(01)00115-5

Barra, C., Maietta, O. W., & Zotti, R. (2019). Academic excellence, local knowledge spillovers and innovation in Europe. *Regional Studies, 53*, 1058–1069. https://doi.org/10.1080/00343404.2018.1540865

Bauer, M., & Leker, J. (2013). Exploration and exploitation in product and process innovation the chemical industry. *R&D Management, 43*, 196–212. https://doi.org/10.1111/radm.12012

Baum, J. A., & Oliver, C. (1991). Institutional linkages and organizational mortality. *Administrative science quarterly, 36*, 187–218. https://doi.org/10.2307/2393353

Belderbos, R., Jacob, J., & Lokshin, B. (2018). Corporate venture capital (CVC) investments and technological performance: Geographic diversity and the interplay with technology alliances. *Journal of Business Venturing, 33*, 20–34. https://doi.org/10.1016/j.jbusvent.2017.10.003

Bercovitz, J. E. L., & Feldman, M. P. (2007). Fishing upstream: Firm innovation strategy and university research alliances. *Research Policy, 36*, 930–994. https://doi.org/10.1016/j.respol.2007.03.002

Bigoness, W. J., & Perreault, W. D. (1981). A conceptual paradigm and approach for the study of innovators. *Academy of Management Journal, 24*, 68–82. https://doi.org/10.2307/255824

Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production, 65*, 42–56. https://doi.org/10.1016/j.jclepro.2013.11.039

Borghesi, S., Cainelli, G., & Mazzanti, M. (2015). Linking emission trading to environmental innovation: Evidence from the Italian manufacturing industry. *Research Policy, 44*, 669–683. https://doi.org/10.1016/j.respol.2014.10.014

Bourne, L., & Walker, D. H. T. (2005). Visualising and mapping stakeholder influence. *Management Decision, 43*, 649–660. https://doi.org/10.1108/00251740510597680

Bridoux, F., & Stoelhorst, J. W. (2014). Microfoundations for Stakeholder Theory: Managing stakeholders with heterogeneous motives. *Strategic Management Journal, 35*, 107–125. https://doi.org/10.1002/smj.2089

Bustinza, O. F., Vendrell-Herrero, F., & Gomes, E. (2019). Unpacking the effect of strategic ambidexterity on performance: A cross-country comparison of MMNEs developing product-service innovation. *International Business Review, 29*, Article 101569. https://doi.org/10.1016/j.ibusrev.2019.01.004

Caputo, F., Garcia-Perez, A., Cillo, V., & Giacosa, E. (2019). A knowledge-based view of people and technology: Directions for a value co-creation-based learning organization. *Journal of Knowledge Management, 23*, 1314–1334. https://doi.org/10.1108/JKM-10-2018-0645

Carbonell, P., Rodriguez-Escudero, A. I., & Pujari, D. (2009). Customer involvement in new service development: An examination of antecedents and outcomes. *Journal of Product Innovation Management, 26*, 536–550. https://doi.org/10.1111/j.1540-5885.2009.00679.x

Chahal, H., Gupta, M., Bhan, N., & Cheng, T. C. E. (2020). Operations management research grounded in the resource-based view: A meta-analysis. *International Journal of Production Economics, 230*, Article 107805. https://doi.org/10.1016/j.ijpe.2020.107805

Chiang, Y.-H., & Hung, K.-P. (2010). Exploring open search strategies and perceived innovation performance from the perspective of inter-organizational knowledge flows. *R&D Management, 40*, 292–299. https://doi.org/10.1111/j.1467-9310.2010.00588.x

Chiesa, V., & Frattini, F. (2011). Commercializing technological innovation: Learning from failures in high-tech markets. *Journal of Product Innovation Management, 28*, 437–454. https://doi.org/10.1111/j.1540-5885.2011.00818.x

Chung, K. S. K., & Crawford, L. (2016). The role of social networks theory and methodology for project stakeholder management. *Procedia - Social and Behavioral Sciences, 226*, 372–380. https://doi.org/10.1016/j.sbspro.2016.06.201

Clarkson, M. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review, 20*, 92–117. https://doi.org/10.5465/amr.1995.9503271994

Cronin, M. A., & Weingart, L. R. (2007). Representational gaps, information processing, and conflict in functionally diverse. *Academy of Management Review, 32*, 761–773. https://doi.org/10.5465/amr.2007.25275511

Cui, A. S., & O'Connor, G. (2012). Alliance portfolio resource diversity and firm innovation. *Journal of Marketing, 76*(4), 24–43. https://doi.org/10.1509/jm.11.0130

Cui, A. S., & Wu, F. (2016). Utilizing customer knowledge in innovation: Antecedents and impact of customer involvement on new product performance. *Journal of the Academy of Marketing Science, 44*, 516–538. https://doi.org/10.1007/s11747-015-0433-x

Cui, A. S., & Wu, F. (2017). The impact of customer involvement on new product development: Contingent and substitutive effects. *Journal of Product Innovation Management, 34*, 60–80. https://doi.org/10.1111/jpim.12326

