Eskişehir Osmangazi Üniversitesi
Sosyal Bilimler Dergisi
Aralık 2022, 23(2), 415-430
DOI: 10.17494/ogusbd.1191082

External Partnering and Innovation Objectives: The Moderating Effect of Industry

Ebru ÖZTÜRK KÖSE[1]

Dışsal Ortaklık ve Yenilik Hedefleri: Sektörün Aracılık Etkisi

Öz

Bu çalışma dışsal ortaklığın gelişmekte olan ülke firmalarının yenilik performansına olan etkisini farklı koşulsal faktörleri dikkate alarak incelemeyi hedeflemektedir. İlk olarak, yenilik hedeflerinin dışsal ortaklık ile yenilik performansı arasındaki ilişkiyi nasıl etkilediği araştırılmaktadır. İkinci olarak, yenilik hedefleri aracılık faktörünün etkisi üretim ve hizmet sektöründe nasıl farklılaştığı araştırılmaktadır. Bu bağlamda, bu araştırma daha düşük yenilik hedeflerine sahip olan firmaların daha çok dışsal ortaklıktan faydalandıklarını ileri sürmektedir. Ayrıca, bu faydalanmanın üretim firmaları için pozitif, hizmet firmaları için negatif olduğunu ileri sürmektedir. Türkiye'nin farklı sektörlerinden oluşan 2370 firma üzerinde yapılan analizler çalışmanın hipotezlerini desteklemektedir.

Anahtar Kelimeler: Dışsal Ortaklık, Yenilik Hedefleri, Sektör, Gelişmekte Olan Ülke Firmaları

External Partnering and Innovation Objectives: The Moderating Effect of Industry

Abstract

This study examines the effect of external partnering on innovation performance of emerging economy firms by considering different conditional factors. Firstly, the effect of innovative intent is examined to understand how the link between external partnering and innovation performance evolves. Secondly, the interaction effect between external partnering and innovative intention is further examined depending on the industry affiliation. This research argues that firms with less innovative intention leverage more from external partnering than firms with more innovative intention. Moreover, this research argues that the link between external partnering and innovative intent becomes positive for manufacturing firms and negative for service firms. Based on a dataset of 2370 firms from different industries in Turkey, this research finds support for the hypotheses.

Keywords: *External Partnering, Innovation Objectives, Industry, Emerging Economy Firms*

Makale Türü: Araştırma

Paper Type: Research

[1] Dr. Öğr. Üyesi, Tokat Gaziosmanpaşa Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, İşletme Bölümü, ebru.ozturk@gop.edu.tr, ORCID: 0000-0002-4056-4105

Makale Gönderim Tarihi:18/10/2022
Makale Kabul Tarihi :15/11/2022

1. Introduction

Firms can have collaborative agreements with suppliers, customers, competitors, and universities. Interacting with a number of external partners provides an increasing number of knowledge elements available to the focal firm, thereby improving its innovation performance (Ahuja, 2000). Accessing external knowledge is crucial for emerging economy firms because of resource scarcity they face inside and outside (Li, Zhang and Lyles, 2013; Thakur-Wernz and Wernz, 2020). Collaborating with external partners enables emerging economy firms to capture more opportunities and become more innovative. However, accessing new knowledge and increased variety can bring complexity and conflicts, thereby increasing firms' managerial and coordination costs (Lavie and Drori, 2012; Roper, Love and Bonner, 2017). Previous studies have provided conflicting findings regarding to the influence of openness to external partnering on innovation performance. Therefore, there is still an important debate about the benefits of collaborative partnering and the contextual conditions under which those benefits are likely to occur (Bos, Faems and Noseleit, 2017; Roper et al., 2017).

This paper advances the literature on external partnering by clarifying the conditions under which it is beneficial for innovation performance. First of all, this study aims to extend previous research (Klingebiel and Rammer, 2014; Ko, O'Neill and Xie, 2021) by investigating whether a firm's innovation objectives influence its ability to leverage from external partnering. As Leiponen and Helfat (2010) suggested the content of technological search depends on firms' research and development objectives. Cohen and Malerba (2001) also argued that firms are supposed to follow different objectives in their innovation activities. Firms' innovation objectives can also vary depending on the context they operate in. For instance, emerging economy firms can have different inclinations toward innovation objectives compared to their counterparts in developed economies since firms from both economies follow different innovative patterns (Hitt et al., 2000). Strategic priorities (i.e., specific objectives) influence firms' strategic choices and decisions. Therefore, based on their innovation objectives, firms can be more likely to invest their resources in either high impact or low impact innovations. Thus, it is important to integrate the role of innovation objectives into the link between openness to external partnering and innovation success. The innovation objectives can be one important contingency to improve the understanding of how openness to external partnering impacts on the innovation performance (Leiponen and Helfat, 2010; Lahiri and Narayanan, 2013).

