REGIONAL DEVELOPMENT, INNOVATION SYSTEMS AND SERVICE COMPANIES' PERFORMANCE

Godfred Adjapong Afrifa
Lecturer in Accounting,
Kent Business School, University of Kent
Canterbury, CT2 7PE
Email: G.A.Afrifa@kent.ac.uk
Tel: +44 (0) 1227 824146

Joseph Amankwah-Amoah*
Kent Business School
University of Kent, Kent ME4 4TE
TEL: +44 (0) 1634 (88)8870
E-mail: J.Amankwah-Amoah@kent.ac.uk

Fred Yamoah
Birkbeck, University of London
London WC1E 7HX
Email: f.yamoah@bbk.ac.uk
Tel: +44 (0) 203 926 1551

Adolf Acquaye
Department of Mechanical and Industrial Engineering,
Rochester Institute of Technology, Dubai, United Arab Emirates
EMAIL: aaacad1@rit.edu

Johnny Syllias
Kent Business School
University of Kent, Kent ME4 4TE
johnjohnny615@gmail.com

Enoch Nii Boi Quaye
School of Accounting and Finance
University of Bristol
15-19 Tyndalls Park Road, Bristol, BS8 1PQ
email: enoch.quaye@bristol.ac.uk

***Corresponding author**

ABSTRACT

This paper examines the impact of firm-level research and development (R&D) and country-level innovation on the relationship between geographic scope and financial performance. Using econometric estimation to analyze data from a sample of 339 United Kingdom (UK) service companies over the period from 2011 to 2017, we found a concave relationship between geographic scope and financial performance. Moreover, the results indicated that UK service companies that increase their R&D expenditure accrue a higher performance from higher geographic scope. This is because the relationship becomes convex but the foreign country's innovation has no direct effect on UK service companies' performance. Additional results showed that performance differences from geographic scope and the influence of firm-level R&D and country-level innovation exist between SMEs and large firms, and between private and public firms.

Key words: Host-country Innovation; International Trade; Performance; Service Companies.

1. INTRODUCTION

In today's knowledge-based economy, innovation has emerged as the cornerstone of activities of many successful companies in both mature and emerging economies (see Afuah, 2009; Alnuaimi, Singh, & George, 2012; Amankwah-Amoah, 2021; Dodgson, Gann & Salter, 2008; Mudambi, 2008). For many firms, innovation has long remained the "lifeblood" which buttresses their market competitiveness and ability to leapfrog market leaders (Alegre & Chiva, 2008; Balachandra & Friar, 1997; Biemans & Griffin, 2018). Accordingly, firms increasingly require innovation to not only revive failing products but to also avoid annihilation. In recent decades, internet technologies coupled with declining cost of communication have provided ample opportunities for international businesses to innovate and create conditions that make success in foreign markets more likely (Amankwah-Amoah et al., 2021b, 2021b; Cavusgil et al., 2020; Zhao et al., 2018). Extant literature has sought to understand some critical factors and contemporary issues in the international business environment that act as enablers for firms to enhance their performance (Perlmutter, 2017; Castellani et al., 2018). Of these, innovation, which is a reflection of research and development (R&D) in both firm-level and country-level activities, has long been the subject of intensive research enquiry (Woodside, 1995; Hausman, 2005; Eggert et al., 2015). Despite the important insights offered by past studies, there remains lack of clarity concerning the potential effects of firm-level R&D and host-country-level innovation activities on the performance of foreign geographic scope (i.e., the total number of foreign countries in which a firm operates). Specifically, there remains limited insight on whether firm-level R&D and host-country-level innovation could moderate the association between foreign geographic scope (FGS) and financial performance. Indeed, cross-national integration of firm activities can be hampered by host-country and location-specific conditions such as access to talent and cost of labour (Cavusgil, et al., 2020).

Against this background, the main objective of the study is to examine the moderating effects of host-country-level innovation and firm-level R&D on the relationship between foreign geographic

scope (FGS) and financial performance. We employed these two moderators because previous studies have shown that foreign firms' success predominantly depends on their internal capabilities and destination country's innovation (see, Anand et al., 2021; Halabi et al., 2021). This line of inquiry has the potential to further advance our limited understanding of the stage at which the host-country effects dwindle. To examine this issue, we utilized data on 339 international service companies operating in the United Kingdom (UK) over the period from 2011 to 2017. The interest in innovation in the service industry is borne out of its many peculiar attributes compared to the much-researched manufacturing industry because of its heterogeneity due to composition of many sub-sectors. In addition, the service industry lacks unique input–output process, has stronger links between users and producers and there is a general lack of its storability due to its intangible nature (Pires et al., 2008). Research insight and understanding garnered from investigating these institutional constructs within the context of the service industry would be unique to the sector.

In essence, our paper enriches several lines of research in innovation and operations strategy. Despite the importance of innovation to firms and countries in today's increasingly integrated global economy (Afuah, 2009; Atuahene-Gima, 2005; Danquah & Amankwah-Amoah, 2017; Li & Atuahene-Gima, 2001), there are few gaps in the current literature. For instance, Balzat and Hanusch (2004) emphasized this stance when they reported that the interplay between a country's innovation system and financial performance has not been studied exhaustively. Also, firms have turned to mobilizing financial resources to increase R&D expenditure as a means of maintaining competitiveness; however, whether such expenditure actually leads to misallocation of resources or delivers higher performance in foreign markets remains underexplored. Although previous studies (Brock et al., 2006; Shine et al., 2017 and Jain and Prakash 2016) have postulated a concave relationship between FGS and performance relationship, their studies failed to examine the possible moderating impact of firm-level innovation and country-level innovation. This paper therefore seeks

to elucidate separately the moderation impact of firm-level innovation and country-level innovation R&D between FGS and financial performance.

Second, we add to the extant literature by moderating both firm-level innovation and country-level innovation on the relationship between geographical spread and performance. The examination of the combined moderating effect is crucial because, whereas firm-level innovation can help foreign firms to better their performance through economies of scale (Abdi & Aulakh, 2018) and exploitation of market imperfections (Kotabe et al., 2002; Halabi et al., 2021), country-level innovation can improve firm performance through experiential learning (Puthusserry et al., 2020) and knowledge (Lundvall, 2007) from the destination country. Thus, the joint moderation of both firm-level innovation and country-level innovation is expected to lead to higher performance effect. By moderating firm-level innovation and country-level innovation on the FGS-performance relationship, we distinguish our paper from previous studies that have only considered the moderating impact of firm-level innovation on performance (Booltink and Saka-Helmhout, 2018; Halabi et al., 2021). As this paper focuses on international service firms operating in the UK, it fills a research gap and provides specific insight into the management of firms in foreign markets.

To achieve these objectives, the rest of the paper is organized as follows. After the introduction section 1, we present a review of the literature on firm-level R&D, host-country-level innovation and financial performance, and the research hypotheses in section 2. This is then followed by the data sources and research methodology in Section 3. Following this, the research findings, analyses and discussion are provided in Section 4 leading to the concluding remarks in Section 5.

2. THEORETICAL UNDERPINNING AND HYPOTHESES

Conceptually, the paper draws on the theory of systems-oriented perspectives on innovation (Edquist and Hommen, 1999) to examine the complex interdependencies and potential interactions

between the various factors which can affect the R&D and innovation and so the performance of firms. The systems-oriented theory of innovation is underpinned by dynamic broader institutional factors (such as country-level innovation and R&D intensity) with fundamental implications for the development of corporate strategies (such as international firm performance).

International business and strategy research highlights mixed outcomes on the relationship between geographic scope and firm performance. This is mainly because foreign geographic scope through multi-nationality provides firms with many positive opportunities to enhance their reputation and profitability, but also challenges, which can threaten their survival. The varied outcomes can be attributed to factors such as country environment diversity (Morrison, 2002) and international asset dispersion (Rugman & Verbeke, 2008). Both the theory of "systems-oriented perspectives on innovation" and relevant international business literature were drawn on to develop the hypotheses.

Positive business opportunities such as economies of scale and scope (Abdi & Aulakh, 2018), the exploitation of market imperfections across different countries and regions (Buckley et al., 2016), resource advantages (Kazlauskaitė, et al., 2015), the opportunity to optimize location economies by re-configuring value-chain activities (Cuervo-Cazurra, et al., 2018) enable firms to enhance their performance via FGS. On the other hand, foreign market expansion can result in increased management and transactions costs as well as other external challenges such as cross-cultural differential, currency fluctuation and even political instabilities (see Cuervo-Cazurra, et al., 2007). Consequently, it is not surprising that there is no consensus on the issues. FGS is a traditional concept used to examine the extent to which the assets of a firm are dispersed across foreign markets (Asmussen, 2009). It provides an indication of the total number of foreign countries in which a firm operates. FGS therefore forms an integral input into a firm's strategic-level decision-making process since the decision to locate productive assets is a key part of a firm's international strategy (Amankwah-Amoah & Debrah, 2017).

Research into the exact relationship between FGS (an example of a critical institutional factor per the tenets of systems-oriented perspectives on innovation) and firm performance has yielded three distinct outcomes, namely positive, negative, concave and convex relationships, leading to intellectual tensions for scholars and ramifications for the management of multi-national enterprises (MNEs). Firstly, scholars including Daniels and Bracker (1989), Grant (1987) and more recently Kovach et al., (2015) have put forward the proposition that there is a positive relationship between FGS and firm performance. As an extension to this, Kim et al., (2015) determined that when firms geographically diversify their foreign operations into resource-poor countries, then there is a positive relationship between the geographic scope and firm performance. This builds on earlier studies such as Chan Kim, et al., (1989) and Tallman and Li (1996), which also confirmed this positive relationship. Denis et al., (2002) contradicted the first positional stance on the relationship between foreign operations and consequently FGS on firm performance by reporting through an extensive analysis of US firms that, an increase in global diversification reduces excess value. This position was supported by Oh, et al., (2015), who argued that the complexity in managing the supply chains in foreign locations increases coordination costs and so it may lead to negative firm performance effects.

Finally, theoretical and empirical evidence have emerged over the years to support the argument put forward by some scholars that the relationship between foreign operations and firm performance is concave, given that there are both positive and negative factors that impact on firm performance. Indeed, Tallman and Li (1996) sought to explain this concave relationship by suggesting that performance would increase with increasing foreign operations because strategic resources are given greater scope. However, performance would begin to decrease when product scope exceeds the range of these resources and governance scope surpasses management capabilities. In terms of geographic scope, past research revealed that the relationship between it and firm performance is more complex than previously suggested, as early studies such as Hitt et al.,

(1997) and Gomes and Ramaswamy (1999) and more contemporary literature such as Qian et al., (2010) and Ang (2017), suggest a concave relationship between geographic scope and firm performance. Thus, the extant literature suggests that there appears to be convergence in the acceptance of the concave relationship between geographic scope and firm performance – at least in resource-rich countries (Kim et al., 2015).