Cummings, J. L., & Holmberg, S. R. (2012). Best-fit alliance partners: The use of critical success factors in a comprehensive partner selection process. *Long Range Planning, 45*, 136–159. https://doi.org/10.1016/j.lrp.2012.01.001

Damanpour, F., & Gopalakrishnan, S. (2001). The dynamics of the adoption of product and process innovations in organizations. *Journal of Management Studies, 38*, 45–65. https://doi.org/10.1111/1467-6486.00227

Dangelico, R. M. (2016). Green product innovation: Where we are and where we are going. *Business Strategy and the Environment, 25*, 560–576. https://doi.org/10.1002/bse.1886

Dangelico, R. M., & Pontrandolfo, P. (2015). Being 'green and competitive': The impact of environmental actions and collaborations on firm performance. *Business Strategy and the Environment, 24*, 413–430. https://doi.org/10.1002/bse.1828

Darnall, N., Henriques, I., & Sadorsky, P. (2010). Adopting proactive environmental strategy: The influence of stakeholders and organization size. *Journal of management studies, 47*, 1072–1094. https://doi.org/10.1111/j.1467-6486.2009.00873.x

Das, T. K., & Teng, B.-S. (2000). A resource-based theory of strategic alliances. *Journal of Management, 26*, 31–61. https://doi.org/10.1177/014920630002600105

Das, T. K., & Teng, B.-S. (2003). Partner analysis and alliance performance. *Scandinavian Journal of Management, 19*, 279–308. https://doi.org/10.1016/S0956-5221(03)00003-4

De Guimarães, J. C. F., Severo, E. A., Dorion, E. C. H., Coallier, F., & Olea, P. M. (2016). The use of organisational resources for product innovation and organisational performance: A survey of the Brazilian furniture industry. *International Journal of Production Economics, 180*, 135–147. https://doi.org/10.1016/j.ijpe.2016.07.018

Di Domenico, M. L., Tracey, P., & Haugh, H. (2009). The dialectic of social exchange: Theorizing corporate–social enterprise collaboration. *Organization Studies, 30*, 887–907. https://doi.org/10.1177/0170840609334954

Di Gregorio, D., & Shane, S. (2003). Why do some universities generate more start-ups than others? *Research Policy, 32*, 209–227. https://doi.org/10.1016/S0048-7333(02)00097-5

Donaldson, T., & Preston, L. E. (1995). The Stakeholder Theory of the corporation: Concepts, evidence, and implications. *The Academy of Management Review, 20*, 65–91. https://doi.org/10.2307/258887

Dong, L., & Glaister, K. W. (2006). Motives and partner selection criteria in international strategic alliances: Perspectives of Chinese organizations. *International Business Review, 15*, 577–600. https://doi.org/10.1016/j.ibusrev.2006.09.003

Doran, J., & Ryan, G. (2016). The importance of the diverse drivers and types of environmental innovation for organization performance. *Business Strategy and the Environment, 25*, 102–119. https://doi.org/10.1002/bse.1860

Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: Social values and organizational behavior. *Pacific Sociological Review, 18*, 122–136. https://doi.org/10.2307/1388226

Driessen, P. H., & Hillebrand, B. (2013). Integrating multiple stakeholder issues in new product development: An exploration. *Journal of Product Innovation Management, 30*, 364–379. https://doi.org/10.1111/j.1540-5885.2012.01004.x

Eisenhardt, K. M., & Schoonhoven, C. B. (1996). Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial organizations. *Organization Science, 7*, 136–150. https://doi.org/10.1287/orsc.7.2.136

Eriksson, R. H., & Forslund, F. (2014). How do universities contribute to employment growth? The role of human capital and knowledge bases. *European Planning Studies, 22*, 2584–2604. https://doi.org/10.1080/09654313.2013.849227

Ettlie, J. E., & Reza, E. M. (1992). Organizational integration and process innovation. *Academy of Management Journal, 35*, 795–827. https://doi.org/10.5465/256316

Evans, S., Vladimirova, D., Holgado, M., Van Fossen, K., Yang, M., Silva, E. A., & Barlow, C. Y. (2017). Business model innovation for sustainability: Towards a unified perspective for creation of sustainable business models. *Business Strategy and the Environment, 26*, 597–608. https://doi.org/10.1002/bse.1939

Faems, D., De Visser, M., Andries, P., & Van Looy, B. (2010). Technology alliance portfolios and financial performance: Value-enhancing and cost-increasing effects of open innovation. *Journal of Product Innovation Management, 27*, 785–796. https://doi.org/10.1111/j.1540-5885.2010.00752.x

Ferreras-Méndez, L. J., Newell, S., Fernández-Mesa, A., & Alegre, J. (2015). Depth and breadth of external knowledge search and performance: The mediating role of absorptive capacity. *Industrial Marketing Management, 47*, 86–97. https://doi.org/10.1016/j.indmarman.2015.02.038

Fitjar, R. D., & Rodríguez-Pose, A. (2013). Firm collaboration and modes of innovation in Norway. *Research Policy, 42*, 128–138. https://doi.org/10.1016/j.respol.2012.05.009

Fossas-Olalla, M., Minguela-Rata, B., López-Sánchez, J.-I., & Fernández-Menéndez, J. (2015). Product innovation: When should suppliers begin to collaborate? *Journal of Business Research, 68*, 1404–1406. https://doi.org/10.1016/j.jbusres.2015.01.022

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston, MA: Pitman.