Firms can have more or less innovative intention (Klingebiel and Rammer, 2014). When firms have more innovative intent they have the intention to produce novel products, enter new product categories, and expand into new markets. Nevertheless, firms with less innovative intent are more likely to focus on the existing products or markets. When firms follow more ambitious objectives they face increasing uncertainties in their activities and lack of relevant prior knowledge (Jansen et al., 2006; Ko et al., 2021). Openness to external partnering aggravates this uncertainty because of the opportunistic behaviour of the partners and the difficulty firms face when transferring knowledge from their external partners. Therefore, firms with more innovative intent use external partnering to a lesser extent compared to the ones with less innovative intent.

Second, this study contributes to the debate on external partnering by suggesting that the interaction between external partnering and innovative intention varies across manufacturing and service industries. Leiponen (2012) highlighted the impact of industries on explaining the link between the breadth in innovation strategies and innovation outcomes. By building on this previous research, the current paper explores the interaction between external partnering and innovative intention in more detail and argues that the trade-offs between them depends on sector of the firm. Since there are differences between service and manufacturing innovation processes, service firms become less advantageous compared to the latter (Ettlie and Rosenthal, 2011). The specific industry characteristics

make the combination between external partnering and innovative intention more beneficial for manufacturing firms than service firms.

This research tests its hypotheses with a sample of 2,370 firms in Turkey representing different industries. The paper finds out that emerging economy firms benefit from external partnering. However, this effect becomes stronger for firms with less ambitious innovation objectives compared to those firms with more ambitious innovation objectives. Moreover, this paper shows that the interaction between external partnering and innovative intention is context dependent. Unlike service firms, manufacturing firms are better off when they focus on more ambitious innovations and use external partnering to innovate.

This study makes two important contributions. First, this study extends recent efforts to better understand the influence of external partnering on innovation performance of emerging economy firms. Previous studies have investigated the link between resource breadth and innovative intention (Klingebiel and Rammer, 2014; Ko et al., 2021). This study extends their work and is the first to look at innovative intention as a contingency of openness to external partnering from the perspective of emerging economy firms. In that sense, this work delineates of how openness to external partnering explains varience in performance outcomes when firms concentrate on objectives aiming to produce novel versus existing products. This means that innovation performance is not only determined by openness to external partners, but also how ambitious firms are in their innovation activities. Second, this research identifies an important contextual condition for the link between external partnering and innovative intention: industry affiliation. This study argues that firms need to be cautious about a dual strategy that pursues both external partnering and more or less innovative objectives, especially for service firms. Therefore, the research extends the work done by Leiponen (2012), which explores how the influence of breadth in innovation strategies on innovation performance vary between service and manufacturing firms. This study becomes important by giving attention on innovation in service firms because most studies continue to focus on manufacturing firms. Understanding innovation processes in service firms enables us to learn how the sector renews itself.

2. Theory and Hypotheses Development

2.1. External Partnering and Innovative Intention

Firms show variance in the degree of innovative intention associated with their innovation activities (He and Wong, 2004). Some firms undertake activities that are tightly linked to their extant products and knowledge while others focus on activities that are distant from their existing knowledge base. For the latter, firms are able to produce new products, enter new product categories, or expand into new market areas. These firms are called more ambitious. In this scenario managers are less likely to have information about the final outcome success. For the former, firms are more keen on focusing on their extant products. These firms are called less ambitious. In this scenario managers have more or less information about the final product success. In both scenarios firms can leverage from external partners. Accessing diverse sources enables them to leverage previously unknown knowledge elements and use them in novel ways to solve innovation problems. It provides new opportunities for novel combinations by incorporating external knowledge with internal. However, it becomes important to ask whether the influence of external partnering on innovation outcome varies with a firm's innovative intention.

This research suggests that if the innovative intention is more ambitious firms do not benefit from external partnering as much as they do when the intention is less ambitious. This can be explained with two mechanisms. First, novelty brings uncertainty into firms' activities. Firms' extant knowledge and technologies might be obselete because of novel changes. Managers have less information on the success of final products. They are less likely to predict the product's commercial viability. Therefore

the returns from such focus are not certain and more distant over time (Hoang and Rothaermel, 2010). On the other hand, when the innovative intention is less ambitious firms continue to carry on their existing products. Therefore previously used knowledge does not become obsolete. Firms can predict the success of the products and thereby the returns become certain and more immidiate in time. Overall, compared to less ambitious projects, more ambitious innovations are riskier for the innovating firm because firms face greater uncertainties when they develop new products and/or create new markets (Bierly, Damanpour and Santoro, 2009).

Collaborating with external partners further increases such uncertainty when firms focus on innovations with more ambitious objectives. Partners can have the opportunistic behaviour. The leakage of sensitive knowledge creates more uncertainty and risk. Appropriability mechanims are especially important to protect intellectual property. Firms should have appropriate and quality protective means if they want to engage in cooperative agreements (Ahuja, 2000). This effect is relevant for firms with more innovative intention because a partner can imitate an innovation thereby reducing the potential competitive advantage of the firm. In addition, firms delineate property rights with far less ambiguity if the products and processes are pre-existent. In other words firms that focus on more ambitious innovations may face higher risk of knowledge leakage. Therefore, firms need to spend greater effort to deal with the opportunistic behaviour (Li, Vanhaverbeke and Schoenmakers, 2008). Here emerging economy firms face even bigger challenges since they need to divert their limited time and money into dealing with the opportunistic behaviours (Zhao, 2006). Therefore, emerging economy firms characterized by the lack of resources can face challenges in managing this uncertainty they have when collaborating with external partners and following more ambitious behaviour in their innovation activities.