More specifically, studies conducted in the area of service firms' internationalization have postulated concave performance relationships. In a UK and USA study, Brock et al., (2006) examined the international diversification effect on performance of global law firms. Their results produced concave results for these global law firms operating in both the UK and USA. Shine et al., (2017) examined the performance effect difference between knowledge-intensive and capital-intensive service micro-multinational enterprises and found concave results. Also, in an Indian study, Jain and Prakash (2016) reported a concave finding when they examined the effect of multinationality on the performance of software firms. This study seeks to establish this relationship for service firms in the UK which proceed to internationalize into other countries as they seek to enhance firm performance. Consequently, we hypothesize that:

> H1: *There is a concave relationship between foreign operations and financial performance for firms in the service industry.*

Possible factors that could moderate the relationship between FGS and firm performance includes country of origin, firm age and size (Bausch & Krist, 2007), organizational learning (Hsu & Pereira, 2008), CEO attributes (Hsu et al., 2013) as well as R&D. Typically, R&D as an institutional factor per the tenets of systems-oriented perspectives on innovation has been traditionally viewed as a dominant feature that affects performance within the manufacturing industry (Ettlie, 1998) due to the critical role that new product development plays in terms of value added to such firms (Atuahene-Gima and Evangelista, 2000; Darawong, 2018). In the same light, R&D is not typically viewed as a feature of service industries as opposed to manufacturing or

technological industries and so have received limited research enquiry. Contemporary research has however shown that R&D is not limited to products but also to new innovative process which is critical to the service industry (Randhawa and Scerri, 2015). Indeed, Thomke (2003) points out that although the economy is increasingly dependent on services, innovation processes remain oriented toward products. Additionally, from a value chain analysis perspective, there is evidence to support the fact that there is a shift in the focus of the firm's strategic positioning towards R&D-related activities as those provide the greater value-added outputs to the firm compared to manufacturing processes as depicted by the Stan Shih "Smile Curve" (Rungi and Prete, 2018). Consequently, examining the exact role that R&D intensity plays in moderating the relationship between FGS and firm performance in the service industry has become not just important but also timely.

R&D intensity is a useful indicative measure to account for the level of innovation within a firm, industry or country (Falk, 2006). Accordingly, it can provide a quantified measure to inform firm-level strategic decision making. At the industry level, insight into R&D intensity can be used to cluster together different industries of similar R&D intensities and to assess its impact on economic performance of that particular cluster of industries. At the country level, it can be used as an indicator for cross-country comparisons or to inform policy assessment and the monitoring of resources devoted to innovation through science and technology.

Although R&D intensity can be evaluated at the firm, industry or country levels, the definition for firm- and industry-level R&D intensity is different from that of the country level due to the dividing variable used in each case. For firms and industries, total asset is used as the dividing variable in the ratio and for country-level innovation Gross Domestic Product (GDP) is used (Savrul & Incekara, 2015). R&D intensity therefore essentially evaluates the ratio of R&D investment undertaken by the firm, industry or country (the unit of analyses) to the output of the unit of analyses. Using the definition of R&D by the OECD (2012), R&D intensity can therefore be defined as the amount of investment embarked upon by a firm, industry or country in any creative work undertaken

on a systematic basis in order to create value (increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications) per output of the firm, industry or country.

Increasing the R&D activities of firms has been considered key to innovation; as a result, research activities are seen as providing a vehicle for measuring firm productivity (Ehie and Olibe, 2010) and thus contribute to its performance. Consequently, it is believed that firms with a greater R&D intensity are more likely to be successful. Despite this notion, measuring the effect of R&D intensity on firm performance has been characterized by research limitations. Osawa and Yamasaki (2005) for instance, attributed these limitations to the lack of definitive means and indices to measure R&D results and time difference between R&D investment and the emergence of results. Consequently, further research on the impact that R&D has on firm performance has become important, particularly within sectors such as the service industry that has traditionally received limited research enquiry.

R&D activities in service firms are very different to those in manufacturing firms given that the mixes of R&D investment and approaches are different due to the variations in their relative orientation. R&D within the service industry would usually focus on activities that would generate enhanced customer service and consumer insight as it would enable firms to better understand and serve their customers. Thus, for these service firms, investments in these less tangible firm-R&D assets are considered more beneficial than tangible assets. The international business literature is awash with research into firm-R&D intensity for manufacturing firms – see for instance Hall and Mairesse (1995), Wakelin (2001), Falk (2012) and Gui-long et al., (2017). However, Ehie and Olibe (2010) highlight the fact that while there are differences between firm-R&D activities in the manufacturing and service industries, little research attention has been given to them.

Past research, for instance Hufbauer (1970), Mansfield (1981), Kotabe (1990) and even contemporary literature such as Falk (2012) and Gui-long et al. (2017), has established that there is a positive relationship between R&D intensity and firm performance. Consequently, innovativeness as reflected in firm-R&D intensity, it is argued, allows firms to enhance their operational efficiency (Wang et al., 2013) and improve performance. The suggestion is that this becomes even more important when firms expand across different foreign markets. Accordingly, when a firm's R&D intensity increases, it is better placed to innovate and so are in a position to leverage on the advantages that diverse foreign operations (geographic scope) offer. We therefore propose that firm-R&D intensity accentuates the effect of geographic scope on firm performance. Consequently, Hypothesis 2 is presented as:

H2. R&D intensity positively moderates and causes a convex relationship between foreign operations and financial performance for firms in the service industry.

Similarly, the level of host-country institutional development (another key dimension of systems-oriented perspectives on innovation), particularly national capabilities, facilitates and accentuates innovation matters in foreign operations of firms and their performance (Wu et al., 2016; Szczygielski et al., 2017; Tsamadias et al., 2018). There are variations of institutional development across countries (Chan et al., 2008), and this consequently influences the choice to and the degree to which firms disperse their assets to specific foreign markets. It is therefore expected that the higher the level of host-country institutional development, the more likely it is a destination for firms to invest their assets in those countries.

Despite these, the literature is yet to cover the influence of host-country innovation on foreign companies' performance. This paper therefore seeks to bridge this gap from the context of the international service industry. Host-country innovation effect on international firms' performance has not been exclusively researched but captured as part of a broad research area of institutional development that constitutes a set of unique capabilities of a country (Makino, 2004; Batabyal &

Nijkamp, 2013; Wu et al., 2016; Szczygielski et al., 2017; Tsamadias et al., 2018); as described by Porter (1990) under the broader framework of competitive advantage of nations. For example, Makino et al., (2004) reported that the extent of institutional development which generates innovation (Borges et al., 2017) at country-level influence on foreign operation performance is as significant as industry-factor effects. The study further reported that both country- and industry-level effects are more relevant to international business environment in developing countries than developed economies.

Another study that focused on the general country-level institutional development asserted that country-level capabilities do not automatically deliver benefits to all firms (Wu et al., 2016) but rather the benefits are industry group specific as earlier reported by Dunning (1998). Beyond confirming the role of country-level innovation on performance Wu et al., (2016) and Zahra and Hayton (2008) also reinforced the need for "absorptive capacity" (Leal-Rodríguez et al., 2014) in addition to a vibrant R&D intensity to respond to socio-cultural, legal and environmental policies to flourish internationally. Tsamadias et al., (2018) also highlighted the importance of innovation to corporate performance through foreign direct investment to OECD countries by recommending policy intervention for increased investment as a critical precursor to attracting foreign direct investments. The importance of country-level innovation to business performance served as the context for interrogating government support for private innovation by Szczygielski et al., (2017). In a two-country based study, Szczygielski et al., (2017) found that government support for R&D activities accentuates innovation and performance of firms.

The extant literature has extensively covered country-level institutional influence on foreign firm performance. Indeed, past studies attest that economic, political and social institutions, as well as the level of technology in a country, are the main determinants of firm profitability (Chan et al., 2008, Khanna & Rivkin, 2001) either under local or foreign ownership. It is also affirmed in the academic literature that strong institutions and high technological development generate and

accentuate R&D, and for that matter country-level innovation (Borges et al., 2017, Wu et al., 2016; Szczygielski et al., 2017; Tsamadias et al., 2018). Despite the extensive research focus on institutional environment, which encompasses country-level innovation to a degree, these studies are limited to sufficiently delineate the specific role of country-level innovation on firm performance, as none of them specifically singled out this variable for investigation. We therefore argue that research is needed to examine the specific influence of country-level innovation, either positive or negative, beyond the limited attention it has received within studies on institutional development (see Chan et al., 2008; Li et al., 2018; Wu et al., 2016, Bell et al., 2012; Khanna & Rivkin, 2001). Such an enquiry is particularly relevant when firms are expanding across different foreign markets with different levels of innovation capacities and activities. Drawing on the assertion of Borges et al., (2017) that institutional development, which encompasses several indicators, of which country-level innovation is just one such factors, generates innovation and promotes innovativeness (Szczygielski et al., 2017; Tsamadias et al., 2018), it is envisaged that country-level innovation as a single factor will not substantially influence the relationship between foreign-country operation and performance. Consequently, Hypothesis 3 is presented as:

> H3. *Country-level innovation does not moderate the concave relationship between foreign operations and financial performance.*

We draw on the theory of country-level R&D spillover (Liu et al., 2018) to state in Hypothesis 4 that R&D and country-level innovation positively moderate and cause a convex relationship between FGS and financial performance. Indeed, a country-level R&D activity is the result of the contribution of publicly supported and publicly funded R&D activities. Using the theory of R&D spillovers, it has been reported that country-level innovation activities are a major source of productivity and growth (Griliches, 1991). The spillover of R&D activities within a country provides an enabling environment for businesses to better flourish because firms that are strategically positioned can take advantage of the external R&D environment in the country to enhance their

performance. This can be achieved through firms taking advantage of what has been described as the most important external resource in a country, 'knowledge', and the most important process in a country, 'learning' (Lundvall, 2007) or through firm-level technological leapfrogging (Götz & Ederington, 2017). The basis for Hypothesis 4 is that firms with a higher R&D intensity would be better placed to take advantage of the opportunities present in the external environment in a country (such as higher country-level R&D intensity). Thus, such firms would leverage on the country-level innovation to enhance their performance. Using the case of the international service industry, the testing of Hypothesis 4 would therefore contribute to the literature on innovation by establishing whether different modes of innovation complement each other and find support in the specific national context. Hypothesis 4 therefore proposes a positive joint influence of firm-R&D intensity and country-level innovation on the relationship between foreign operations and performance, and so it is presented in this study as:

H4. *R&D and country-level innovation positively moderate and causes a convex relationship between foreign operations and financial performance.*

<<Figure 1 demonstrates our conceptual model linking the hypotheses noted above>>.

RESEARCH METHODOLOGY

3.1 Data

The firm- and host-country-specific data for this study are drawn from the Financial Analysis Made Easy (FAME) database, The Global Economy website and World Bank's World Development Indicators. The sample period starts from 2011 and ends in 2017 because one of the main moderating variables – host-country innovation – is only available for that period. The process for selecting firms to be included in the sample was undertaken as follows: First, a particular firm must be a registered service company in accordance with the NACE 2 industry classification. Second, an identified service company must have the UK as its home country. Third, a selected service company

must have operations in countries other than the UK. The criteria resulted in a sample size of 339 service companies, consisting of a balanced panel data of 2,314 firm-year observations. Figure 2 below presents highlights of the number of firms in each host country with the data scaled to the number of UK service firms operating in each host country.

