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Strategic Resource Decisions to Enhance the Performance of Global Engineering Services

Yufeng Zhang
Senior Lecturer in Operations Management, University of Birmingham

Zhibo Yang
Research Fellow, Henan Academy of Social Sciences

Tao Zhang
Lecturer in Marketing, University of Birmingham

Abstract- This paper extends our understanding of the internationalisation and firm performance (I-FP) relationship of service firms by considering the influence of strategic decisions on three types of slack resources. The research focusses on an important type of service operations - global engineering services, which are a major part of the global economy and represent a distinctive business model in the contemporary business environment. In doing so, we theorise the I-FP relationship by addressing the knowledge-intensive, project-based and people-centric features of engineering service firms (ESFs); and test the relationship with a carefully assembled dataset containing 12 years' data from 242 ESFs. We identify a negative overall I-FP relationship, i.e. ESFs' international expansion leads to worse financial performance in general. The presence of slack resources explains why such a result exists. Our findings have significant implications, both for future research on internationalisation and performance and for firms to effectively deploy their resources to support global service operations in a strategic manner.

Keywords: Internationalisation-Firm Performance (I-FP) Relationship, Strategic Resource Decisions, Engineering Services Firms (ESFs)

1. Introduction

Understanding the relationship between internationalisation and firm performance has been a key task for senior decision makers. The task is particularly challenging in global service operations because the existing theoretical insights which might help to frame the decision making practices are mainly drawn from a manufacturing-focussed empirical ground (Caper and Kotabe 2003; Contractor et al. 2007; Heineke and Davis 2007; Chase and Apte 2007; Harvey et al. 2016). However, service operations are substantially different from manufacturing in a number of distinctive features, e.g. heterogeneity, intangibility, perishability or inseparability (Løwendahl 2005; Greenwood et al., 2005; Lewis and Brown 2012; Karpen et al. 2012). Such different features of service operations may have significant implications for the relationship between their internationalisation and performance in ways that challenge the received wisdom as reflected in existing theories of internationalisation and firm performance (I-FP). It thus becomes a critical research task to understand the varying form of the I-FP relationship for service firms and eventually generate new knowledge to guide strategic decisions of global service operations in a sector-specific context.

While some important recent studies have made considerable progress in illustrating the features of service operations that may influence the I-FP relationship, there are still considerable unknown areas, both empirically and conceptually, regarding whether, how, why, and when internationalisation leads to improved firm performance (Contractor 2012; Marano et al. 2016; Miller et al. 2016; Powell 2014). Empirical research has generated very varied evidence (Contractor et al. 2003; Contractor 2012; Li 2007), which has prompted scholars to propose a range of contingencies in the relationship including the motives of internationalisation and the modes of internationalisation pursued (Contractor 2007; 2012), home and host country institutional influences (Berry et al. 2010), and the progress of developing institutional capabilities across borders (Carney et al. 2016). The highly ambiguous evidence-base has prompted scholars to propose increasingly refined conceptual models, especially those that pay increased attention to the roles of strategic decisions, such as those on geographic diversification (Wiersema and Bowen 2011), product diversification (Oh and Contractor 2012), learning approaches (Hsu et al. 2013), strategic alignment

(Powell 2014), international coherence (Celo and Chacar 2015), as well as international intensity, diversity and distance (Miller et al. 2016) in the I-FP relationship.

Within this context, we theorise that service firms' strategic decisions on slack resources, which have been widely considered as the key property enhancing the ability of an organisation to cope with challenges in the complex process of internationalisation (Cyert and March 1963; Nohria and Gulati 1996; Greenley and Oktemgil 1998; Mishina et al. 2004), are of critical importance for payoffs to their internationalisation. As pointed out by Bourgeois (1981, p30)- *"Slack [...] allows an organisation to adapt successfully to internal pressures for adjustment or to external pressures for change in policy, as well as to initiate changes in strategy with respect to the external environment."* Specifically, we proposed that the overall I-FP relationship for service firms are governed by the presence of three types of slack resources (Nohria and Gulati 1996; Mishina et al. 2004), i.e. absorbed slack human resources (AHR), other kinds of absorbed slack resources (OAR) and unabsorbed slack resources (USR). Albeit their obvious importance, such strategic resource decisions are very difficult to be made appropriately due to their complex implications in international service operations (Tan and Peng 2003; Daniel et al. 2004). On the one hand, service firms need a certain amount of slack resources to expand their service operations in global business networks. On the other hand, a high level of slack resources may lead to a low utilisation rate, thus threatening firm performance. In brief, we believe that it is theoretically valuable and practically useful to investigate the I-FP relationship for service firms in the global context with a particular attention to examining the influence of slack resources.