Second, novelty brings difficulty in transferring the acquired knowledge from external partners. Firms with more innovative intention must usually adapt their knowledge base because they do not follow the already established root. The knowledge sources they use previously can be obsolete in the new context. For such firms the partner has deep knowledge about the innovation which is essential to combine and reconfigure new knowledge (Hansen, 1999). However, the transfer of the such deep and tacit knowledge can be very challenging (Sampson, 2007). Therefore, firms with more ambitious innovations face additional coordination and transactions costs when they collaborate with external partners. Absorptive capacity literature suggests that prior knowledge base is essential for firms to understand and benefit from external partners (Cohen and Levinthal, 1990). When firms are less ambitious in their innovations they tend to focus on existing products and services. They continue to follow the design already established. Here when firms collaborate with different external partners to increase their chances of innovative success, they can balance the costs are coming from interacting with outside partners. Since firms are more experienced and have knowledge about their extant products and technologies, they can canalize their time and effort to understand the knowledge coming from their partners. Therefore, this research suggests that emerging economy firms with high innovative intention benefit less from openness to external partnering to increase innovation performance. Hence,

Hypothesis 1: The link between openness to external partnering and innovation performance is weaker for firms with high innovative intent than those with low intent.

2.2. The Moderating Effect of Industry

The interaction between external partnering and innovative intent varies depending on which sector firms operate in. Manufacturing firms are different from services in terms of the nature of business. The discrapencies between manufacturing and service sectors influence the way innovations and the innovative processes per se are dealt with (Sundbo, 1997; Miles, 2007). For that reason, this

research argues that when the innovative intention focuses more on novel products the influence of openness to collaborative partnering on innovation performance increases if firms operate in manufacturing industry rather than service industry. This argument is further explained below.

Service firms encounter a higher magnitude of uncertainty in comparison to manufacturing firms. One of the reasons that increases uncertainty is the ease of imitation (Ettlie and Rosenthal, 2011). Service firms are associated with their intangible nature of processes (Ettlie and Rosenthal, 2011; Chesbrough, 2011). Service firms also do not trade any physical object in their businesses (e. g. Dolfsma, 2004; Gallouj, 2002). The intangible nature makes it more challenging to protect their newly developed services. Therefore, innovation activities become very risky for service firms because a competitor can easily imitate a newly introduced service (Sundbo, 1997; Groysberg and Lee, 2009). In addition, firms in the service sector face the complexity of defining and applying appropriation regimes of innovative outcomes to protect their service innovations. Therefore, service firms benefit from intellectual property rights to a lesser extent than manufacturing firms (Desyllas, Miozzo, Lee and Miles, 2018). Protecting innovation becomes of great importance to service firms with high innovative ambitions. Such firms become more protective to reduce the chances of imitation. Therefore, service firms hesitate to collaborate with external partners when they produce radicalness in their services due to the risk of imitation. The difficulty they have in protecting their services creates extra uncertainty that hinder such firms to collaborate with external partners. Unlike service firms, manufacturing firms are associated with their tangible nature of innovation processes in products. The tangible nature of products makes these products eligible for patent protection, thereby reducing the risk of replicating a product or technology. For that reason, manufacturing firms are more likely to collaborate with external partners even though they are focusing on more ambitious innovation projects.

Service firms with more ambitious innovations also encounter difficulties when they transfer knowledge from their partners. Being more ambitious requires firms to integrate new operations with the existing business activities. This integration is more important for new service development than manufacturing context (Nijssen, Hillebrand, Vermeulen and Kemp, 2006). Firms are better to learn from scratch how to leverage the new service if their innovative intent is more ambitious. However, this can be difficult for service firms because they can experience greater incompatibility between their innovation and current organizational activities (Atuahene-Gima, 1996). They can have difficulties in managing the relationship between new service operations and existing services. Better communication and coordination, and reduced conflicts inside the organizations are of great importance to service firms. However, leveraging from external partners can aggravate the problems of integration and coordination here. Obtained knowledge from external partners is likely to be limited in prior knowledge and understanding. Partners and firms are less likely to have shared values and goals. This unfamiliarity results in lack of commitment and so conflicts. Lack of formalization of development and conceptualization of ideas create difficulties in articulating the underlying tacit knowledge obtained from partners (Du, Leten and Vanhaverbeke, 2014). For that reason, service firms face challenges when they want to transfer and integrate knowledge from external partners for more ambitious innovations. In addition, service firms have shortage of standardization in R&D they cannot have enough capability to manage this partnership process efficiently (Leiponen, 2012). Therefore, lack of understanding can cause difficulties in combining new knowledge with existing service activities. In contrast, manufacturing firms are associated with R&D investments and spend more on developing new technologies compared to service firms (Chesbrough, 2011). Manufacturing firms with R&D investments can increase their experience and accumulate firm specific knowledge. This can help manufacturing firms leverage from external partners effectively. Hence,

Hypothesis 2(a): The link between external partnering and innovative intent becomes negative for service firms' innovation performance.