Insert Figure 1 about here

3.2 Variable Definitions

The main firm-performance measure employed as a dependent variable is the return on assets (ROA), which is defined as the ratio of profit before interest and taxation to total assets. We employed an accounting measure of performance because the service companies in our sample are all not publicly quoted, which makes it impossible to employ any market-performance measure. This is in line with prior studies on geographic scope and company performance that have also used ROA as a measure of performance (see Kotabe et al., 2002; Contractor et al., 2007; Tsai, 2014)[1]. The main explanatory variable used in this study is the FGS, which is defined as the log of the total number of foreign countries where a company operates. Similar studies including Mohr and Batsatis (2017) used the same measure. Refer to Figure 3 for the host-country-level innovation indices for each host country presented using their geographic positioning.

The two moderation variables are firm R&D and host-country innovation. The firm R&D is measured as the ratio of total R&D expenditure to total assets for each firm. Host-country innovation, which is based on the "five pillars: institutions, human capital and research, infrastructure, market sophistication, and business sophistication", is measured as the sum of innovation indices for all countries where a company operates scaled by the total number of countries. In line with prior studies, we controlled for firm-specific characteristics. Firm age is defined as the period in years

[1] As a robustness test, another performance measure, return on sales (ROS), is employed in section 4.4.

between incorporation and each calendar year. Firm size is measured as the natural logarithm of total assets. Intangible assets ratio is measured as the ratio of intangible assets to total assets. Leverage is measured as the ratio of total long-term debt to total assets. Home concentration is measured as the ratio of home-country sales turnover to total sales turnover. We also control for two specific country level development indicator namely gross domestic product (GDP) and annual inflation. GDP is defined as the annual growth of GDP. Inflation is measured as the GDP deflator of annual inflation.

Insert Figure 2 about here

3.3 Econometric Estimation

The hypotheses developed are tested using the fixed effects regression methodology (Allison, 2009) and the software used is the STATA version 16. To test the relationship between FGS and firm performance (Hypothesis 1), the following regression model was used:

$$ROA_{it} = \beta_0 + \beta_1 Scope_{it-1} + \beta_2 Scope^2_{i,t-1} + \beta_3 R\&D_{it-1} + \beta_4 CInnovation_{it-1} + \beta_5 Age_{t.1-t} + \beta_7 Size_{i,t-1} + \beta_8 Intan_{i,1-t} + \beta_9 Leverage_{it-1} + \beta_9 Hoe\ concentration_{it-1} + \beta_{10} GDP_{i,1-t} + \beta_{11} Inflation_{it-1} + Firmeffects + Year\ effects + \varepsilon_{it} \quad (1)$$

To test the moderation impact of firm R&D on the relationship between FGS and firm performance (Hypothesis 2), the following regression model was used:

$$ROA_{it} = \beta_0 + \beta_1 Scope_{it-1} + \beta_2 Scope^2_{i,t-1} + \beta_3 Scope * R\&D_{it-1} + Scope^2 * R\&D_{it-1} + \beta_4 R\&D_{it-1} + \beta_5 CInnovation_{it-1} + \beta_6 Age_{t.1-t} + \beta_7 Size_{i,t-1} + \beta_8 Intan_{i,1-t} + \beta_9 Leverage_{it-1} + \beta_{10} Home\ concentrationn_{it-1} + \beta_{11} GDP_{i,1-t} + \beta_{12} Inflation_{it-1} + Firmeffects + Year\ effects + \varepsilon_{it} \quad (2)$$

To test the moderation impact of host-country innovation on the relationship between FGS and firm performance (Hypothesis 3), the following regression model was used:

$$ROA_{it} = \beta_0 + \beta_1 Scope_{it-1} + \beta_2 Scope^2_{i,t-1} + \beta_3 Scope * CInnovation_{it-1} + Scope^2 * CInnovation_{it-1} + \beta_4 R\&D_{it-1} + \beta_5 CInnovation_{it-1} + \beta_6 Age_{t.1-t} + \beta_7 Size_{i,t-1} + \beta_8 Intan_{i,1-t} + \beta_9 Leverage_{it-1} + \beta_{10} Home\ concentration_{it-1} + \beta_{11} GDP_{i,1-t} + \beta_{12} Inflation_{it-1} + Firmeffects + Year\ effects + \varepsilon_{it} \quad (3)$$

To test the moderation impact of firm-level R&D and host-country innovation on the relationship between geographic scope and firm performance (Hypothesis 4), we used the regression model below:

$$ROA_{it} = \beta_0 + \beta_1 Scope_{it-1} + \beta_2 Scope^2_{i,t-1} + \beta_3 Scope * R\&D * CInnovation_{it-1} + Scope^2 * R\&D * CInnovation_{it-1} + \beta_4 R\&D_{it-1} + \beta_5 CInnovation_{it-1} + \beta_6 Age_{t.1-t} + \beta_7 Size_{i,t-1} + \beta_8 Intan_{i,1-t} + \beta_9 Leverage_{it-1} + \beta_{10} Home\ concentration_{it-1} + \beta_{11} GDP_{i,1-t} + \beta_{12} Inflation_{it-1} + Firmeffects + Year\ effects + \varepsilon_{it} \quad (4)$$

Given that we are proposing a concave relationship between foreign operations and financial performance for firms in the service industry, it is important to first test whether this relationship is a concave function. Therefore, we employ the Ramsey's RESET test of functional misspecification to detect whether there is any evidence of concave relationship in the first place (Ramsey, 1969). Thus, equation (1) is run and the fitted values saved. The saved values are then included in equation (1) to detect the presence of any possible concave in the function. The result of the Ramsey's RESET test [F (3, 2295) = 59.32; p-value 0.000] confirms the concave function; hence, the need to model the relationship as a concave function.

All variables are defined in Table 1.

Insert Table 1 about here
---

4. RESULTS

4.1 Descriptive Statistics and Correlation Matrix

Table 2 provides the descriptive statistics of all the variables used in regressions (1) to (4). The mean ROA is 12.1%, suggesting that the average UK service firm in our sample is profitable. The average log of FGS is approximately 1.634. The average ratio of firm R&D to total assets is 10.9%, which demonstrates the level of resources international service companies in the UK commit to R&D. The average host-country innovation in our sample is approximately 50.813 points, which suggests that the average firm in our sample is high on innovation. The reason is that much of the FGS is located in developed countries such as the USA and Europe. The rest of the descriptive statistics are as follows: The average firm in our sample is 78.347 years old, which shows that international service companies in the UK are old. The average log of firm size, as measured by total assets, is 10.981. The mean ratio of intangible assets is 15.2%. Leverage is on average 12.9%. The percentage of the average firm's sales revenue in the UK of total sales revenue is approximately 62.0 %. Although this figure shows that the average firm has the majority of its sales in the UK, this figure is low compared with the figure of 88% obtained by Mohr and Batsatis (2017). The average GDP and inflation rate

over the sample period are 2.259 and 1.921, respectively. The appendix shows the frequency of observations over the sample period.

Insert Table 2 about here

The correlation matrix, which shows the multi-collinearity among the variables, indicates no issues. Specifically, the correlation coefficient of all the variables is below 0.5. The correlation coefficient between ROA and the log of FGS is positive and statistically significant (0.254). Although the correlation matrix does not show the best causality between variables, it provides the first indication of the influence of FGS on ROA. The coefficients of firm-level R&D (0.076) and host-country innovation (0.158) with ROA are all positive and statistically significant, giving the initial indication of their effects on ROA. The remainder of the correlations between variables are consistent with the literature.

4.2 Multivariate Regression Results

In all the regressions, the standard errors are clustered at the firm level to reduce heteroscedasticity. The baseline results from running regression models (1) to (4) to test hypotheses (1) to (4) are presented in Table 3. The results from running regression model (1) to test the relationship between FGS and ROA are presented in column (1). The coefficient of the FGS is positive and statistically significant at the 1% level ($\beta = 0.241$, t-statistic = 19.22). However, the coefficient of its squared is negative and statistically significant at the 1% level ($\beta = -0.054$, t-statistic = −16.31). This clearly shows evidence of a concave relationship between geographic scope and firm performance. Specifically, the results show that UK service companies achieve higher performance at lower levels of FGS; however, performance begins to decline as geographic scope increases. At lower levels, a 10% increase in FGS is expected to increase ROA by 2.41%; however, at high levels, a 10% increase

in geographic scope decreases ROA by 0.54%. These findings are consistent with previous studies including Hitt et al., (1997) and Caper and Kotabe (2003).

The results of the moderation impact of firm level R&D on the relationship between FGS and performance from running regression model (2) are displayed in column (2). With the moderation of firm R&D, the relationship between geographic scope and performance changes to become convex. Specifically, the coefficient of the moderation of FGS and R&D is negative and statistically significant at the 1% level ($\beta = -0.278$, t-statistic = −4.31); however, the coefficient of moderation of its square and R&D is positive and statistically significant at the 1% level ($\beta = 0.063$, t-statistic = 4.22). Additionally, the coefficient of R&D is positive and statistically significant at the 1% level ($\beta = 0.217$, t-statistic = 5.51), suggesting a positive direct association between firm R&D and performance. Overall, the results show that with high R&D expenditure, a lower level of FGS leads to lower performance, whereas a high FGS results in higher performance.

Column (3) of Table 3 presents the results of the moderation impact of host-country innovation on the relationship between FGS and firm performance. The first observation is the lack of a relationship between host-country innovation and firm performance, whereas the concave relation between FGS and firm performance still exists. The coefficient of host-country innovation is statistically significantly related with firm performance ($\beta = 0.000$, t-statistic = 1.66). With regard to the moderation effect, *Geographic scopeXcountry innovation* ($\beta = -0.000$, t-statistic = −0.48) and *Geographic scope squaredXcountry innovation* ($\beta = -0.000$, t-statistic = −0.000) are not statistically significant. These results show that all things being equal, UK service companies' performance is indifferent to the host-country innovation.

In the last column (4) of Table 3, we examine the possible moderation impact of firm R&D and host-country innovation on the association between FGS and firm performance. Since host-country innovation does not affect performance, but firm-level R&D does, we speculated that it is

UK service companies who intensify their R&D that are able to take advantage of host-country innovation. The results still show that the association between geographic scope and firm performance is concave (β = 0.269, t-statistic = 18.61) for FGS and (β = −0.060, t-statistic = −15.77) for geographic scope squared, whereas a positive association between host-country-level innovation and firm performance exists (β = 0.001, t-statistic = 4.68). The coefficients of the main two moderation variables of interest, *Geographic scopeXR&DXcountry innovation* (β = −0.005, t-statistic = −4.13) and *Geographic scope squaredXR&DXcountry innovation* (β = 0.001, t-statistic = 3.82) show a convex relation between geographic scope and firm performance in the presence of high firm R&D and host-country innovation. Regarding the control variables, the coefficient of firm size and intangible assets are positive and statistically significant in columns (1) and (3).

Additionally, in terms of the control variables, the coefficient of intangible assets is positive and statistically significant, whereas the coefficients of home concentration is negative and statistically significant in all four columns. The coefficients of the rest of the control variables namely firm age, firm size, leverage, GDP and inflation are not statistically significant in all four columns.