Fritsch, M., & Franke, G. (2004). Innovation, regional knowledge spillovers and R&D cooperation. *Research Policy, 33*, 245–255. https://doi.org/10.1016/S0048-7333(03)00123-9

Grant, R. M., & Baden-Fuller, C. (2004). A knowledge accessing theory of strategic alliances. *Journal of Management Studies, 41*, 61–84. https://doi.org/10.1111/j.1467-6486.2004.00421.x

Greenley, G. E., & Foxall, G. R. (1997). Multiple stakeholder orientation in UK companies and the implications for company performance. *Journal of Management Studies, 34*, 258–284. https://doi.org/10.1111/1467-6486.00051

Gulati, R. (1999). Network location and learning: The influence of network resources and organization capabilities on alliance formation. *Strategic Management Journal, 20*, 397–420. https://doi.org/10.1002/(SICI)1097-0266(199905)20:5%3C397::AID-SMJ35%3E3.0.CO;2-K

Gupta, A. K., Smith, K. G., & Shalley, C. E. (2006). The interplay between exploration and exploitation. *Academy of Management Journal, 49*(4), 693–706. https://doi.org/10.5465/amj.2006.22083026

Hall, J., & Vredenburg, H. (2005). Managing stakeholder ambiguity. *MIT Sloan Management Review, 47*, 11–13.

Hansen, E. G., & Klewitz, J. (2012). The role of an SME's green strategy in public-private eco-innovation initiatives: The case of Ecoprofit. *Journal of Small Business and Entrepreneurship, 25*, 451–477. https://doi.org/10.1080/08276331.2012.10593584

Harmancioglu, N., Sääksjärvi, M., & Hultink, E. J. (2020). Cannibalize and combine? The impact of ambidextrous innovation on organizational outcomes under market competition. *Industrial Marketing Management, 85*, 44–57. https://doi.org/10.1016/j.indmarman.2019.07.005

Henriques, I., & Sadorsky, P. (1999). The relationship between environmental commitment and managerial perceptions of stakeholder importance. *The Academy of Management Journal, 42*, 87–99. https://doi.org/10.5465/256876

Hess, A. M., & Rothaermel, F. T. (2011). When are assets complementary? star scientists, strategic alliances, and innovation in the pharmaceutical industry. *Strategic Management Journal, 32*, 895–909. https://doi.org/10.1002/smj.916

Hessels, J., & Parker, S. C. (2013). Constraints, internationalization and growth: A cross-country analysis of European SMEs. *Journal of World Business, 48*, 137–148. https://doi.org/10.1016/j.jwb.2012.06.014

Holzl, W. (2009). Is the R&D behaviour of fast-growing SMEs different? Evidence from CIS III data for 16 countries. *Small Business Economics, 33*, 59–75. https://doi.org/10.1007/s11187-009-9182-x

Hoskisson, R. E., Gambeta, E., Green, C. D., & Li, T. X. (2018). Is my firm-specific investment protected? Overcoming the stakeholder investment dilemma in the resource based view. *Academy of Management Review, 43*, 284–306. https://doi.org/10.5465/amr.2015.0411

Hult, G. T. M., Mena, J. A., Ferrell, O. C., & Ferrell, L. (2011). Stakeholder marketing: A definition and conceptual framework. *AMS Review, 1*, 44–65. https://doi.org/10.1007/s13162-011-0002-5

Ibrahim, L. M., Taha, D. B., & Mahmod, M. S. (2013). A comparison study for intrusion database (Kdd99, Nsl-Kdd) based on self organization map (SOM) artificial neural network. *Journal of Engineering Science and Technology, 8*, 107–119.

Jajja, M. S. S., Kannan, V. R., Brah, S. A., & Hassan, S. Z. (2017). Linkages between organization innovation strategy, suppliers, product innovation, and business performance Insights from resource dependence theory. *International Journal of Operations & Production Management, 37*, 1054–1075. https://doi.org/10.1108/IJOPM-09-2014-0424

Jap, S. D., & Anderson, E. (2003). Safeguarding interorganizational performance and continuity under ex post opportunism. *Management Science, 49*, 1684–1701. https://doi.org/10.1287/mnsc.49.12.1684.25112

Jiang, R. J., Tao, Q. T., & Santoro, M. D. (2010). Alliance portfolio diversity and firm performance. *Strategic Management Journal, 31*, 1136–1144. https://doi.org/10.1002/smj.869

Jiang, W., Wang, A. X., Zhou, K. Z., & Zhan, C. (2019). Stakeholder relationship capability and firm innovation: A contingent analysis. *Journal of Business Ethics, 167*, 111–125. https://doi.org/10.1007/s10551-019-04161-4

Jones, T. M., Harrison, J. S., & Felps, W. (2018). How applying instrumental Stakeholder Theory can provide sustainable competitive advantage. *Academy of Management Review, 43*, 371–391. https://doi.org/10.5465/amr.2016.0111