Hypothesis 2(b): The link between external partnering and innovative intent becomes positive for manufacturing firms' innovation performance.

3. Method

3.1. Sample

The research draws its data from Turkish Innovation Survey which is conducted by the Turkish Statistical Institute. It is also known as a CIS survey. Different countries and statistics agencies across the world have conducted these innovation surveys. This enables these surveys to be pre-tested and piloted across different countries, industries, and firms. This has increased the interpretability, reality, and validity of the surveys (Grimpe and Kaiser, 2010). The Turkish government conducts the Innovation Survey every two years, therefore the quantity and quality of the responses are increased due to its experience in conducting this survey. There have been many economic and management related papers over the years that use CIS data extensively (Love, Roper and Vahter, 2014; Stephan, Andries and Daou, 2019). Firms' official representatives are interviewed face-to-face, thereby increasing response rates. In addition, telephone interviews or mail survey cause some bias. Therefore face-to-face interviewing avoids certain shortcomings (Bertrand and Mullainathan, 2001). This survey's respondents are managers of firms. They are particularly responsible for innovation or R&D activities.

This study uses 2011 Innovation Survey, which covers innovation activities during 2008-2010. There are 6,877 manufacturing and service firms initially in the sample. The selected firms in the sample have more than 10 employees. After sending out the questionnaires 5,767 usable responses are obtained with a response rate of 83.8%. As there are legal obligations for Turkish firms to be part of this questionnaire, this response rate is not surprising. This response rate has also been experienced in other studies that draw its data from innovation surveys, such as Spain and Finland (Parrilli, Balavac and Radicic, 2020). The questionnaire is designed to deal with the common method bias problem. In fact, it is difficult for respondents to maintain logical relations between different questions in the questionnaire. Psychological separation method is used in the design of the survey and also there are different response formats. Nevertheless, the Harman one-factor test has been conducted to check such the common method bias (Podsakoff, MacKenzie, Lee and Podsakoff, 2003). Prior studies have most widely used this technique to address the issue of common method bias. The results show that common method bias is not present.

This study excludes 3,397 firms because these firms do not report any product innovation activity during the observation period. For those firms who do not produce any type of innovation do not provide any information regarding their innovation activities. Therefore, the final dataset consists of 2,370 firms. Overall, there are 1,027 service firms and 1,343 manufacturing firms. Service firms are represented across six industries and manufacturing firms are represented across thirteen industries. The sample consists of 19 industries.

3.2. Measures

Innovation performance: This paper uses the share of sales with products new to the market as a dependent variable to measure innovative outcome. The variable refers to 2010 sales which are from the products introduced between 2008 and 2010. Prior work has also used this measure (e.g., Klingebiel and Rammer, 2014). This variable provides important information about the firm's success in commercializing innovations across different industries. This measure complements the conventional measure (i.e., patent) that is used for innovation success.

External partnering: The survey asks whether firms collaborate with different partners. The questionnaire indentifies seven collaborative partners. For each type of collaborative partner, firms are also asked to show whether their partner is located in Turkey or in foreign nations. For instance, firms can have their partners in European Union countries (EU), China/India, United States (US), and in other countries. In order to capture collaborative partners breadth, firms' binary responses for each of seven collaborative partners for each location are added up. In this way, as there are seven types of collaboration for each five region (Turkey, EU, US, CH/IND, and other), a firm can have 35 collaborative partners in total.

Innovative intention: Innovative intention variable distinguishes between more ambitious and less ambitious firms. This papers considers what firms state as their innovation objectives (see Klingebiel and Rammer, 2014). In order to measure innovative intention, this research asks firms the importance of the following objectives for their innovation activities. Likert scale (0=not relevat; 1=low; 2=medium; 3=high important) is used to understand the importance of different innovation objectives. This research focuses on two relevant objectives. One is the 'Increase range of goods and services' and the other one is 'Enter new markets'. Subsequently, two objectives are simply added up therefore each firm gets a value ranging from 0 to 6. If a firm scores high on these two objectives it is more ambitious in their innovations. For such firms creating novel products which are dissimilar from the extant ones becomes important. In splitting the sample according to innovative intention, this paper uses a composite score of the two objectives. In doing so, more ambitious firms are associated with the maximum score of 6 (1260 firms). Then, less ambitious firms are with a score of 4 or less (737 firms). This research omits firms where the score for two objectives are 5 because this score does not perfectly show the differences between the two types of firms.