We in our investigations focus on a particular type of service operations - global engineering services, which are typically knowledge-intensive, project-based, and people-centric, representing a distinctive business model of professional service firms in general (Løwendahl 2005; Malhotra and Morris 2009; Von Nordenflycht 2010; Zhang et al. 2016). In doing so, we are able to generate theoretical insights potentially useful for a wider range of service firms which have attracted a growing research interest among IB scholars (Zhang et al. 2015; Bello et al. 2016; Shin et al. 2017). At the same time, the research focus itself has significant industrial implications. Global engineering services, as one of the largest professional service industries in the world, is an

important part of the contemporary global economy, directly contributing to GDP and employment and indirectly providing critical inputs for organisations creating high value products and services across sectors. ISG (2013) estimated the global spend on engineering services to be around US$930 billion in 2012, rising to US$1.4 trillion by 2020. In addition, this sector provides a fertile context in which to examine the I-FP relationship because internationalisation has been a major strategic focus in the sector in recent years as many engineering service firms (ESFs) have sought to grow and enhance their competitiveness on a global scale, driven by the rapid growth of the emerging economies (Fernandez-Stark et al. 2010), increasing engineering capabilities (and work force) in the developing countries, the global race for talent (Lewin et al. 2009) and opportunities made available by the progress of information technologies (Zhang et al. 2016).

To report our research in a more accessible manner, the next section of the paper sets out the state of knowledge regarding the I-FP relationship for service (and non-service) firms. We formulate a set of hypotheses to advance our understanding about the I-FP relationship for ESFs by addressing their knowledge-intensive, project-based and people-centric features. We subsequently introduce our research approach, before reporting our findings. We finally conclude this paper by discussing the main contributions and suggesting directions for future research.

2. The I-FP Relationship for Service Firms

In this section, we briefly review the state of knowledge regarding the relationship between internationalisation and firm performance, paying particular attention to a comparison between research focussing on manufacturing and service firms. Li (2007) provided a synthetic review of the I-FP theories. We updated his summary and produced the latest view of empirical studies on the I-FP relationship which consists of 56 studies in major IB journals based on their relevance to the topic as well as their contribution to the research method (see Appendix 1). Our update confirms that over the past four decades the I-FP relationship has been an important research issue in literature, which is reflected in a large and growing body of academic research, including a number of meta-analyses (e.g. Li 2007; Ruigrok and Wagner 2004; Geleilate et al. 2016), the latest and most comprehensive of which identifies 359 studies of the I-

FP relationship collectively encompassing 2.5 million firm-year observations (Marano et al. 2016). As mentioned earlier, the vast majority of the existing empirical I-FP studies were in the manufacturing sector. In a large number of empirical studies identified in our literature review, only 7 of them look into the service sector. These studies suggested five primary views about the I-FP relationship: (i) not significant, (ii) positive linear, (iii) negative linear, (iv) U-shaped and (v) inverted U-shaped. Our review indicates that such seemingly contradictory findings were caused by the different conceptualisation and measurement of the variables, the quality of data, and the methods adopted (see Appendix 1). Nevertheless, they provided rich and constructive insights for international expansions of manufacturing firms.

The dearth of research into the I-FP relationship of service firms has been continuingly reported. Contractor et al. (2003, p.9) claimed that *"although services are more important than manufacturing [justified by their shares of GDP worldwide], there is little research on the growth and internationalisation of service firms",* and Caper and Kotabe (2003, p.345) repeated the message by saying that *"a major gap in the literature has been the non-existence of studies that have examined the effect of international diversification on performance in service firms [although the relationship has been extensively investigated in manufacturing firms]."* The message was reinforced by Greenwood et al. (2007, p.661)- *"despite their [service firms'] significance, little is known of the determinants of their performance";* and Contractor et al. (2007, p.407) - *"it is ironic, therefore, that virtually all the empirical studies on performance versus internationalisation in the past 30 years have been in manufacturing".*

Having acknowledged this major gap and recognised the importance of the service sector in the global economy, a handful of studies examined the I-FP relationships of service firms (see Table 1, extracted from Appendix 1). These studies discussed the differences between service firms and manufacturing firms and argued for a different trajectory of internationalisation for service operations. Albeit that they provide a good start point for our research, there are major limitations to their findings due to the narrow time span and multiple service sectors covered in their datasets. Different kinds of services, for example knowledge-intensive and capital-intensive service firms (Shin et al. 2017), may operate very differently in international expansions. Studies aggregating data across multiple industries in general face more empirical obstacles (Delios and