Kahn, K. B. (2018). Understanding innovation. *Business Horizons, 61*, 453–460. https://doi.org/10.1016/j.bushor.2018.01.011

Kang, J. (2013). The relationship between corporate diversification and corporate social performance. *Strategic Management Journal, 34*, 94–109. https://doi.org/10.1002/smj.2005

Kang, K. H., & Kang, J. (2010). Does partner type matter in R&D collaboration for product innovation? *Technology Analysis & Strategic Management, 22*, 945–959. https://doi.org/10.1080/09537325.2010.520473

Katila, R. (2002). New product search over time: Past ideas in their prime? *Academy of Management Journal, 45*, 995–1010. https://doi.org/10.5465/3069326

Katila, R., & Ahuja, G. (2002). Something old, something new: A longitudinal study of search behavior and new product introduction. *Academy of Management Journal, 45*, 1183–1194. https://doi.org/10.5465/3069433

Kemp, R. & Pearson, P. (2007). Final report MEI project about measuring eco-innovation, OECD, Retrieved from: https://www.oecd.org/env/consumption-innovation/43960830.pdf. Accessed 20 October 2020.

Kim, D.-Y., Kumar, V., & Kumar, U. (2012). Relationship between quality management practices and innovation. *Journal of Operations Management, 30*, 295–315. https://doi.org/10.1002/smj.2005

Kim, H. J. (2017). The complementary effects of transaction cost economics and resource-based view: A technological alliance perspective. *International Journal of Business Excellence, 13*, 355–376. https://doi.org/10.1504/IJBEX.2017.087230

Kobarg, S., Stumpf-Wollersheim, J., & Welpe, I. M. (2019). More is not always better: Effects of collaboration breadth and depth on radical and incremental innovation performance at the project level. *Research Policy, 48*, 1–10. https://doi.org/10.1016/j.respol.2018.07.014

Koka, B. R., & Prescott, J. E. (2002). Strategic alliances as social capital: A multidimensional view. *Strategic Management Journal, 23*, 795–816. https://doi.org/10.1002/smj.252

Krolikowski, M., & Yuan, X. (2017). Friend or foe: Customer-supplier relationships and innovation. *Journal of Business Research, 78*, 53–68. https://doi.org/10.1016/j.jbusres.2017.04.023

Kull, A. J., Mena, J. A., & Korschun, D. (2016). A resource-based view of stakeholder marketing. *Journal of Business Research, 69*, 5553–5560. https://doi.org/10.1016/j.jbusres.2016.03.063

Landkammer, F., & Sassenberg, K. (2016). Competing while cooperating with the same others: The consequences of conflicting demands in co-opetition. *Journal of Experimental Psychology, 145*, 1670–1686. https://doi.org/10.1037/xge0000232

Lau, A. K. W., Tang, E., & Yam, R. C. M. (2010). Effects of supplier and customer integration on product innovation and performance: Empirical evidence in Hong