Control variables: Following prior studies, some controls variables that explain innovation performance are included in the model (Klingebiel and Rammer, 2014; Ko et al., 2021). Search breadth variable is controlled in order to see whether firms get access to different knowledge sources rather than their collaboration agreements with their partners. In order to measure this variable nine sources of knowledge are coded as a dummy variable and then they are added up. Hence, a firm gets 0 value if the firm does not use knowledge sources at all, whereas the firm gets the value of 9 if the firm uses all knowledge sources. To account for the number of employees the log transformation of the raw data is used. This study also controls for business group subsidiary. Here, the firm gets the value of 1 if it is a subsidiary of a business group, and the firm gets the value of 0 if the firm is not a part of a business group. Being a part of a business group needs to be considered in the model because they may have access to the internal sources of other firms in the group, which can influence innovation performance. This study controls for process innovation with a dummy variable, for innovation can also occur within processes and complement part of product innovations thereby increase innovation performance. This study controls for whether firms are undertaking internal continuous R&D in their innovation activities. If firms carry out R&D on a continuous basis, they take the value of 1. If firms do not carry out research and development activities, they are coded as 0. Additionally, external R&D expenditure is controlled in natural logarithmic form as the extent to which firms spend on external R&D is expected to lead to more innovative outputs. Controlling for the number of employees with a PhD degree is also important to understand the innovative capability of firms. Therefore this variable is used in natural logarithmic form. In addition to this variable it is also controlled whether firms leverage internal or external training for their personnel in order to advance their capability to innovate. Training activities variable is controlled with a dummy variable. This study also controls for international market experience to measure whether firms operate in international markets. If firms operate in international markets they are coded as 1. If firms do not operate in international markets they are coded as 0. Having international market experience enables firms to absorb knowledge from other nations more easily

compared to those firms do not have such experience. Therefore, the former ones are likely to be more innovative compared to the latter. Finally, this research controls for the industry effect by including 19 industry dummies following two-digit level NACE coding.

3.3. Model Estimation

Since many firms do not have sales from any type of innovation activities, the data is called as censored. As the dependent variables ranges from 0 to 100, Tobit analysis is used to test the hypotheses. Tobit model adequately accounts for this specific feature of the data.

This paper follows split sample analysis to be able to analyze firstly the impact of external partnering and then the interaction between innovative intention and external partnering across different industries. First, the sample is splitted into two in order to indicate the influence of external partnering on innovation depending on innovative intention i.e., low versus high innovative intention. Then the sample is splitted into two based on the sector of firms i.e., manufacturing versus service firms. For the split based on sector, this study follows NACE coding. 1,343 firms are in the manufacturing industry whereas 1,027 firms are in the service industry. In doing so, the interaction effect between external partnering and innovative intention has been further examined depending on the sector that a firm operates in.

As a baseline, control variables are added into the model. In order to test Hypothesis 1, firms' openness to external partnering and their innovative intention as independent variables are added into the model. Later, the sample is splitted into two based on innovative intention. This research follows previous study by Klingebiel and Rammer (2014) to split the sample into two depending on the innovation objectives. In order to test Hypotheses 2(a) and 2(b), an interaction term of external partnering and innovative intent is added into the model and the sample is splitted into two according to industry affiliation.

Moreover, additional analyses have been conducted to assess the marginal effects of the interaction relationships. Since Tobit estimation is non-linear such further analyses are essential. Specifically, following Bowen (2012) the interaction effect for each observation is calculated. Using this method enables to determine whether the sample has significant interaction effects or no interaction effects.

4. Results

The correlations across the variables examined in the study are present in Table 1. The results are marked with a star if the significance level is $p<0.05$. The correlation findings show that there is no high collinearity among the exploratory variables. In addition, the variance inflation factor (VIF) statistics suggest that multicollinearity is not likely to influence the regression coefficients.

Tablo 1. Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Innovation	1.00											
(2) Firm size	-0.07*	1.00										
(3) Business group	-0.07*	0.41*	1.00									
(4) Process innovation	0.03	0.11*	0.07*	1.00								
(5) Continuous R&D	0.08*	0.30*	0.20*	0.13*	1.00							
(6) International market exp.	-0.03	0.38*	0.18*	0.07*	0.25*	1.00						
(7) External R&D expenditure	0.01	0.22*	0.16*	0.11*	0.33*	0.11*	1.00					
(8) Number of employees with PhDs	-0.01	0.41*	0.24*	0.07*	0.26*	0.11*	0.25*	1.00				
(9) Training employees	0.00	0.26*	0.21*	0.23*	0.35*	0.17*	0.28*	0.17*	1.00			
(10) Search breadth	0.06*	0.23*	0.15*	0.22*	0.30*	0.18*	0.26*	0.20*	0.33*	1.00		
(11) External partnering	0.08*	0.25*	0.24*	0.12*	0.27*	0.14*	0.31*	0.26*	0.23*	0.32*	1.00	
(12) Innovative intention	0.09*	0.09*	0.05*	0.13*	0.23*	0.18*	0.17*	0.08*	0.25*	0.42*	0.15*	1.00

Note: *p<0.05.

The means and standard deviations are also present in Table 2. The means show even though there are many differences between the means of manufacturing and service firms, manufacturing firms have a greater focus on continuous R&D and international markets than service firms.