Insert Table 3 about here

4.3 Further Analysis

4.3.1 SME Versus Larger Firms

The existing literature argues that SMEs are not miniatures of large firms (Curran & Blackburn, 2001), and that SMEs are different species from large firms (Penrose, 1995; Afrifa and Tauringana, 2015). Therefore, their internationalization experiences are expected to be different from large firms (Love et al., 2016). Internationalization comes with challenges and opportunities (De et al., 2012; Casillas et al., 2015), which may be different between SMEs and large firms. In fact, Ruzier et al., (2006) states that the theories used in explaining large firms' internationalization may not be appropriate for SMEs. As a result, many researchers have put forward different theories to explain SMEs' internationalization (Saarenketo et al., 2004; Graves & Thomas, 2008; Mejri & Umemoto,

2010). Consequently, our study seeks to make this distinction in the analyses. Following the European Commission's recommendation 2003/361/CE of 6th May 2003, on the definition of SMEs studies, firms in our sample are classified as SMEs if they met the following criteria:

- Turnover less than €50 million
- Possession of less than €43 million of total assets
- Employees fewer than 250 persons

We divided our sample into two: large and SME-firm groups. The classification of firms into these two groups is based on the FAME database classification.

Insert Table 4 about here

This section examines the possible differences between large firms and SMEs in terms of the relationship between FGS and firm performance, and the related moderations of firm R&D and host-country innovation. The results are presented in Table 4 with the first four columns focusing on larger firms, while the last four columns focus on SMEs. The results in columns (1) and (5) show a concave relationship between FGS and firm performance for both large firms and SMEs. However, the coefficients of FGS and their square are greater in magnitude for large firms than their SME counterparts. This indicates that at lower levels of geographic scope, larger firms enjoy higher firm performance.

However, at high FGS, the decrease in performance is also greater in larger firms than SMEs. The results of the moderation effect of firm R&D in columns (2) and (6) show a convex relationship between geographic scope and firm performance for both larger firms and SMEs. However, the magnitude of the coefficients of *Geographic scopeXR&D* and *Geographic scope squaredXR&D* are higher for large firms than SMEs. These results suggest that, compared with SMEs, as R&D

expenditure increases, geographic scope performance is abysmal at lower levels for large firms, but performance increases as geographic scope increases. In terms of the moderation effect of host-country innovation on the relationship between FGS and firm performance, the results in columns (3) and (7) show no statistically significant difference between large firms and SMEs. This indicates that host-country innovation impact on UK service companies' performance is indifferent between large firms and SMEs. The results in columns (4) and (8), which examine the moderation impact of firm R&D and host-country innovation on the relationship between FGS and firm performance, show significant difference between large firms and SMEs. Specifically, the results show a convex relationship between FGS and firm performance in the presence of firm R&D and host-country innovation. However, the coefficient of the large firms is much greater than the SMEs. These results suggest that, in the presence of firm R&D and host-country innovation, large firms experience lower performance at low geographic scope but enjoy higher performance at high geographic scope.

Regarding the control variables, the coefficients of firm size and intangible assets are positive and statistically significant in the first four columns which relate to large firms but not significant under SME firm in the last four columns. The coefficient of home concentration is negative and statistically significant in all columns, except for column (3). The coefficients of the rest of the control variables namely firm age, leverage, GDP and inflation are not statistically significant in all columns.

4.3.2 Public versus Private Firms

Previous studies have examined differences between private and public firms in areas such as cash management (Gao et al., 2013), investment policies (Asker et al., 2015), trade credit use (Abdulla et al., 2017) and investment opportunities (Mortal & Reisel, 2013). In relation to this area of research, Amighini et al., (2013) examined the differences in internationalization of Chinese private and public firms for the period from 2003 to 2008 and found sharp differences of internationalization motives between private and public Chinese firms. Their findings show that, compared with public firms, Chinese private firms are more attracted to large markets and host-country strategic assets but

averse to economic and political risk. Public firms tend to be large (Abdulla et al., 2017), with easy access to external finance (Sutherland & Ning, 2011; Abdulla et al., 2017). In effect, public firms may have better FGS performance because of their financial resource base. Our study seeks to highlight any differences in the results due to the type of firm ownership and so makes distinctions between private and publicly owned firms in the analyses. We divided our sample into two: private and public firm groups. The classification of firms into these two groups is based on the FAME database classification.

We add to existing literature by examining the relationship between geographic scope and performance in this section, and the possible moderation impact of firm R&D and host country innovation. The results are presented in Table 5. The first four columns focus on private firms, while the last four columns focus on public firms. The results in columns (1) and (5) show a concave relationship between FGS and firm performance for both private and public firms. However, the coefficients of geographic scope and its square are greater in magnitude for public firms than their private counterparts. This indicates that at lower levels of FGS, public firms enjoy higher firm performance; however, at high FGS, the decrease in performance is greater in public firms than private firms.

Insert Table 5 about here

The results of the moderation effect of firm R&D in columns (2) and (6) show a convex relationship between FGS and firm performance for both private and public firms. However, the magnitude of the coefficients of *Geographic scopeXR&D* and *Geographic scope squaredXR&D* are high for public firms. These results suggest that, as R&D expenditure increases, the decrease in performance from lower FGS is higher for public firms than private firms; whereas the increase in performance becomes higher for public firms at high levels of FGS. The results of the moderation effect of host-country innovation on the relationship between geographic scope and firm performance are

presented in columns (3) and (7). The results show no statistically significant difference between private and public firms because the coefficients of Geographic *scopeXR&D* and *Geographic scope squaredXR&D* are not statistically significant for both private and public firms. The results in columns (4) and (8), which examine the moderation impact of firm R&D and host-country innovation on the relationship between FGS and firm performance, show significant difference between private and public firms. Specifically, the results show a convex relationship between geographic scope and firm performance in the presence of firm R&D and host-country innovation. However, the coefficient of the public firms is much greater than the private firms. These results suggest that, in the presence of firm R&D and host-country innovation, public firms experience lower performance at low FGS but enjoy higher performance at high FGS.

Regarding the control variables, the coefficients of intangible assets and leverage are significantly positive and negative, respectively in the first four columns which relate to private firms but not significant for public firms in the last four columns. The coefficient of home concentration is negative and statistically significant only in columns (1) to (4) and (6). The coefficients of the rest of the control variables namely firm age, firm size, GDP and inflation are not statistically significant in all columns.

4.4 Robustness Test

This provides an alternative measure of firm performance using return on sales.

Insert Table 6 about here

To test the robustness of our main results in Table 3, in this section we employ an alternative measure of firm performance – return on sales (ROS). Similar studies have also used this ROS as a performance measure (see Capar & Kotabe, 2003). The results which are presented in Table 6 show qualitatively similar results as those contained in Table 3 above. More specifically, there is a concave relationship between FGS and ROS in column (1). In column (2), the moderation of firm R&D

changes the association to a convex one, but the moderation of host-country innovation does not produce any significant results in column (3). Finally, the results in column (4) show a convex relationship after the moderation of firm R&D and host-country innovation. These suggest that our main results in Table 3 are robust as an alternative measure of firm performance.

Regarding the control variables, the coefficient of firm size is positive and statistically significant, whereas the coefficients of leverage and home concentration are negative and statistically significant in all four columns. The coefficients of the rest of the control variables namely firm age, intangible assets, GDP and inflation are not statistically significant in all four columns.

5. CONCLUSION AND IMPLICATIONS

In this study we sought to provide deeper understanding of the effects of geographic scope, host-country-level innovation activities and firm-R&D intensity on firm financial performance for international service firms in the UK. We utilized data on 339 UK service companies from 2011 to 2017 and found that service companies that increase their R&D expenditure achieve a higher performance in foreign markets. An important finding to emerge from the test is that the relationship between the two becomes convex but the foreign country's innovation does not affect service companies' performance in the UK.

Taken together, our analyses imply a concave association between FGS and firm performance for both private and public firms. We observed that at lower levels of FGS, public firms enjoy higher firm performance. In addition, at high FGS, the decrease in performance is greater in public firms than private firms. For public firms, this suggests a possible mismatch between level of resources, expertise and managerial attention in line with FGS, which creates conditions for performance to dwindle. The shift from lower FGS to higher FGS has not been accompanied by necessary firm-level resources.

Our findings also indicate that foreign-country innovation is more valuable for firms with higher R&D expenditure. An increase in R&D expenditure is associated with higher performance from FGS. Accompanying greater R&D expenditure is more resources devoted towards improving service performance, customization and localization of services, thereby enhancing firms' competitiveness irrespective of number of markets. Our results show that higher R&D expenditure coupled with lower levels of geographic scope leads to lower overall firm performance, whereas a higher geographic scope results in higher performance. A possible salient explanation for this is that by spreading a firm's activities across multiple geographic scopes, firms are able to spread the risk of their investments and are more likely to benefit from cross-subsidization and cross-fertilization of knowledge across markets.

Theoretically, our study provides additional insight into the extent to which institutions (host-country-innovation activities) matter for service companies. Specifically, we shed new light on the stage at which any benefits accrued fade off for some firms. The results also provide very useful input for scholarly works seeking better explanations of institutional effects. Taken together, we contribute to the ongoing debate in international business and strategy on whether and the extent to which institutional context matters or impacts on internationalizing firms (Jackson & Deeg, 2008; Peng, 2002; van Hoorn & Maseland, 2016) and regional development (Rodríguez-Pose, 2013). In addition, in spite of the surge in research on internationalization of service companies (Coviello & Martin, 1999), the issue of effects of host country-level-innovation activities has received limited research attention. This study adds to the current literature on internationalization (Contractor, Kundu & Hsu, 2003) by exploring the effects of host countries on UK companies.

From a practical standpoint, given that countries with higher levels of innovation activities tend to be developed nations with robust infrastructures that support higher education and research, there is a need for nations seeking to elevate their innovation activities to invest in well-developed education systems, robust legal environments and protection of intellectual property to create the conducive

environment for R&D activities to thrive. In addition, our study illustrates the importance of host-country-level innovation activities to not only home-country firms but also foreign firms. The analysis indicates that this can have positive effects on the performance of foreign firms that invest in R&D. This suggests that firms with higher R&D expenditure are better able to acquire scarce market and service knowledge, which buttress their ability to compete in foreign markets and deliver performance improvement.

5. 1 Limitations and Directions for Future Research

There are some important limitations of the study worth considering. First, given that industrialized nations are mainly characterized by a fundamental shift from manufacturing to service economy with thriving service economies, the findings might not be generalized to the manufacturing sector where the key source of market advantage might be on functionality of products rather than service quality. Thus, the result might not be replicable in the manufacturing sector. Future studies could focus on the manufacturing and other industries. Another limitation worth acknowledging is that our study covered a limited period from 2011 to 2017. This is far too limited to provide a more in-depth chronology on the issue. A line of future research might seek to drill down the results by looking at different categories of services such as financial, transport, insurance and construction services over several decades. Another issue for future research to address is a need for a systematic analysis of how different sectors are impacted by host-country-level innovation activities. It might be that there are some sectors where firms are better able to turn both host-country advantages and constraints into advantages. There is also a need for comparative analysis of multiple developed-countries' service firms' performance in different institutional settings of developed and other developing countries. Despite recent research interest and important insights offered here, more work is needed to better account for stages and conditions at which host-country effects fade off for some firms.

REFERENCES

Abdi, M., & Aulakh, P. S. (2018). Internationalization and performance: Degree, duration, and scale of operations. *Journal of International Business Studies* 49(7), 832-857.

Abdulla, Y., Dang, V.A., & Khurshed, A. (2017). Stock market listing and the use of trade credit: Evidence from public and private firms. *Journal of Corporate Finance*, *46*, 391-410.