Kong manufacturers. *Journal of Product Innovation Management, 27*, 761–777. https://doi.org/10.1111/j.1540-5885.2010.00749.x
Lavie, D. (2006). The competitive advantage of interconnected organizations: An extension of the resource-based view. *Academy of Management Review, 31*, 638–658. https://doi.org/10.5465/amr.2006.21318922
Lawler, E. J., & Yoon, J. (1998). Network structure and emotion in exchange relations. *American Sociological Review, 63*, 871–894. https://doi.org/10.2307/2657506
Lee, B., O'Brien, J., & Sivaramakrishnan, K. (2008). An analysis of financial analysts' optimism in long-term growth forecasts. *Journal of Behavioral Finance, 9*, 171–184. https://doi.org/10.1080/15427560802341889
Li, H., & Atuahene-Gima, K. (2001). Product innovation strategy and performance of new technology ventures in China. *Academy of Management Journal, 44*, 1123–1134. https://doi.org/10.5465/3069392
Lin, X., Ho, C. M. F., & Shen, G. Q. P. (2019). Who should take the responsibility? Stakeholders' power over social responsibility issues in construction projects. *Journal of Cleaner Production, 154*, 318–329. https://doi.org/10.1016/j.jclepro.2017.04.007
Lin, Z., Yang, H., & Arya, B. (2009). Alliance partners and firm performance: Resource complementarity and status association. *Strategic Management Journal, 30*, 921–940. https://doi.org/10.1002/smj.773
Lioukas, C. S., Reuer, J. J., & Zollo, M. (2016). Effects of information technology capabilities on strategic alliances: Implications for the resource-based view. *Journal of Management Studies, 53*, 161–183. https://doi.org/10.1111/joms.12179
Liu, Y., Luo, Y., & Liu, T. (2009). Governing buyer–supplier relationships through transactional and relational mechanisms: Evidence from China. *Journal of Operations Management, 27*, 294–309. https://doi.org/10.1016/j.jom.2008.09.004
Maine, E., Lubik, S., & Garnsey, E. (2012). Process-based vs. product-based innovation: Value creation by nanotech ventures. *Technovation, 32*, 179–192. https://doi.org/10.1016/j.technovation.2011.10.003
March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science, 2*, 71–87. https://doi.org/10.1287/orsc.2.1.71
Martinez, M. G., Zouaghi, F., & Garcia, M. S. (2019). Casting a wide net for innovation: The mediating effect of R&D human and social capital to unlock the value from Alliance Portfolio Diversity. *British Journal of Management, 30*, 769–790. https://doi.org/10.1111/1467-8551.12310
Mason, G., Williams, G., & Cranmer, S. (2009). Employability skills initiatives in higher education: What effects do they have on graduate labour market outcomes? *Education Economics, 17*, 1–30. https://doi.org/10.1080/09645290802028315
Medda, G. (2020). External R&D, product and process innovation in European manufacturing companies. *The Journal of Technology Transfer, 45*, 339–369. https://doi.org/10.1007/s10961-018-9682-4
Miles, S. (2017). Stakeholder Theory classification: A theoretical and empirical evaluation of definitions. *Journal of Business Ethics, 142*, 1–23. https://doi.org/10.1007/s10551-015-2741-y
Mitchell, R., Agle, B., & Wood, D. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review, 22*, 853–886. https://doi.org/10.5465/amr.1997.9711022105
Miyata, Y. (2000). An empirical analysis of innovative activity of universities in the United States. *Technovation, 20*, 413–425. https://doi.org/10.1016/S0166-4972(00)00024-9
Molina-Morales, F. X., & Martínez-Fernández, M. T. (2010). Too much love in the neighbourhood can hurt: How an excess of intensity and trust in relationships may produce negative effects on firms. *Strategic Management Journal, 30*, 1013–1023. https://doi.org/10.1002/smj.766
Nesta. (2009). *The vital 6 per cent*. London: Nesta.
Nielsen, B. B. (2003). An empirical investigation of the drivers of international strategic alliance formation. *European Management Journal, 21*, 301–322. https://doi.org/10.1016/S0263-2373(03)00043-4
Nieto, M. J., & Santamaría, L. (2010). Technological collaboration: Bridging the innovation gap between small and large firms. *Journal of Small Business Management, 286*, 44–69. https://doi.org/10.1111/j.1540-627X.2009.00286.x
O'Connor, M., Doran, J., & McCarthy, N. (2021). Cognitive proximity and innovation performance: Are collaborators equal? *European Journal of Innovation Management, 24*, 637–654. https://doi.org/10.1108/EJIM-11-2019-0347
Ozdemir, S., Kandemir, D., & Eng, T. Y. (2017). The role of horizontal and vertical new product alliances in responsive and proactive market orientations and performance of industrial manufacturing firms. *Industrial Marketing Management, 64*, 25–35. https://doi.org/10.1016/j.indmarman.2017.03.006
Ozdemir, S., Kandemir, D., Eng, T.-Y., & Gupta, S. (2019). Vertical stakeholder collaborations for firm innovativeness in new product development: The moderating roles of legal bonds and operational linkages. *Journal of Business Research, 119*, 172–184. https://doi.org/10.1016/j.jbusres.2019.08.014
Pan, X., & Li, S. (2016). Dynamic optimal control of process–product innovation with learning by doing. *European Journal of Operational Research, 248*, 136–145. https://doi.org/10.1016/j.ejor.2015.07.007
Park, N. K., Mezias, J. M., & Song, J. (2004). A resource-based view of strategic alliances and firm value in the electronic marketplace. *Journal of Management, 30*(1), 7–27. https://doi.org/10.1016/j.jm.2002.11.001
Pereira, V., & Bamel, U. (2021). Extending the resource and knowledge based view: A critical analysis into its theoretical evolution and future research directions. *Journal of Business Research, 132*, 557–570. https://doi.org/10.1016/j.jbusres.2021.04.021
Pereira, E. T., Vilas-Boas, M., & Rebelo, C. F. C. (2020). University curricula and employability: The stakeholders' views for a future agenda. *Industry and Higher Education, 34*, 321–329. https://doi.org/10.1177/0950422220901676