Tablo 2. Descriptives

Variable	Full Sample				Manufacturing firms	Service firms
	Min.	Max.	Std. Dev.	Mean	Mean	Mean
External partnering	0	22	3.07	1.46	1.36	1.61
Firm size	10	29151	1499.81	419.43	433.46	401.07
Business group	0	1	0.43	0.24	0.22	0.26
Process innovation	0	1	0.39	0.80	0.81	0.78
Continuous R&D	0	1	0.42	0.24	0.27	0.20
International market experience	0	1	0.49	0.48	0.60	0.33
External R&D expenditure	0	18.24	4.12	1.78	1.89	1.62
Number of employees with PhD	0	84	2.75	0.50	0.54	0.45
Training employees	0	1	0.49	0.53	0.54	0.53
Search breadth	0	30	7.05	11.97	10.41	9.69
Innovative intention	0	6	1.83	4.71	4.83	4.57
Innovation performance	0	100	30.57	19.02	19.10	18.91

Table 3 reports the estimated coefficients of control and independent variables in full sample models. Model 1 shows positive significance for continuous R&D and search breadth whereas business group negatively affects innovation performance. Model 2 includes independent variables, namely openness to external partnering and innovative intention. The findings indicate that external partnering and innovative intention positively influence innovation performance, respectively (β = 0.01, $p<0.01$; β = 0.04, $p<0.01$). This shows that emerging economy firms leverage from collaborative partnering to increase their innovativeness. Table 3 also indicates the findings of the split-sample models estimated to test the impact of external partnering in subsamples of firms with less and more innovative intention. Model 3 and 4 correspond to the regression model used to test Hypothesis 1. The results suggest that the effect of external partnering is positive and significant for firms with less innovative intention (β = 0.04, $p<0.01$). External partnering is also positive and significant for firms with more innovative intention (β = 0.01, $p<0.01$). Furthermore, Wald tests with a seemingly unrelated estimation procedure are conducted to see whether the influence of external partnering is different between the models. As expected, the Wald test results display that the influence of external partnering on innovation performance significantly differs between the models for firms with less and more innovative intention ($p<0.05$). The significant difference between these two models enables to make a comparison between the coefficients of the models. Thus, the result shows that the coeffcient for external partnering for firms with less innovative intention is greater than for those firms with more innovative intention. This provides support for H1 suggesting that the link between openness to collaborative partnering and innovation performance is weaker for firms with high innovative intention than those firms with low innovative intention.

Tablo 3. Tobit results predicting innovation performance (split sample analysis depending on innovative intention and industry)

	Model 1 (Full Sample)	**Model 2 (Full Sample)**	**Model 3 (Low Innovative Intent)**	**Model 4 (High Innovative Intent)**	**Model 5 (Service firms)**	**Model 6 (Manufacturing firms)**
Control variables						
Firm size (log)	-0.01	-0.01	-0.03	0.00	0.00	-0.02*
	(0.00)	(0.00)	(0.02)	(0.01)	(0.01)	(0.01)
Business group	-0.06**	-0.08***	-.010	-0.10***	-0.11**	-0.04
	(0.03)	(0.03)	(0.09)	(0.03)	0(.04)	(0.04)
Process innovation	0.04	0.03	-0.05	0.06	0.08*	-0.02
	(0.03)	(0.03)	(0.07)	(0.04)	(0.05)	(0.04)
Continuous R&D	0.17***	0.15***	0.29***	0.11***	0.19***	0.12***
	(0.02)	(0.02)	(0.11)	(0.03)	(0.04)	(0.03)
International market experience	-0.01	-0.03	0.02	-0.04	-0.02	-0.03
	(0.02)	(0.02)	(0.07)	(0.03)	(0.04)	(0.03)
External R&D expenditure (log)	0.00	0.00	-0.00	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Number of employees with PhD (log)	-0.01	-0.02	-0.19**	-0.00	-0.03	-0.02
	(0.02)	(0.02)	(0.09)	(0.02)	(0.04)	(0.03)
Training employees	0.00	-0.01	0.02	-0.02	-0.04	0.01
	(0.02)	(0.02)	(0.07)	(0.03)	(0.04)	(0.03)
Search breadth	0.00***	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Focal variables						
External partnering		0.01***	**0.04*** **	**0.01*** **	0.07**	-0.02
		(0.00)	**(0.01)**	**(0.00)**	(0.02)	(0.02)
Innovative intention		0.04***	*(Wald Test) p=0.02 ** *		0.05***	0.04***
		(0.00)			(0.01)	(0.01)
External partnering X Innovative intention					**-0.01** ** **(0.00)** **[0.040]**	**0.00** ** **(0.00)** **[0.041]**
Number of firms	2370	2370	737	1260	1027	1343
Number of firms uncensored	1138	1138	231	732	466	672
R-squared	0.03	0.05	0.05	0.03	0.06	0.05
Log likelihood	-1655.16	-1626.38	-480.63	-837.81	-704.47	-910.68

Note: S.E. in parentheses;*p≤ 0.1; **p≤ 0.05; ***p≤ 0.01.

Table 3 also highlights the findings for the interaction between external partnering and innovative intention in sub-samples of sector. Model 5 and 6 analyze split samples of service firms (NACE code 46 and over) and manufacturing firms (NACE code between 5 and 46), respectively. According to the results, there is a negative interaction between external partnering and innovative intention for service firms (see Model 5). The interaction effect equals -0.01 and significant (p<0.05). following Bowen's (2012) method, the interaction coefficients are between -0.01 and -0.00. The z-statistics are between -3.21 and -1.30. From these values 98% of them are significant and there are no significant sign change over any value.

Nevertheless, there is a positive interaction between external partnering and innovative intention for manufacturing firms (see Model 6). The interaction effect equals 0.00 and significant (p<0.05).