Acs, Z. J., Audretsch, D. B., Lehmann, E. E., & Licht, G. (2017). National systems of innovation. *Journal of Technology Transfer*, 42(5), 997-1008.

Afuah, A. (2009). *Strategic Innovation: New Game Business Models for Competitive Advantage*. Routledge: New York.

Alegre, J., & Chiva, R. (2008). Assessing the impact of organizational learning capability on product innovation performance: An empirical test. *Technovation*, 28(6), 315–326.

Allison, P. D. (2009). *Fixed effects regression models*, SAGE publications.

Alnuaimi, T., Singh, J., & George, G. (2012). Not with my own: Long-term effects of cross-country collaboration on subsidiary innovation in emerging economies versus advanced economies. *Journal of Economic Geography*, *12*(5), 943-968.

Amankwah-Amoah, J. (2021). COVID-19 pandemic and innovation activities in the global airline industry: A review. *Environment International*, *156*, 106719.

Amankwah-Amoah, J., & Debrah, Y.A. (2017). Toward a construct of liability of origin. *Industrial and Corporate Change*, *26*(2), 211-231.

Amankwah-Amoah, J., Debrah, Y.A., Yu, W., Lin, Z., Danso, A., & Adomako, S. (2021a). Technology strategies in emerging economies: Emerging issues, challenges and new research agenda. *Technological Forecasting and Social Change*, 170, 120881.

Amankwah-Amoah, J., Khan, Z., Wood, G., & Knight, G. (2021b). COVID-19 and digitalization: The great acceleration. *Journal of Business Research*, *136*, 602-611.

Amighini, A. A., Rabellotti, R., & Sanfilippo, M. (2013). Do Chinese state-owned and private enterprises differ in their internationalization strategies? *China Economic Review*, *27*, 312-325.

Anand, J., McDermott, G., Mudambi, R., & Narula, R. (2021). Innovation in and from emerging economies: New insights and lessons for international business research. *Journal of International Business Studies* (2021) 52, 545–559

Ang, S. H. (2017). International diversification: A "quick fix" for pressures in company performance? *University of Aukland Business Review* 9(1).

Asker, J., Farre-Mensa, J., & Ljungqvist, A. (2014). Corporate investment and stock market listing: A puzzle? *The Review of Financial Studies*, *28*(2), 342-390.

Asmussen, C. G. (2009). Local, regional, or global? Quantifying MNE geographic scope. *Journal of International Business Studies* 40(7), 1192-1205.

Atuahene-Gima, K. (2005). Resolving the capability—rigidity paradox in new product innovation. Journal of marketing, 69(4), 61-83.

Atuahene-Gima, K., & Evangelista, F. (2000). Cross-functional influence in new product development: an exploratory study of marketing and R… D perspectives. Management science, 46(10), 1269-1284.

Audretsch, D. B., & Feldman, M. P. (1996). R&D spillovers and the geography of innovation and production. *American economic review*, 86(3), 630-640.

Balachandra, R., Friar, J.H., 1997. Factors for success in R&D projects and new product innovation: a contextual framework. *IEEE Transactions on Engineering Management* 44 (3), 276–287.

Balzat, M., & H. Hanusch (2004). Recent trends in the research on national innovation systems. *Journal of Evolutionary Economics* 14(2), 197-210.

Bausch, A., & M. Krist (2007). The effect of context-related moderators on the internationalization-performance relationship: Evidence from meta-analysis. *Management International Review* 47(3), 319-347.

Booltink, L. W. A., & Saka-Helmhout, A. (2018). The effects of R&D intensity and internationalization on the performance of non-high-tech SMEs. *International Small Business Journal*, *36*(1), 81–103.
Brock, D. M., Yaffe, T., & Dembovsky, M. (2006). International diversification and performance: A study of global law firms. Journal of International Management, 12(4), 473–489.
Buckley, P. J., Munjal, S., Enderwick, P., & Forsans, N. (2016). Cross-border acquisitions by Indian multinationals: Asset exploitation or asset augmentation? 25(4), 986-996
Capar, N., & Kotabe, M. (2003). The relationship between international diversification and performance in service firms. *Journal of international business studies*, *34*(4), 345-355.
Casillas, J. C., Barbero, J. L., & Sapienza, H. J. (2015). Knowledge acquisition, learning, and the initial pace of internationalization. *International Business Review*, *24*(1), 102-114.
Castellani, D., Narula, R., Nguyen, Q. T., Surdu, I., & Walker, J. T. (Eds.). (2018). Contemporary Issues in International Business: Institutions, Strategy and Performance. Springer.
Cavusgil, S.T., Knight, G.A., & Riesenberger, J.R. (2020). International business: The new realities, (5th ed.) Pearson Prentice Hall, Upper Saddle River, NJ.Chan Kim, W., Hwang, P., & Burgers, W. P. (1989). Global diversification strategy and corporate profit performance. *Strategic Management Journal*, 10(1), 45-57.
Chan, C. M., Isobe, T., & Makino, S. (2008). Which country matters? Institutional development and foreign affiliate performance. *Strategic Management Journal*, 29(11), 1179-1205.
Contractor, F. J., Kundu, S. K., & Hsu, C. C. (2003). A three-stage theory of international expansion: The link between multinationality and performance in the service sector. *Journal of international business studies*, 34(1), 5-18.
Coviello, N. E., & Martin, K.A.M. (1999). Internationalization of service SMEs: an integrated perspective from the engineering consulting sector. *Journal of International Marketing*, 42-66.
Cuervo-Cazurra, A., Maloney, M. M., & Manrakhan, S. (2007). Causes of the difficulties in internationalization. *Journal of International Business Studies*, *38*(5), 709-725.
Cuervo-Cazurra, A., Mudambi, R., & Pedersen, T. (2018). The boundaries of the firm in global strategy. *Global Strategy Journal*, *8*(2), 211-219.
Curran, J., & Blackburn, A. (2001). *Researching the Small Enterprise*. London: Sage.
Daniels, J. D., & J. Bracker (1989). Profit performance: do foreign operations make a difference?" *Management International Review*: 46-56.
Danquah, M., & Amankwah-Amoah, J. (2017). Assessing the relationships between human capital, innovation and technology adoption: Evidence from sub-Saharan Africa. *Technological Forecasting and Social Change*, *122*, 24-33.
Darawong, C. (2018). Dynamic capabilities of new product development teams in performing radical innovation projects. International Journal of Innovation Science. 10 (3), 333-349.
Denis, D. J., Denis, D. K., & Yost, K. (2002). Global diversification, industrial diversification, and firm value. J*ournal of Finance*, 57(5), 1951-1979.
Dodgson, M., Gann, D. M., & Salter, A. (2008). *The management of technological innovation: strategy and practice*. Oxford University Press.
Edquist, C., & Hommen, L. (1999). Systems of innovation: theory and policy for the demand side. Technology in society, 21(1), 63-79.
Eggert, A., Thiesbrummel, C., & Deutscher, C. (2015). Heading for new shores: Do service and hybrid innovations outperform product innovations in industrial companies? *Industrial Marketing Management*, 45, 173-183.
Ehie, I. C., & K. Olibe (2010). The effect of R&D investment on firm value: An examination of US manufacturing and service industries. *International Journal of Production Economics* 128(1), 127-135.
Einola, S., Kohtamäki, M., Parida, V., & Wincent, J. (2017). Retrospective relational sensemaking in R&D offshoring. *Industrial Marketing Management*, 63, 205-216.

Eng, T.-Y., & S. Ozdemir (2014). International R&D partnerships and intrafirm R&D–marketing–production integration of manufacturing firms in emerging economies. *Industrial Marketing Management* 43(1), 32-44.

Ettlie, J. E. (1998). R&D and global manufacturing performance. Management Science, 44(1), 1-11.

Falk, M. (2006). What drives business Research and Development (R&D) intensity across Organisation for Economic Co-operation and Development (OECD) countries?" *Applied Economics* 38(5), 533-547.

Falk, M. (2012). Quantile estimates of the impact of R&D intensity on firm performance. *Small Business Economics* 39(1), 19-37.

Feldman, M. P. (1993). An examination of the geography of innovation. *Industrial and Corporate Change*, 2(3), 451-470.

Gomes, L., & K. Ramaswamy (1999). An Empirical Examination of the Form of the Relationship Between Multinationality and Performance. *Journal of International Business Studies* 30(1), 173-187.

Götz, G., & J. Ederington (2017). *Leapfrogging: Time of entry and firm productivity* (No. 11-2018). Joint Discussion Paper Series in Economics.

Grant, R. M. (1987). Multinationality and performance among British manufacturing companies. Journal of International Business Studies 18(3), 79-89.

Graves, C., & Thomas, J. (2008). Determinants of the internationalization pathways of family firms: An examination of family influence. *Family Business Review*, *21*(2), 151-167.

Griliches, Z. (1991). The search for R&D spillovers, National Bureau of Economic Research.

Gui-long, Z., Yi, Z., Kai-hua, C., & Jiang, Y. (2017). The impact of R&D intensity on firm performance in an emerging market: Evidence from China's electronics manufacturing firms. *Asian Journal of Technology Innovation*, *25*(1), 41-60.

Hall, B. H., & J. Mairesse (1995). Exploring the relationship between R&D and productivity in French manufacturing firms. *Journal of Econometrics* 65(1), 263-293.

Hausman, A. (2005). Innovativeness among small businesses: Theory and propositions for future research. *Industrial Marketing Management* 34(8), 773-782.

Hill, C. W.L., &. Hult, G.T.M. (2018). *Global Business Today*, 10th Edition, McGraw-Hill.

Hitt, M. A., Hoskisson, R. E., & Kim, H. (1997). International diversification: Effects on innovation and firm performance in product-diversified firms. *Academy of Management journal*, 40(4), 767-798.

Hsu, C.-C., & A. Pereira (2008). Internationalization and performance: The moderating effects of organizational learning. Omega 36(2), 188-205.

Hsu, W. T., Chen, H. L., & Cheng, C. Y. (2013). Internationalization and firm performance of SMEs: The moderating effects of CEO attributes. *Journal of World Business*, 48(1), 1-12.

Hufbauer, G. (1970). The impact of national characteristics & technology on the commodity composition of trade in manufactured goods. The technology factor in international trade, *NBER*: 145-231.

Jackson, G., & Deeg, R. (2008). Comparing capitalisms: Understanding institutional diversity and its implications for international business. *Journal of International Business Studies*, 39(4), 540-561.

Jain, N. K., & Prakash, P. (2016). Multinationality and performance: The moderating influence of internationalization motives and resources. *International Studies of Management & Organization*, 46(1), 35–49.

Kazlauskaitė, R., Autio, E., Gelbūda, M., & Šarapovas, T. (2015). The resource-based view and SME internationalisation: An emerging economy perspective. *Resource*, *3*(2).

Kim, H., Hoskisson, R. E., & Lee, S. H. (2015). Why strategic factor markets matter: "New" multinationals' geographic diversification and firm profitability. Strategic Management Journal, 36(4), 518-536.

Kotabe, M. (1990). The relationship between offshore sourcing and innovativeness of US multinational firms: An empirical investigation. *Journal of International Business Studies* 21(4), 623-638.