Beamish 1999; Hennart 2007; Powell 2014). It is not ridiculously unreasonable to speculate that differences among the existent I-FP theories might result from the vast diversity of service firms in different operations settings. It is therefore more likely to advance our theoretical understanding of the I-FP relationship that might be influenced by strategic decisions among professional service firms (with ESFs as a typical example) that adopt a distinctive business model generally recognised by their knowledge-intensive, project-based and people-centric features (Løwendahl 2005; Zhang et al. 2016).

Table 1: Summary of empirical I-FP studies involving service firms

Empirical studies	Degree of Internationalisation (I)		Firm Performance (FP)		Sampling	Analytical method	Key moderator or control	Results (I-FP relationship)
	Dimensions	Measures	Types	Measures				
Capar and Kotabe (2003)	Single; sales-based	FSTS	Accounting based financial indicator	ROS	81 major German service firms in 4 industries (1997 to 1999)	OLS regression	Firm size; industrial effect	U curve
Contractor *et al.* (2003)	Single; index-based	3-component index (FSTS, foreign to total employees, ratio of foreign to total offices)	Accounting based financial indicators	ROS/ROA	103 largest service Companies from 11 industries (1983 to 1988)	Time series cross-sectional regression	Firm size; Industrial sector effect, and home country effect	Horizontal S-shaped curve (esp. the knowledge-intensive sub-sample)
Li (2005)	Single; sales-based	FSTS	Accounting-based financial indicator	ROS	574 American service firm (1997 to 2001)	Feasible GLS regression	Size; business diversity; capital intensity; market share; financial leverage; growth and downsize; industry control	Horizontal S-curve for the whole sample; Home region oriented strategy positively moderates I-FP relationship
Hitt et al. (2006)	Single; count-based	Entropy index based on number of foreign offices and number of lawyers	Self-reported and unaudited data from *American Lawyer*	ROS	72 largest US law firms (1992 to 1999)	GLS regression	Firm size; leverage; location in NYC; service diversification; domestic geographic dispersion; prior performance	Positive and inverted U curve; human capital positively moderates I-FP; Relational capital does not have a moderating effect on I-FP
Contractor et al. (2007)	Single; sales-based	FSTS	Accounting-based financial indicator	ROA; ROE; ROS; tested separately	269 Indian firms (142 manufacturing & 127 service firms in 4 industries, 1997 to 2011)	Two-stage GLS regression	Firm size; firm age; a dummy variable for industry sub-sectors	U curve; service firms gain the positive benefits sooner than manufacturing firms
Powell (2014)	Single; count-based	Count of host countries where a firm maintains offices in an observation year divided by the sample maximum number of host countries across all observation years.	Accounting-based financial indicator	Profits-Per-Partner (PPP); Revenue-Per-Lawyer (RPL); downside risk on PPP; downside risk on RPL	102 US largest law firms (1986 to 2008)	OLS regression	Firm age; firm size; ratio of associates to partners; international experience; environmental complexity etc.	S curve; firm-specific optimal levels of internationalisation exists so we need MA-P relationship.

Shin et al. (2017)	Single; count-based	The mean of two ratios (0 to 1): [the number of foreign affiliates/the max number in samples], and [the number of countries/the max number]	Accounting-based financial indicator	ROA, with robustness test of ROE	1082 Spanish micro service firms over an eight-year period 2005-2012	Feasible generalised least square regression	Firm age, Firm size, Indebtedness, Entry Mode	Inverted U-Shaped relationship for knowledge intensive micro service firms; U-shaped relationship for capital intensive micro service firms.

3. Distinctive Features of ESFs and Theoretical Development

We start our quest for an improved I-FP theory for service firms with a proper understanding of their distinctive features, beginning with ESFs that represent a knowledge-intensive, project-based, people-centric business model also adopted by a wider range of professional service firms. This allows us to assess their influences on the I-FP relationship, and thus possibly identifying additional theoretical constructs to reconcile contradictory views in literature.