Following Bowen's (2012) method, the interaction coefficients ranged from 0.000 to 0.009. The z-statistics ranged from 0.46 to 3.88. From these values 97% of them are significant and there are no significant sign change over any value. These results support H2a and H2b.

4.1. Robustness Check

Additional robustness tests are run for the models (available upon request). First of all, innovative intentions with the value of 5 are kept in the sample while testing the interaction between external partnering and innovative intention. The results remain consistent. Second, unlike formal linkages in collaboration partnering, access to external knowledge sources can also be undertaken via informal linkages with such as, suppliers, competitors, and consultancies. When hypotheses are tested with breadth in search, the sign of coefficients remain same but they lose their significance.

5. Discussion

This study deepens the understanding of under which conditions openness to external partnering becomes beneficial for innovation performance. First, this study splits the sample into two depending on how ambitious a firm's objectives are. Previous literature has highlighted the role of innovation objectives while investigating the importance of openness for innovation success (Klingebiel and Rammer, 2014; Ko et al., 2021). Leiponen and Helfat (2010) have underlined the important interaction between the breadth in objectives and knowledge sources. The current paper extends this research area by focusing on innovation objectives and grouping them into two different categories, namely less ambitious and more ambitious innovations. Consistent with that logic, the findings of this paper suggest that openness to external partnering is beneficial for both more ambitious and less ambitious firms in their innovations. However, this effect is greater for firms intending to continue their existing products and services (i.e., less ambitious innovations). This result suggests that the benefit of external partnering varies depending on some conditions.

Second, under which conditions the trade-off between external partnering and innovation intention become beneficial have not been explicitly analyzed. Thus, the interaction between external partnering and innovation intention is further explored with the moderating impact of firm industry affiliation. Previous studies have emphasized that external knowledge sources and innovation objectives are beneficial for manufacturing firms but not for service firms (Leiponen, 2012). In addition, Klingebiel and Rammer (2014) have highlighted the importance of industry-level differences in explaining the interaction between breadthness and innovative intention. This study further extends previous research by suggesting that the trade-off between external partnering and innovation objectives becomes beneficial for manufacturing firms and not beneficial for service firms. Service firms face the challenge of uncertainty due to the ease of imitation. These firms also struggle to transfer knowledge from their partners because they need to learn from scratch to implement the changes in their innovation activities. In other words, service firms face certain challenges due to their characteristics whereas manufacturing firms mitigate some of those challenges. These difficulties can result in friction for service firms focusing on more ambitious innovation objectives. These firms need to be careful when obtaining knowledge from their external partners.

Finally, this research has its limitations. Future studies can expand on these limitations and further explore. First, cross-sectional nature of the data causes some problems. Therefore, future research can utilize from different waves of the survey to be able to create panel datasets. That way, future studies can establish causality and examine the longer-term effects of the relationships identified here. Second, this study examines the effect of openness to external partnering on innovation performance when firms are following more or less ambitious innovation objectives. However, as Leiponen and Helfat (2010) suggested, it is also important to investigate how breadth in objectives and external

partnering interact with each other. Thus, future research could extend this research by looking at the interaction between the breadth in objectives and the breadth in knowledge sources. Finally, this research investigates the relationships for an emerging economy, Turkey. Therefore, it can be an important question what these results mean for developed economy firms. Future studies can explore these interactions in developed economies.

Statement of Research and Publication Ethics

This study does not require ethical permission.

Funding Statement

The author received no specific funding for this work.

Conflicts of Interest

The author states that there is no conflict of interest.

References

Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: a longitudinal study. *Administrative Science Quarterly*, 45(3), 425-455.

Atuahene-Gima, K. (1996). Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia. *Journal of Product Innovation Management*, 13(1), 35-52.

Bertrand, M. and Mullainathan, S. (2001). Do people mean what they say? Implications for subjective survey data. *The American Economic Review*, 91(2), 67-72.

Bierly III, P. E., Damanpour, F. and Santoro, M. D. (2009). The application of external knowledge: organizational conditions for exploration and exploitation. *Journal of Management Studies*, 46(3), 481-509.

Bos, B., Faems, D. and Noseleit, F. (2017). Alliance concentration in multinational companies: examining alliance portfolios, firm structure, and firm performance. *Strategic Management Journal*, 38(11), 2298-2309.

Bowen, H. P. (2012). Testing moderating hypotheses in limited dependent variable and other nonlinear models: secondary versus total interactions. *Journal of Management*, 38(3), 860-889.

Chesbrough, H. W. (2011). Bringing open innovation to services. *MIT Sloan Management Review*,52(2), 85.

Cohen, W. M. and Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128-152.

Cohen, W. M. and Malerba, F. (2001). Is the tendency to variation a chief cause of progress? *Industrial and Corporate Change*, 10(3), 587-608.

Desyllas, P., Miozzo, M., Lee, H. and Miles, I. (2018). Capturing value from innovation in knowledge intensive business service firms: the role of competitive strategy. *British Journal of Management*, 29(4), 769-795.

Dolfsma, W. (2004). The process of new service development: formalisation and appropriability. *International Journal of Innovation Management*, 8(3), 319-337.