Kotabe, M., Srinivasan, S. S., & Aulakh, P. S. (2002). Multinationality and firm performance: The moderating role of R&D and marketing capabilities. *Journal of international business studies*, *33*(1), 79-97.

Kovach, J. J., Hora, M., Manikas, A., & Patel, P. C. (2015). Firm performance in dynamic environments: The role of operational slack and operational scope. Journal of Operations Management, 37, 1-12.

Leal-Rodríguez, A. L., Ariza-Montes, J. A., Roldán, J. L., & Leal-Millán, A. G. (2014). Absorptive capacity, innovation and cultural barriers: A conditional mediation model. *Journal of Business Research*, 67(5), 763-768.

Li, H., & Atuahene-Gima, K. (2001). Product innovation strategy and the performance of new technology ventures in China. Academy of management Journal, 44(6), 1123-1134.

Liu, J., Lu, K., & Cheng, S. (2018). International R&D Spillovers and Innovation Efficiency. Sustainability, 10(11), 3974.

Lundvall, B. Å. (2007). National Innovation Systems—Analytical Concept and Development Tool. Industry and Innovation 14(1), 95-119.

Mansfield, E. (1981). Composition of R and D expenditures: relationship to size of firm, concentration, and innovative output. Review of Economics and Statistics: 610-615.

Mejri, K., & Umemoto, K. (2010). Small-and medium-sized enterprise internationalization: Towards the knowledge-based model. *Journal of International Entrepreneurship*, *8*(2), 156-167.

Mohr, A., & Batsakis, G. (2017). Internationalization speed and firm performance: A study of the market-seeking expansion of retail MNEs. *Management International Review*, *57*(2), 153-177.

Morrison, J. (2002). *The international business environment: diversity and the global economy*, Palgrave Basingstoke.

Mortal, S., & Reisel, N. (2013). Capital allocation by public and private firms. *Journal of Financial and Quantitative Analysis*, *48*(1), 77-103.

Mudambi, R. (2008). Location, control and innovation in knowledge-intensive industries. *Journal of economic Geography*, *8*(5), 699-725.

OECD (2012). Main Science and Technology Indicators, Available at: http://www.oecd.org/sti/msti.htm.

Oh, C. H., Sohl, T., & Rugman, A. M. (2015). Regional and product diversification and the performance of retail multinationals. *Journal of International Management*, *21*(3), 220-234.

Osawa, Y., & Y. Yamasaki (2005). Proposal of industrial research and development performance indices. *R&D Management* 35(4), 455-461.

Peng, M. W. (2002). Towards an institution-based view of business strategy. *Asia Pacific Journal of Management*, 19(2-3), 251-267.

Peng, M. W. (2017). Global Business, 4th edition. Boston: Cengage Learning

Penrose, E.T. 1995. *The Theory of the Growth of the Firm*. 3rd edn ed. Oxford, Oxford University Press.

Perlmutter, H. V. (2017). The tortuous evolution of the multinational corporation. International Business, Routledge: 117-126.

Pires, C. P., Sarkar, S., & Carvalho, L. (2008). Innovation in services–how different from manufacturing?. Service Industries Journal, 28(10), 1339-1356.

Qian, G., Khoury, T. A., Peng, M. W., & Qian, Z. (2010). The performance implications of intra- and inter-regional geographic diversification. *Strategic Management Journal*, 31(9), 1018-1030.

Randhawa, K., & Scerri, M. (2015). Service innovation: A review of the literature. The handbook of service innovation, 27-51.

Rodríguez-Pose, A. (2013). Do institutions matter for regional development? *Regional Studies*, 47(7), 1034-1047.

Rugman, A. M., & A. Verbeke (2008). A new perspective on the regional and global strategies of multinational services firms. *Management International Review* 48(4), 397-411.

Ruzzier, M., Hisrich, R. D., & Antoncic, B. (2006). SME internationalization research: past, present, and future. *Journal of small business and enterprise development*, *13*(4), 476-497.

Saarenketo, S., Puumalainen, K., Kuivalainen, O., & Kyläheiko, K. (2004). Dynamic knowledge-related learning processes in internationalizing high-tech SMEs. *International Journal of Production Economics*, *89*(3), 363-378.

Savrul, M., & A. Incekara (2015). The Effect of R&D Intensity on Innovation Performance: A Country Level Evaluation. *Procedia - Social and Behavioral Sciences* 210: 388-396.

Shin, J., Mendoza, X., Hawkins, M. A., & Choi, C. (2017). The relationship between multinationality and performance: Knowledge-intensive vs capital-intensive service micro-multinational enterprises. International Business Review, 26(5), 867–700.

Sutherland, D., & Ning, L. (2011). Exploring 'onward-journey' ODI strategies in China's private sector businesses. *Journal of Chinese Economic and Business Studies*, *9*(1), 43-65.

Tallman, S., & J. Li (1996). Effects of international diversity and product diversity on the performance of multinational firms. *Academy of Management Journal* 39(1), 179-196.

Tauringana, V., & Afrifa, G. (2013). The relative importance of working capital management and its components to SMEs' profitability. *Journal of Small Business and Enterprise Development*, *20*(3), 453-469.

Tsai, H.T. (2014). Moderators on international diversification of advanced emerging market firms. *Journal of Business Research*, *67*(6), 1243-1248.

van Hoorn, A., & Maseland, R. (2016). How institutions matter for international business: Institutional distance effects vs institutional profile effects. *Journal of International Business Studies*, 47(3), 374-381.

Wakelin, K. (2001). Productivity growth and R&D expenditure in UK manufacturing firms. *Research Policy* 30(7), 1079-1090.

Wang, C. H., Lu, Y. H., Huang, C. W., & Lee, J. Y. (2013). R&D, productivity, and market value: An empirical study from high-technology firms. *Omega*, 41(1), 143-155.

Woodside, A.G. (1995). Pricing an industrial technological innovation: A case study: What decision do you recommend: Skim? penetration?, or price parity with an older technology?" *Industrial Marketing Management 24*(3), 145-150.

Zhao, X., Zhao, K., & Deng, J. (2018), Geography still matters: Examine the role of location in online markets for foreign branded products. *Decision Sciences*. doi:10.1111/deci.12337.

Godfred Adjapong Afrifa
Kent Business School, University of Kent
Canterbury, CT2 7PE
Email: G.A.Afrifa@kent.ac.uk
Tel: +44 (0) 1227 824146

Joseph Amankwah-Amoah*
Kent Business School
University of Kent, Kent ME4 4TE
TEL: +44 (0) 1634 (88)8870
E-mail: J.Amankwah-Amoah@kent.ac.uk

Fred Yamoah
Birkbeck, University of London
London WC1E 7HX
Email: f.yamoah@bbk.ac.uk
Tel: +44 (0) 203 926 1551

Adolf Acquaye
Department of Mechanical and Industrial Engineering,
Rochester Institute of Technology, Dubai, United Arab Emirates
EMAIL: aaacad1@rit.edu

Johnny Syllias
Kent Business School
University of Kent, Kent ME4 4TE
johnjohnny615@gmail.com

Enoch Nii Boi Quaye
School of Accounting and Finance
University of Bristol
15-19 Tyndalls Park Road, Bristol, BS8 1PQ
email: enoch.quaye@bristol.ac.uk

Appendix 1

	2011		2012		2013		2014		2015		2016		2017	
	Mean	Freq.	Mean	Freq.	Mean	Freq.	Mean	Freq.	Mean	Freq.	Mean	Freq.	Mean	Freq.
Return on assets	0.125	326	0.122	326	0.125	328	0.12	328	0.120	330	0.117	336	0.12	340
Geographic scope	1.638	326	1.638	326	1.635	328	1.63	328	1.628	330	1.632	336	1.64	340
R&D	0.139	326	0.153	326	0.124	328	0.14	328	0.132	330	0.129	336	0.14	340
Country innovation	48.763	326	52.046	326	51.308	328	50.32	328	51.345	330	50.611	336	51.27	340
Firm age	75.640	326	76.388	326	77.485	328	78.36	328	79.302	330	79.919	336	81.16	340
Firm size	10.860	326	10.898	326	10.929	328	10.97	328	11.029	330	11.059	336	11.11	340
Intangibles	0.177	326	0.158	326	0.150	328	0.15	328	0.142	330	0.141	336	0.15	340
Leverage	0.127	326	0.129	326	0.129	328	0.13	328	0.130	330	0.130	336	0.13	340
Home concentration	0.620	326	0.614	326	0.617	328	0.63	328	0.628	330	0.621	336	0.61	340
SME dummy	0.445	326	0.448	326	0.448	328	0.45	328	0.452	330	0.446	336	0.44	340
Public dummy	0.242	326	0.239	326	0.238	328	0.24	328	0.236	330	0.232	336	0.23	340

Figure 1: Conceptual model

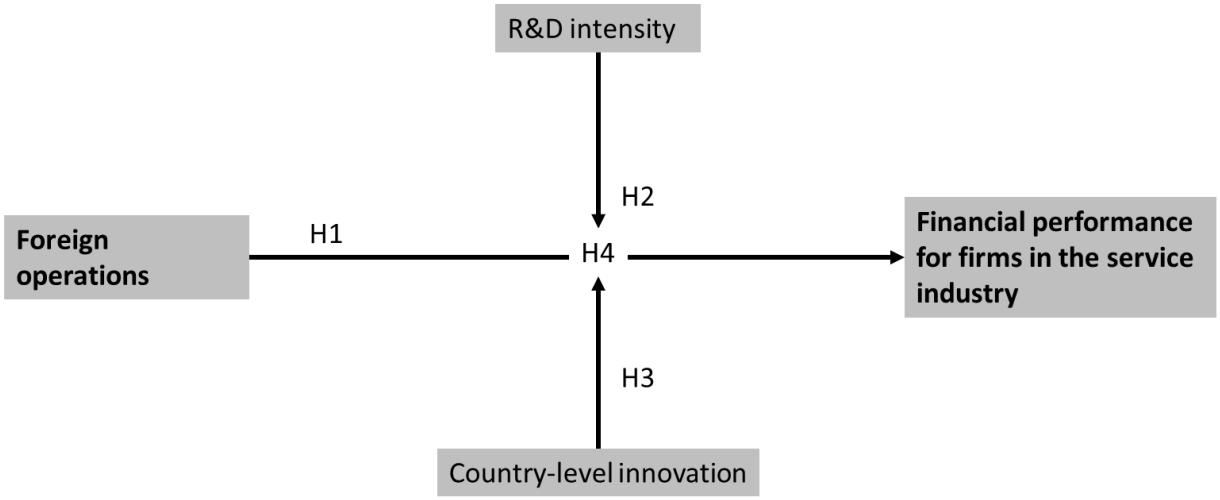

Figure 2: Highlights of countries and their geographic positioning hosting UK service firms used in the sample. Bubbles are scaled to the number of firms being hosted.