3.1 Revisit the I-FP relationship for Service Firms

The knowledge-intensive feature has a positive influence on the I-FP relationship. First, effective value creation in professional service operations is primarily based on the application of knowledge (e.g. the know-how, skills, expertise and experience of professionals), as opposed to manufacturing where the use of equipment and special facility is usually predominant (Zhang et al. 2016). This allows service firms to easily expand their businesses in a different country without investing heavily in equipment or facility at the early stages. Service firms may then be able to avoid high upfront spending for international expansion and thus more likely having a better financial performance than manufacturing firms.

Second, service firms in general need to have some local resources due to the simultaneous production-consumption (i.e. inseparability and perishability) nature of service operations (Zhang and Zhang 2014). Contractor et al. (2003) distinguished between capital-intensive and knowledge-intensive service firms. EFSs as typical knowledge-intensive service firms, compared with capital-intensive service firms (e.g. hotels, restaurants or retailers), have more intangible resources and a much lower fixed cost burden. It is not necessary for them to invest heavily into local branches to serve customers; instead they can expatriate experienced engineers to deliver services or collaborate with local engineers. Various moderating effects of such industrial characters have been reported in Shin et al. (2017)' recent study on Spanish micro service firms.

Third, many countries have strict control over the extent of foreign involvement in their service industries, which results in a lower operations efficiency of foreign service firms (Capar and Kotabe 2003; Feketeluty 1988). This happens to many capital-intensive

service firms rather than knowledge-intensive service firms such as ESFs - many countries actually provide favourable policies and incentives to encourage foreign ESFs with global leading expertise to participate in important engineering projects. For example, the UK's high speed railway project HS2 welcomed international participation and attracted bids from more than 1000 ESFs from across the world. These favourable policies can have a positive effect on the performance of service firms.

For these reasons we would like to suggest the following hypothesis to kick off the investigation-

- **H1: A higher level of internationalisation generates better financial performance for ESFs.**

***The project-based feature will also influence the I-FP relationship*.** Professional service firms in general provide one-off solutions to address the particular need of a client instead of repeating production in a large volume as many manufacturers do. This may influence the I-FP relationship in a much complex manner. First, for many service firms (e.g. hotels or retailers) operating internationally, the revenues they gained from international markets are mainly from individual consumers. At the initial stage of foreign expansion their revenues are generally small - this implies a negative effect on their performance. However for ESFs, overseas engineering projects are usually large scale contracts of high monetary values. For example, the UK nuclear power plant contract is worth above £80 billion. The high value nature of international engineering projects can have a positive effect on the performance of ESFs at the initial stage of their foreign expansion.

Second, many foreign service firms have to adapt their service offerings extensively for local clients because of linguistic, cultural and institutional differences. This applies to capital-intensive service firms such as retailers and hotels as well as some knowledge-intensive service firms such as accounting and legal service firms. However, as engineering knowledge is culture-neutral thanks to the well-developed international standards for engineering procedures, specifications and outputs. ESFs are *"less prone to severe adaptation or cultural assimilation costs"* (Contractor et al. 2007), which may lead to a positive effect on their performance.

Third, engineering projects have to be client oriented with a high level of interaction, participation and customisation (Løwendahl 2005; Machuca et al. 2007), i.e. ESFs have to understand and adapt to clients' changing needs whilst collaborating on service provision. Major drivers for engineering task choice are often external, e.g. clients or collaborators, rather than solely based on the curiosity of an engineer or driven by an ESF's desire for discovery (Zhang et al. 2014). It is difficult to specify such tasks comprehensively and precisely at the outset of a complex engineering project. To produce a useful solution in an effective manner, ESFs increasingly depend on inputs from different technological disciplines and multiple collaborative organisations. Each project may involve a different set of collaborators to complete the planned tasks, e.g. sub-contractors, equipment providers, auditors or other third parties, for better proximity of and probably collocation at the project site. In addition, ESFs have to adapt their working methods effectively and respond quickly to changing contexts to solve unpredictable problems with limited resources and limited time available. As the result, from a long-term point of view ESFs have to cope with high uncertainty and complexity in international operations, including external changes from markets and customers, and internal changes from operational and technological aspects. This has a negative influence on the I-FP relationship due to a degree of operations uncertainty, and thus high cost for coordination and transaction (Williamson 1981). As the degree of internationalisation increases, coordination costs also increase. ESFs have to cope with more governance and coordination problems, which lead to high uncertainty and complexity in their international service operations. When ESFs' degree of internationalisation reaches a certain point their increased coordination costs will surpass gains from internationalisation (Galbraith and Kazanjian 1986). This rationale was well addressed also in Contractor et al. (2007), i.e. the stage 3 negative slope: internationalisation beyond an optimum level. We would therefore like to argue that the project-based feature of ESFs has a positive influence on the I-FP relationship at the initial stage and a negative influence on the I-FP relationship later.