Perkmann, M., & Salter, A. (2012). How to create productive partnerships with universities. *MIT Sloan Management Review, 53*, 79–88.
Phillips, R. A., Freeman, R. E., & Wicks, A. C. (2003). What Stakeholder Theory is not. *Business Ethics Quarterly, 13*, 479–502. https://doi.org/10.5840/beq200313434
Piboonrungroj, P., & Disney, S. M. (2015). Supply chain collaboration in tourism: A transaction cost economics analysis. *International Journal of Supply Chain Management, 4*, 25–31.
Pilav-Velić, A., & Marjanovic, O. (2016). Integrating open innovation and business process innovation: Insights from a large-scale study on a transition economy. *Information & Management, 53*, 398–408. https://doi.org/10.1016/j.im.2015.12.004
Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879–903. https://doi.org/10.1037/0021-9010.88.5.879
Polzer, J. T., Mannix, E. A., & Neale, M. A. (1998). Interest alignment and coalitions in multiparty negotiation. *The Academy of Management Journal, 41*, 42–54. https://doi.org/10.5465/256896
Potter, A., & Paulraj, A. (2021). Unravelling supplier-laboratory knowledge spillovers: Evidence from Toyota's central R&D laboratory and subsidiary R&D centers. *Research Policy, 50*, Article 104200. https://doi.org/10.1016/j.respol.2021.104200
Rangus, K., & Slavec, A. (2017). The interplay of decentralization, employee involvement and absorptive capacity on firms' innovation and business performance. *Technological Forecasting and Social Change, 120*, 195–203. https://doi.org/10.1016/j.techfore.2016.12.017
Reichstein, T., & Salter, A. (2006). Investigating the sources of process innovation among UK manufacturing firms. *Industrial and Corporate Change, 15*, 653–682. https://doi.org/10.1093/icc/dtl014
Rindfleisch, A., & Moorman, C. (2001). The acquisition and utilization of information in new product alliances: A strength of ties perspective. *Journal of Marketing, 65*, 1–18. https://doi.org/10.1509/jmkg.65.2.1.18253
Rindfleisch, A., & Moorman, C. (2003). Interfirm collaboration and customer orientation. *Journal of Marketing Research, 40*, 421–436. https://doi.org/10.1509/jmkr.40.4.421.19388
Robin, S., & Schubert, S. (2013). Cooperation with public research institutions and success in innovation: Evidence from France and Germany. *Research Policy, 42*, 149–166. https://doi.org/10.1016/j.respol.2012.06.002
Roscoe, S., Cousins, P. D., & Lamming, R. C. (2016). Developing eco-innovations: A three-stage typology of supply networks. *Journal of Cleaner Production, 112*, 1948–1959. https://doi.org/10.1016/j.jclepro.2015.06.125
Rothaermel, F. T., & Deeds, D. L. (2004). Exploration and exploitation alliances in biotechnology: A system of new product development. *Strategic Management Journal, 25*, 201–221. https://doi.org/10.1002/smj.376
Rothaermel, F. T., & Ku, D. N. (2008). Intercluster innovation differentials: The role of research universities. *IEEE Transactions on Engineering Management, 55*, 9–22. https://doi.org/10.1109/TEM.2007.912815
Rowley, T. J., & Moldoveanu, M. (2003). When will stakeholder groups act? An interest- and identity-based model of stakeholder group mobilization. *Academy of Management Review, 28*, 204–219. https://doi.org/10.1109/TEM.2007.912815
Sanou, F. H., Le Roy, F. E., & Gnyawali, D. R. (2016). How does centrality in coopetition networks matter? An empirical investigation in the mobile telephone industry. *British Journal of Management, 27*, 143–160. https://doi.org/10.1111/1467-8551.12132
Santamaria, L., & Surroca, J. (2011). Matching the goals and impacts of R&D collaboration. *European Management Review, 8*, 95–109. https://doi.org/10.1111/j.1740-4762.2011.01012.x
Schneper, W. D., & Guillén, M. F. (2004). Stakeholder rights and corporate governance: A crossnational study of hostile takeovers. *Administrative Science Quarterly, 49*, 263–295.
Schweitzer, F., Palmié, M., & Gassmann, O. (2018). Beyond listening: The distinct effects of proactive versus responsive customer orientation on the reduction of uncertainties at the fuzzy front end of innovation. *R&D Management, 48*, 534–551. https://doi.org/10.1111/radm.12252
Segarra-Blasco, A., & Arauzo-Carod, J.-M. (2008). Sources of innovation and industry–university interaction: Evidence from Spanish organizations. *Research Policy, 37*, 1283–1295. https://doi.org/10.1016/j.respol.2008.05.003
Sena, V., & Ozdemir, S. (2020). Spillover effects of investment in big data analytics in B2B relationships: What is the role of human capital? *Industrial Marketing Management, 86*, 77–89. https://doi.org/10.1016/j.indmarman.2019.05.016
Sharma, S., & Henriques, I. (2005). Stakeholder influences on sustainability practices in the Canadian forest products industry. *Strategic Management Journal, 26*, 159–180. https://doi.org/10.1002/smj.439
Shefer, D., & Frenkel, A. (2005). R&D, organization size and innovation: An empirical analysis. *Technovation, 25*, 25–32. https://doi.org/10.1016/S0166-4972(03)00152-4
Shubham, Charan, P., & Murty, L.S. (2018). Secondary stakeholder pressures and organizational adoption of sustainable operations practices: The mediating role of primary stakeholders. *Business Strategy and the Environment,* 27, 910-923. https://doi.org/10.1002/bse.2041.
Simms, C., Frishammar, J., & Ford, N. (2021). The front end in radical process innovation projects: Sources of knowledge problems and coping mechanisms. *Technovation, 105*, Article 102214. https://doi.org/10.1016/j.technovation.2020.102214
Sjödin, D. R., Eriksson, P. E., & Frishammar, J. (2011). Open innovation in process industries: A life-cycle perspective on development of process equipment. *International Journal of Technology Management, 56*, 225–240. https://doi.org/10.1504/IJTM.2011.042984
Sodhi, M. S. (2015). Conceptualizing social responsibility in operations via stakeholder resource-based view. *Production and Operations Management, 24*, 1375–1389. https://doi.org/10.1111/poms.12393