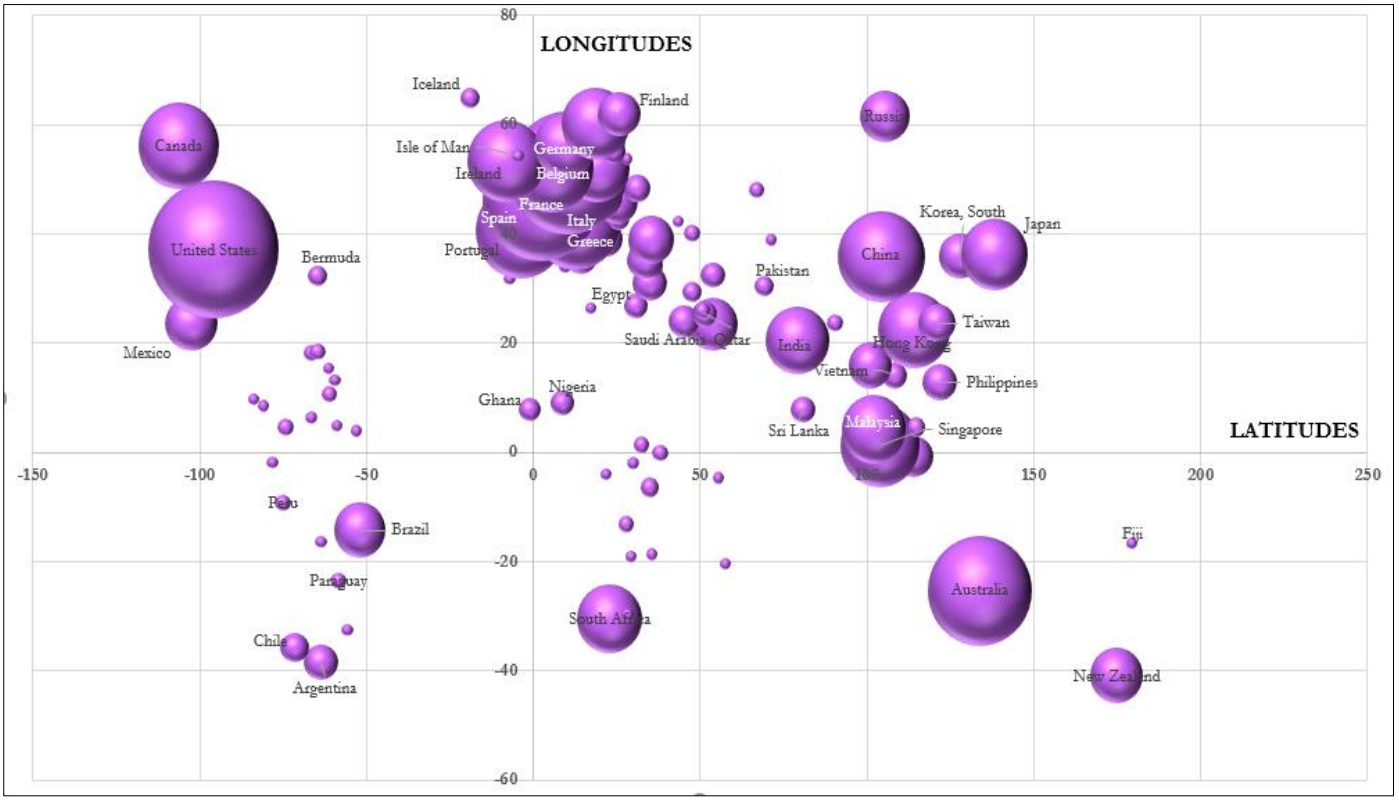

Figure 3: Host country Innovation Indices and their geographic positions

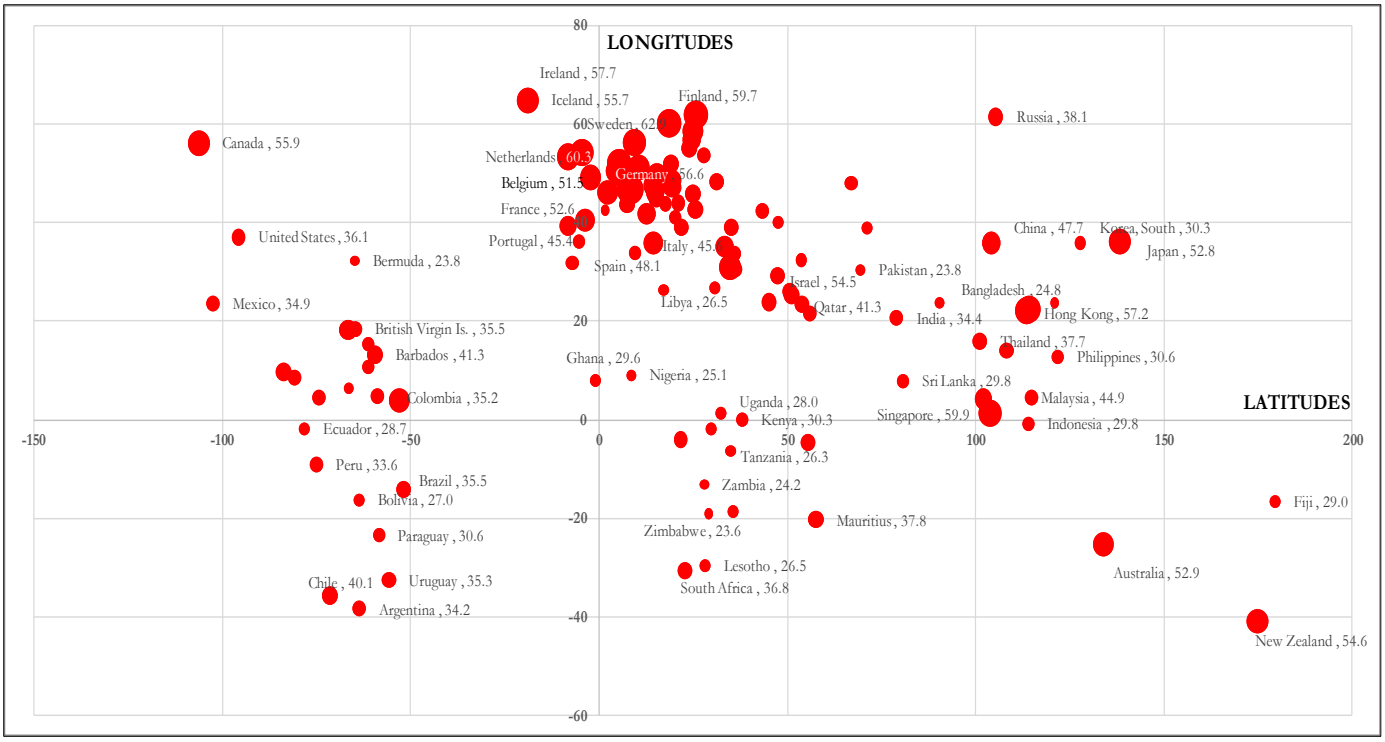

Table 1: Variable definitions

Variable	Description	Source
Dependent variables		
Return on assets	Profit before interest and taxation scaled by total assets	FAME database
Return on sales	Profit before interest and taxation scaled by total turnover	FAME database
Independent variables		
Geographic scope	The total number of foreign countries in which the company operates	FAME database
Moderating variables		
Firm level R&D	Total research and expenditure scaled by total assets	FAME database
Country level innovation	The sum of innovation index of foreign countries the company operates divided by the number of countries the company operates	The Global Economy database
Control variables		
Firm age	Number of years between incorporation and the calendar year end of each company.	FAME database
Firm size	Natural log of total assets of companies	FAME database
Intangible assets	Intangible assets scaled by total assets	FAME database
Leverage	Long-term debt scaled by total assets	FAME database
Country turnover concentration	National turnover scaled by total turnover	FAME database
Gross domestic product (GDP)	Annual growth of GDP	World Bank's World Development Indicators
Inflation	Annual inflation, GDP deflator	World Bank's World Development Indicators
Dummy variables		
SME	A dummy variables equals to 1 if the firm is classified as SMEs in the FAME database or zero otherwise	FAME database
Public	A dummy variables equals to 1 if the firm is classified as quoted on the LSE in the FAME database or zero otherwise	FAME database

Table 2. Descriptive statistics and correlation matrix

Variable	N	mean	S.D	1	2	3	4	5	6	7	8	9	10	11	12	13
Return on assets	2314	0.121	0.131	1												
Geographic scope	2314	1.634	1.112	0.254*	1											
R&D	2314	0.109	0.109	0.076*	0.017	1										
Country innovation	2314	50.813	11.609	0.158*	-0.183*	0.063*	1									
Firm age	2314	78.347	23.001	-0.029	-0.120*	0.060*	0.022	1								
Firm size	2314	10.981	1.464	0.137*	0.121*	-0.350*	-0.040	-0.109*	1							
Intangibles	2314	0.152	0.379	-0.043*	-0.014	0.439*	0.034	-0.056*	-0.245*	1						
Leverage	2314	0.129	0.042	-0.144*	0.043*	0.019	-0.148*	-0.096*	-0.073*	0.124*	1					
Home concentration	2314	0.62	0.315	-0.206*	0.008	0.107*	-0.117*	-0.026	-0.184*	0.078*	0.231*	1				
GDP	2314	2.259	2.363	-0.017	-0.002	-0.036	0.015	0.067*	0.047*	-0.026	0.010	0.005	1			
Inflation	2314	1.921	1.781	-0.004	0.002	0.005	-0.018	0.026	0.019	0.001	0.001	-0.009	0.270*	1		
SME dummy	2314	0.447	0.497	0.194*	-0.062*	0.437*	0.109*	0.074*	-0.471*	0.271*	-0.095*	0.052*	0.001	-0.005	1	
Public dummy	2314	0.236	0.425	0.123*	-0.067*	-0.080*	0.030	0.073*	0.337*	-0.139*	-0.135*	-0.187*	-0.007	-0.001	-0.171*	1

This Table presents the descriptive statistics and Pearson's correlation coefficients for the dependent and independent variables. All variables are as defined in Table 1. * indicates statistical significance at the 5%

Table 3: Foreign Geographic Scope (FGS) and firm performance

Variables	(1)	(2)	(3)	(4)
FGS	0.241***	0.271***	0.259***	0.269***
	(19.22)	(18.30)	(8.56)	(18.61)
FGS squared	-0.054***	-0.061***	-0.055***	-0.060***
	(-16.31)	(-15.68)	(-5.86)	(-15.77)
FGS x R&D		-0.278***		
		(-4.31)		
FGS squared x R&D		0.063***		
		(4.22)		
FGS x Country innovation			-0.000	
			(-0.48)	
FGS squared x Country innovation			-0.000	
			(-0.03)	
FGS x R&D x Country innovation				-0.005***
				(-4.13)
FGS squared x R&D x Country innovation				0.001***
				(3.82)
R&D	0.037**	0.217***	0.036**	0.188***
	(2.08)	(5.51)	(2.03)	(5.19)
Country level innovation	0.000**	0.000**	0.001*	0.000***
	(2.25)	(2.21)	(1.66)	(4.68)
Firm age	0.000	0.000	0.000	0.000
	(0.01)	(0.05)	(0.00)	(0.08)
Firm size	0.006	0.005	0.006	0.005
	(1.37)	(1.16)	(1.36)	(1.18)
Intangibles	0.015**	0.017**	0.015**	0.020**
	(2.05)	(2.08)	(2.05)	(2.47)
Leverage	-0.089	-0.088	-0.088	-0.090
	(-1.49)	(-1.47)	(-1.47)	(-1.49)
Home concentration	-0.045***	-0.046***	-0.044***	-0.046***
	(-2.85)	(-2.95)	(-2.81)	(-3.02)
GDP	-0.005	-0.005	-0.006	-0.005
	(-1.21)	(-1.16)	(-1.33)	(-1.22)
Inflation	0.004	0.003	0.003	0.004
	(0.34)	(0.31)	(0.33)	(0.38)
Constant	-0.099*	-0.108**	-0.137**	-0.123**
	(-1.80)	(-1.98)	(-2.24)	(-2.23)
Firm and year	Yes	Yes	Yes	Yes
Adjusted R-square	0.5077	0.5213	0.5153	0.5197
F-statistic	516.21***	614.61***	555.00***	620.22***
N	2314	2314	2314	2314