Du, J., Leten, B. and Vanhaverbeke, W. (2014). Managing open innovation projects with science based and market-based partners. *Research Policy*, 43(5), 828-840.

Ettlie, J. E. and Rosenthal, S. R. (2011). Service versus manufacturing innovation. *Journal of Product Innovation Management*, 28(2), 285-299.

Gallouj, F. (2002). Innovation in services and the attendance old and new myths. *Journal of Socio-Economics*, 31(2), 137-154.

Grimpe, C. and Kaiser, U. (2010). Balancing internal and external knowledge acquisition: the gains and pains from R&D outsourcing. *Journal of Management Studies*, 47(8), 1483-1509.

Groysberg, B. and Lee, L. (2009). Hiring stars and their colleagues: exploration and exploitation in professional service firms. *Organization Science*, 20(4), 740-758.

Hansen, M. T. (1999). The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44(1), 82-111.

He, Z. and Wong, P. (2004). Exploration vs exploitation: an empirical test of the ambidexterity hypothesis. *Organization Science*, 15(4), 481-494.

Hitt, M. A., Dacin, M. T., Levitas, E., Arregle, J. L. and Borza, A. (2000). Partner selection in emerging and developed market contexts: Resource-based and organizational learning perspectives. *Academy of Management Journal*, 43(3), 449-467.

Hoang, H. A. and Rothaermel, F. T. (2010). Leveraging internal and external experience: exploration, exploitation, and R&D project performance. *Strategic Management Journal*, 31(7), 734-758.

Jansen, J. J. P., Van Den Bosch, F. A. J. and Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661-1674.

Klingebiel, R. and Rammer, C. (2014). Resource allocation strategy for innovation portfolio management. *Strategic Management Journal*, 35(2), 246-268.

Ko, Y. J., O'Neill, H. and Xie, X. (2021). Strategic intent as a contingency of the relationship between external knowledge and firm innovation. *Technovation*, 104, 102260.

Lahiri, N. and Narayanan, S. (2013). Vertical integration, innovation, and alliance portfolio size: implications for firm performance. *Strategic Management Journal*, 34(9), 1042-1064.

Lavie, D. and Drori, I. (2012). Collaborating for knowledge creation and application: the case of nanotechnology research programs. *Organization Science*, 23(3), 704-724.

Leiponen, A. and Helfat, C. (2010). Innovation objectives, knowledge sources, and the benefits of breadth. *Strategic Management Journal*, 31(2), 224-236.

Leiponen, A. (2012). The benefits of R&D and breadth in innovation strategies: a comparison of Finnish service and manufacturing firms. *Industrial and Corporate Change*, 21(5), 1255-1281.

Li, Y., Vanhaverbeke, W. and Schoenmakers, W. (2008). Exploration and exploitation in innovation: reframing the interpretation. *Creativity and Innovation Management*, 17(2), 107-126.

Li, H., Zhang, Y. and Lyles, M. (2013). Knowledge spillovers, search, and creation in China's emerging market. *Management and Organization Review*, 9(3), 395-412.

Love, J. H., Roper, S. and Vahter, P. (2014). Learning from openness: the dynamics of breadth in external innovation linkages. *Strategic Management Journal*, 35(11), 1703-1716.

Miles, I. (2007). Research and development (R&D) beyond manufacturing: the strange case of services R&D. *R&D Management*, 37(3), 249-268.

Nijssen, E. J., Hillebrand, B., Vermeulen, P. and Kemp, R. (2006). Exploring product and service innovation similarities and differences. *International Journal of Research in Marketing*, 23(3), 241-251.

Parrilli, M. D., Balavac, M. and Radicic, D. (2020). Business innovation modes and their impact on innovation outputs: regional variations and the nature of innovation across EU regions. *Research Policy*, 49(8), 104047.

Podsakoff, P., MacKenzie, S., Lee, J. and Podsakoff, N. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.

Roper, S., Love, J. H. and Bonner, K. (2017). Firms' knowledge search and local knowledge externalities in innovation performance. *Research Policy*, 46(1), 43-56.

Rosenkopf, L. and Nerkar, A. (2001). Beyond local search: boundary-spanning, exploration, and impact in the optical disk industry. *Strategic Management Journal*, 22(4), 287-306.

Sampson, R. C. (2007). R&D alliances and firm performance: the impact of technological diversity and alliance organization on innovation. *Academy of Management Journal*, 50(2), 364-386.

Stephan, U., Andries, P. and Daou, A. (2019). Goal multiplicity and innovation: how social and economic goals affect open innovation and innovation performance. *Journal of Product Innovation Management*, 36(6), 721-743.

Sundbo, J. (1997). Management of innovation in services. *Service Industries Journal*, 17(3), 432-455.

Thakur-Wernz, P. And Wernz, C. (2020). Does R&D offshore outsourcing improve innovation in vendor firms from emerging economies? A study of biopharmaceutical industry in India. *International Journal of Emerging Markets*, 17(6), 1373-1403.

Zhao, M. (2006). Conducting R&D in countries with weak intellectual property rights protection. *Management Science*, 52(8), 1185-1199.