Stanko, M. A., & Henard, D. H. (2017). Toward a better understanding of crowdfunding, openness and the consequences for innovation. *Research Policy, 46*, 784–798. https://doi.org/10.1016/j.respol.2017.02.003
Su, W., & Tsang, E. W. K. (2015). Product diversification and financial performance: The moderating role of secondary stakeholders. *The Academy of Management Journal, 58*, 1128–1148. https://doi.org/10.5465/amj.2013.0454
Tang, M., Walsh, G., Lerner, D., Fitza, M. A., & Li, Q. (2018). Green innovation, managerial concern and firm performance: An empirical study. *Business Strategy and the Environment, 27*, 39–51. https://doi.org/10.1002/bse.1981
Teng, B.-S., & Cummings, J. L. (2002). Trade-offs in managing resources and capabilities. *Academy of Management Executive, 16*, 81–91. https://doi.org/10.5465/ame.2002.7173548
Terjesen, S., & Patel, P. C. (2017). In search of process innovations: The role of search depth, search breadth, and the industry environment. *Journal of Management, 43*. https://doi.org/10.1177/0149206315575710
Thomas, E. (2013). Supplier integration in new product development: Computer mediated communication, knowledge exchange and buyer performance. *Industrial Marketing Management, 42*, 890–899. https://doi.org/10.1016/j.indmarman.2013.05.018
Tichy, G. (2004). The over-optimism among experts in assessment and foresight. *Technological Forecasting and Social Change, 71*, 341–363. https://doi.org/10.1016/j.techfore.2004.01.003
Todtling, F., Lehnera, P., & Kaufmann, A. (2009). Do different types of innovation rely on specific kinds of knowledge interactions? *Technovation, 29*, 59–71. https://doi.org/10.1016/j.technovation.2008.05.002
Torres, A., Bijmolt, T. H. A., Tribóc, J. A., & Verhoef, P. (2012). Generating global brand equity through corporate social responsibility to key stakeholders. *International Journal of Research in Marketing, 29*, 13–24. https://doi.org/10.1016/j.ijresmar.2011.10.002
Triguero, A., Cuerva, M. C., & Álvarez-Aledo, C. (2017). Environmental innovation and employment: Drivers and synergies. *Sustainability, 9*, 2057. https://doi.org/10.3390/su9112057
Triguero, A., Moreno-Mondéjar, L., & Davia, M. A. (2013). Drivers of different types of eco-innovation in European SMEs. *Ecological Economics, 92*, 25–33. https://doi.org/10.1016/j.ecolecon.2013.04.009
Troilo, G., De Luca, L. M., & Atuahene-Gima, K. (2014). More innovation with less? A strategic contingency view of slack resources, information search, and radical innovation. *Journal of Product Innovation Management, 31*, 259–277. https://doi.org/10.1111/jpim.12094
Un, C. A., & Asakawa, K. (2015). Types of R&D collaborations and process innovation: The benefit of collaborating upstream in the knowledge chain. *Journal of Product Innovation Management, 32*, 138–153. https://doi.org/10.1111/jpim.12229
van Beers, C., & Zand, F. (2014). R&D cooperation, partner diversity, and innovation performance: An empirical analysis. *Journal of Product Innovation Management, 31*, 292–312. https://doi.org/10.1111/jpim.12096
Vanhaverbeke, W., Gilsing, V., Beerkens, B., & Duysters, G. (2009). The role of alliance network redundancy in the creation of core and non-core technologies. *Journal of Management Studies, 46*, 215–244. https://doi.org/10.1111/j.1467-6486.2008.00801.x
Vaona, A., & Pianta, M. (2008). Firm size and innovation in European manufacturing. *Small Business Economics, 30*, 283–299. https://doi.org/10.1007/s11187-006-9043-9
Wang, Q. (2007). Artificial neural networks as cost engineering methods in a collaborative manufacturing environment. *International Journal of Production Economics, 109*, 53–64. https://doi.org/10.1016/j.ijpe.2006.11.006
Wassmer, U., Li, S., & Madhok, A. (2017). Resource ambidexterity through alliance portfolios and firm performance. *Strategic Management Journal, 38*, 384–394. https://doi.org/10.1002/smj.2488
Weitzner, D., & Darroch, J. (2010). The limits of strategic rationality: Ethics, enterprise risk management, and governance. *Journal of Business Ethics, 92*, 361–372. https://doi.org/10.1007/s10551-009-0159-0
Williams, Z., & Moore, R. (2007). Supply chain relationships and information capabilities: The creation and use of information power. *International Journal of Physical Distribution & Logistics Management, 37*, 469–483. https://doi.org/10.1108/09600030710763387
Wuyts, S., & Dutta, S. (2014). Benefiting from alliance portfolio diversity: The role of past internal knowledge creation strategy. *Journal of Management, 40*, 1653–1674. https://doi.org/10.1177/0149206312442339
Wuyts, S., Dutta, S., & Stremersch, S. (2004). Portfolios of interfirm agreements in technology-intensive markets: Consequences for innovation and profitability. *Journal of Marketing, 68*, 88–100. https://doi.org/10.1509/jmkg.68.2.88.27787
Wynarczyk, P., & Watson, R. (2005). Firm growth and supply chain partnerships: An empirical analysis of UK SME subcontractors. *Small Business Economics, 24*, 39–51. https://doi.org/10.1007/s11187-005-3095-0
Xu, S., Wu, F., & Cavusgil, E. (2013). Complements or substitutes? Internal technological strength, competitor alliance participation, and innovation development. *Journal of Product Innovation Management, 30*, 750–762. https://doi.org/10.1111/jpim.12014
Zahay, D., Griffin, A., & Fredericks, E. (2011). Information use in new product development: An initial exploratory empirical investigation in the chemical industry. *Journal of Product Innovation Management, 28*, 485–502. https://doi.org/10.1111/j.1540-5885.2011.00821.x
Zhang, M., & Hartley, J. L. (2018). Guanxi, IT systems, and innovation capability: The moderating role of proactiveness. *Journal of Business Research, 90*, 75–86. https://doi.org/10.1016/j.jbusres.2018.04.036
Zhao, S., & Priporas, C. V. (2017). Information technology and marketing performance within international market-entry alliances: A review and an integrated conceptual framework. *International Marketing Review, 34*, 5–28. https://doi.org/10.1108/IMR-01-2016-0024
Zheng, Y., Liu, J., & George, G. (2010). The dynamic impact of innovative capability and inter-firm network on firm valuation: A longitudinal study of biotechnology start-ups. *Journal of Business Venturing, 25*, 593–609. https://doi.org/10.1016/j.jbusvent.2009.02.001
Zucker, L. G., Darby, M. R., & Armstrong, J. S. (2002). Commercializing knowledge: University science, knowledge capture, and organization performance in biotechnology. *Management Science, 48*, 138–153. https://doi.org/10.1287/mnsc.48.1.138.14274