This Table presents the results of the relationship between FGS and firm performance. All regressions are run with robust standard errors to reduce heteroscedasticity. The dependent variable in all regressions is return on assets. All variables are as defined in Table 1. *Standard errors* are shown in parentheses. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 4: SME versus large firms

	Large firms				SME firms			
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FGS	0.263***	0.303***	0.251***	0.307***	0.227***	0.257***	0.194**	0.252***
	(20.64)	(14.98)	(10.94)	(15.45)	(13.86)	(12.50)	(2.48)	(12.20)
FGS squared	-0.058***	-0.069***	-0.052***	-0.070***	-0.051***	-0.057***	-0.045**	="-0.056
	(-17.43)	(-13.84)	(-6.35)	(-14.13)	(-10.39)	(-9.51)	(-2.23)	(-9.29)
FGS x R&D		-0.741***				-0.170***		
		(-2.65)				(-3.08)		
FGS squared x R&D		0.194***				0.037***		
		(2.95)				(2.77)		
FGS x Country innovation			0.000				0.001	
			(0.69)				(0.41)	
FGS squared x Country innovation			-0.000				-0.000	
			(-0.92)				(-0.22)	
FGS x R&D x Country innovation				-0.016***				-0.003***
				(-3.05)				(-2.74)
FGS squared x R&D x Country innovation				0.004***				0.001**
				(3.30)				(2.21)
R&D	0.046**	0.487***	0.045**	0.472***	0.003	0.121***	0.004	0.099***
	(2.16)	(2.92)	(2.10)	(3.45)	(0.10)	(3.24)	(0.10)	(2.90)
Country level innovation	0.000***	0.000***	0.000	0.001***	0.002**	0.002**	0.001	0.002***
	(4.53)	(4.19)	(1.20)	(2.93)	(2.30)	(2.32)	(1.26)	(2.70)
Firm age	-0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000
	(-1.60)	(-1.33)	(-1.53)	(-1.24)	(1.36)	(1.21)	(1.41)	(1.20)
Firm size	0.014***	0.016***	0.014***	0.015***	0.004	0.002	0.004	0.002
	(2.77)	(3.01)	(2.76)	(2.96)	(0.34)	(0.18)	(0.34)	(0.18)
Intangibles	0.046***	0.078***	0.046**	0.088***	0.004	0.004	0.004	0.005
	(2.61)	(3.27)	(2.57)	(3.40)	(0.50)	(0.46)	(0.48)	(0.60)
Leverage	-0.081	-0.076	-0.080	-0.094	-0.048	-0.040	-0.047	-0.040
	(-0.96)	(-0.90)	(-0.95)	(-1.10)	(-0.57)	(-0.49)	(-0.58)	(-0.49)
Home concentration	-0.041*	-0.040*	-0.041	-0.042*	-0.044***	-0.044***	-0.044***	-0.044***
	(-1.65)	(-1.69)	(-1.64)	(-1.85)	(-3.17)	(-3.20)	(-3.19)	(-3.19)

GDP	-0.005	-0.005	-0.006	-0.004	-0.006	-0.006	-0.005	-0.006
	(-0.87)	(-0.87)	(-0.98)	(-0.76)	(-0.81)	(-0.77)	(-0.79)	(-0.83)
Inflation	0.006	0.006	0.007	0.004	-0.009	-0.009	-0.010	-0.008
	(0.45)	(0.41)	(0.50)	(0.30)	(-0.55)	(-0.56)	(-0.61)	(-0.50)
Constant	-0.230***	-0.272***	-0.241***	-0.306***	-0.124	-0.124	-0.095	-0.137
	(-3.15)	(-3.60)	(-3.27)	(-3.80)	(-0.87)	(-0.87)	(-0.68)	(-0.97)
Firm and year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.6355	0.6520	0.6402	0.6514	0.5298	0.5378	0.5304	0.5367
F-statistic	678.97***	832.19***	739.69***	870.35***	334.96***	383.18***	345.26***	365.90***
N	1279	1279	1279	1279	1035	1035	1035	1035

This Table presents the results of the relationship between FGS and firm performance for SME and large firms separately. All regressions are run with robust standard errors to reduce heteroscedasticity. The dependent variable in all regressions is return on assets. All variables are as defined in Table 1. *Standard errors* are shown in parentheses. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 5: Listed firms versus unlisted firms

	Private firms				Public firms			
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FGS	0.223***	0.246***	0.245***	0.247***	0.287***	0.343***	0.331***	0.340***
	(16.81)	(15.29)	(9.95)	(15.64)	(10.25)	(10.67)	(3.62)	(10.78)
FGS squared	-0.051***	-0.056***	-0.056***	-0.057***	-0.056***	-0.069***	-0.064***	-0.068***
	(-15.73)	(-14.33)	(-7.06)	(-14.49)	(-6.53)	(-6.83)	(-2.62)	(-6.91)
FGS x R&D		-0.196***				-0.753**		
		(-3.10)				(-2.54)		
FGS squared x R&D		0.044***				0.166***		
		(3.04)				(2.60)		
FGS x Country innovation			-0.000				-0.001	
			(-0.86)				(-0.46)	
FGS squared x Country innovation			0.000				0.000	
			(0.49)				(0.25)	
FGS x R&D x Country innovation				-0.004***				-0.014**
				(-3.05)				(-2.51)
FGS squared x R&D x Country innovation				0.001***				0.003**
				(2.82)				(2.54)
R&D	0.050***	0.173***	0.050***	0.162***	0.005	0.565**	0.005	0.549**
	(2.66)	(5.49)	(2.63)	(5.45)	(0.09)	(2.22)	(0.08)	(2.27)
Country level innovation	0.000***	0.000***	0.001*	0.000***	0.002***	0.002***	0.003**	0.003***
	(3.04)	(2.94)	(1.73)	(4.48)	(2.88)	(2.87)	(2.45)	(3.60)
Firm age	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.89)	(0.86)	(0.88)	(0.89)	(-1.50)	(-1.43)	(-1.51)	(-1.37)
Firm size	0.009	0.007	0.009	0.007	-0.003	-0.002	-0.003	-0.002
	(1.43)	(1.16)	(1.43)	(1.16)	(-0.53)	(-0.31)	(-0.57)	(-0.33)
Intangibles	0.017**	0.019**	0.017**	0.022***	0.001	0.017	0.002	0.018
	(2.32)	(2.39)	(2.30)	(2.69)	(0.05)	(0.51)	(0.09)	(0.59)
Leverage	-0.140*	-0.143**	-0.139*	-0.146**	0.001	0.021	-0.000	0.020
	(-1.94)	(-1.98)	(-1.94)	(-2.00)	(0.01)	(0.36)	(-0.00)	(0.32)
Home concentration	-0.050***	-0.050***	-0.050**	-0.050***	-0.023	-0.028*	-0.023	-0.027
	(-2.59)	(-2.60)	(-2.56)	(-2.64)	(-1.36)	(-1.68)	(-1.36)	(-1.61)

GDP	-0.003	-0.003	-0.003	-0.003	-0.009*	-0.009	-0.009**	-0.009
	(-0.57)	(-0.56)	(-0.55)	(-0.61)	(-1.68)	(-1.63)	(-2.04)	(-1.59)
Inflation	-0.004	-0.004	-0.005	-0.003	0.012	0.011	0.012	0.011
	(-0.33)	(-0.29)	(-0.38)	(-0.22)	(0.94)	(0.87)	(1.05)	(0.84)
Constant	-0.121	-0.118	-0.146*	-0.130*	-0.144**	-0.195**	-0.181**	-0.245***
	(-1.56)	(-1.53)	(-1.81)	(-1.69)	(-1.97)	(-2.53)	(-2.25)	(-2.83)
Firm and year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R−square	0.5306	0.5427	0.5340	0.5432	0.5753	0.5879	0.5743	0.5893
F−statistic	411.53***	480.35***	457.25***	499.62***	224.51***	326.72***	282.99***	315.70***
N	1767	1767	1767	1767	547	547	547	547

This Table presents the results of the relationship between FGS and firm performance for public and private firms separately. All regressions are run with robust standard errors to reduce heteroscedasticity. The dependent variable in all regressions is return on assets. All variables are as defined in Table 1. *Standard errors* are shown in parentheses. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 6: Alternative measure of performance – return on sales

Variables	(1)	(2)	(3)	(4)
FGS	0.268***	0.375***	0.389***	0.345***
	(5.76)	(7.14)	(3.12)	(6.36)
FGS squared	-0.040***	-0.068***	-0.066**	-0.061***
	(-3.59)	(-5.18)	(-2.01)	(-4.52)
FGS x R&D		-1.016***		
		(-3.34)		
FGS squared x R&D		0.262***		
		(3.62)		
FGS x Country innovation			-0.002	
			(-1.00)	
FGS squared x Country innovation			0.001	
			(0.79)	
FGS x R&D x Country innovation				-0.015**
				(-2.27)
FGS squared x R&D x Country innovation				0.004**
				(2.54)
R&D	0.232*	0.831***	0.230*	0.617**
	(1.75)	(3.03)	(1.74)	(2.21)
Country level innovation	0.000**	0.000**	0.003	0.001**
	(2.19)	(2.16)	(1.19)	(2.43)
Firm age	-0.001	-0.001	-0.001	-0.001
	(-1.34)	(-1.41)	(-1.41)	(-1.39)
Firm size	-0.047***	-0.047***	-0.046***	-0.046***
	(-3.25)	(-3.50)	(-3.23)	(-3.39)
Intangibles	0.066	0.061	0.065	0.066
	(1.61)	(1.52)	(1.59)	(1.60)
Leverage	-1.822***	-1.793***	-1.820***	-1.805***
	(-5.04)	(-5.16)	(-5.05)	(-5.14)
Home concentration	-0.135***	-0.134***	-0.133***	-0.134***
	(-3.24)	(-3.28)	(-3.21)	(-3.30)
GDP	-0.012	-0.011	-0.011	-0.011
	(-1.00)	(-0.91)	(-0.93)	(-0.89)
Inflation	-0.001	-0.004	-0.006	-0.004
	(-0.05)	(-0.14)	(-0.20)	(-0.14)
Constant	0.871***	0.802***	0.730***	0.778***
	(4.66)	(4.57)	(3.26)	(4.25)
Firm and year	Yes	Yes	Yes	Yes
Adjusted R-square	0.2314	0.2600	0.2438	0.2562
F-statistic	213.87***	253.97***	226.87***	241.73***
N	2314	2314	2314	2314

This Table presents the results of the relationship between FGS and firm performance. All regressions are run with robust standard errors to reduce heteroscedasticity. The dependent variable in all regressions is return on sales. All variables are as defined in Table 1. *Standard errors* are shown in parentheses. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.