Sena Ozdemir (PhD, University of Portsmouth, UK) is a Senior Lecturer in Marketing at Lancaster University Management School, United Kingdom. Her research focuses on strategic new product alliances, global product development, B2B marketing, the use of Big Data and digital technologies for innovation, inter- firm cross-functional NPD team integration, and social innovation. She currently serves as an editorial board member for the *Journal of Business to Business Marketing*. Her publications have appeared in journals such as *Journal of Business Research, Industrial Marketing Management, British Journal of Management, Journal of Business to Business Marketing, Qualitative Market Research: An International Journal, International Marketing Review,* and *Innovation: Organization & Management*, and so forth.

Juan Carlos Fernandez de Arroyabe (PhD, Autonoma University, Spain), is a Professor of Innovation and Entrepreneurship at Essex Business School, the University of Essex. His research interests include joint innovation and eco-innovation, circular economy, networks, and cyber-security systems. He is author or co-author of numerous papers published in the *British Journal of Management, Business Strategy and the Environment, IEEE Transaction Engineering Management, Complexity, Technovation, Emergence: Organization and Complexity, Studies in Higher Education, Technological Forecasting Social Change, International Small Business Journal, Journal Cleaner Production, European Journal of Work and Organisational Psychology, Technology Analysis and Strategic Management, Journal Enterprise Information Management* and *Industry and Higher Education*. Also, he is a member of the Editorial Board of *Technological Forecasting Social Change* and Associate Editor of the *Journal of Entrepreneurship in Emerging Economies*.

Vania Sena (PhD, University of York, UK) Vania Sena (PhD, University of York, UK) is a Professor of Entrepreneurship and Enterprise at the University of Sheffield, Management School, UK. Prior to joining to the University of Sheffield, she worked at Essex Business School, the University of Essex, Leeds University Business School (LUBS), the University of Leeds and at Aston Business School (ABS), Aston University. Her research focuses on the Big Data Analytics, innovation and operational performance, Data Envelopment Analysis, and Stochastic Frontiers. She is a member of the Analytics development group of the OR society and member of the OR Society Council. Her work has been published in *European Journal of Operational Research, Small Business Economics, Journal of Comparative Economics, The Economic Journal, Scandinavian Journal of Economics, Oxford Bulletin of Economics and Statistics, Regional Studies, Journal of Banking and Finance, International Journal of Production Economics, British Journal of Management, and Annals of Operations Research,* amongst others.

Suraksha Gupta (PhD, Brunel University, UK) is the Professor of Marketing at Newcastle University London. She holds a PhD from Brunel University in UK, MBA from Institute of Management Technology in India and Bachelor of Commerce from University of Delhi, India. She has an expertise in marketing activities of multinational firms and international brands in developing markets, particularly India. Her practitioner background with academic skills make her research highly relevant to the industrial practices. She works on strategies of multinational companies and contributions they make towards social development in developing markets. Her research publications have appeared in highly reputed journals such as *Journal of World Business*, *British Journal of Management*, *Journal of Business Research*, *Industrial Marketing Management*, *European Journal of Marketing*, *Technological Forecasting and Social Change*, and *Thunderbird International Business Review*. She is also an editorial member of the *British Journal of Management*.