The above reasoning suggests an inverted U-shaped curvilinear I-FP relationship for ESFs. As there are two opposite forces governing the relationship, an optimal level of internationalisation would exist. Before the degree of internationalisation reaches the optimal point, a positive slope exists; the performance then moves down as the degree

of internationalisation increases after the optimal point, making the slope negative. An alternative hypothesis to H1 has been formulated as following:

- **H1_alt: The relationship between internationalisation and the financial performance of ESFs is an inverted U-shape, with positive slope at low levels of internationalisation and negative slope at high levels of internationalisation.**

3.2 The influence of strategic resource decisions

We expect H1 to be supported by our data because there is a trend in reality for ESFs to grow their businesses on a global scale (Lewin et al. 2009; Fernandez-Stark et al. 2010; Zhang and Gregory 2011; Zhang et al. 2016). H1_alt might also be supported for considering that the trend is a fairly recent phenomenon, and that the knowledge-intensive and project-based features of ESFs will influence the I-FP relationship in various ways. But if both H1 and H1_alt were rejected, e.g. our data suggested a negative relationship between internationalisation and firm performance, we would face a fundamentally very interesting question - how on earth could ESFs expand their international businesses to get worse financial performance?

In order to answer this question, our proposition is to further investigate various approaches that ESFs deploy their resources to support international growth since the distinctive features of ESFs suggest significant differences in the composition and deployment of resources which may alter the fundamental I-FP relationship (Løwendahl 2005; Malhotra and Morris 2009; Lewis and Brown 2012; Zhang et al. 2016). The key is to understand whether it is the scarcity or abundance of slack resources that is most beneficial to the financial performance of ESFs (Bradley et al. 2011). Some scholars argued that in order to exploit opportunities for expansion, ESFs must have access to slack resources to buffer costs and risks incurred overseas due to greater managerial complexity and liability of foreignness (Pierce and Aguinis 2011; Tseng et al. 2007); while others held the opposite view which insists that slack resources could promote risk-taking activities and breed inefficiency (Tan and Peng 2003). Therefore it is critical to understand the moderating effect of slack resources on the I-FP relationship in the process of international expansion (Lin et al. 2009).

3.2.1 The moderating effect of absorbed slack human resources (AHR)

The people-centric feature may lead to various moderating effects through resource decisions (Lewis and Brown 2012; Zhang et al. 2016). The process of service provision and delivery is underpinned by the application of professionals' intangible knowledge to provide complex solutions customised to clients' needs. Clients cannot easily understand or accurately weight the engineering competence that involved in this process, and therefore have to rely on the professional judgement of ESFs. Human resources, i.e. well educated/trained professionals with in-depth knowledge about certain engineering discipline(s), are critical resources of ESFs. A close scrutiny on the influence of human resources is therefore necessary. Human resources, and particularly the absorbed slack human resources (AHR) that are specialised, rare and absorbed in engineering service operations, have been widely considered an important factor that facilitates the exploitation of business opportunities abroad (Westhead et al. 2001; Mishina et al. 2004). At the early stage of the internationalisation, because of lacking foreign operations experience ESFs need to deal with a certain level of liabilities of foreignness. ESFs need also to keep a certain level of AHR to buffer uncertainties or uncontrollable contingencies that could lead to lower performance in a foreign market. We posit that AHR can strengthen the I-FP relationship at the early stage of internationalisation based on the following theoretical arguments.

First, according to the replacement cost argument, when an ESF ample AHR, employee turnover will result in limited replacement costs for the firm; any resignation threat will not be considered as threatening, leading to lower bargaining power of the employees (Lal et al. 1999; Wang et al. 2013). Second, AHR are a kind of accumulated resources; thus the slack could be consistent with an ESF's international strategies. These firm-specific and path-dependent human resources are valuable for the firm because it is difficult for its competitors to obtain them, thus contributing to sustainable competitive advantages over its competitors (Mishina et al. 2004). Third, engineering service operations in a less predictable international environment requires an ESF to have highly skilled (and experienced) engineers who can secure the success of critical international projects. It normally takes many years for an engineer to gain necessary experiences, skills and capabilities. Thus it is often difficult for an ESF to recruit engineers with required skills in a short time to deal with emergent issues in an international environment; keeping a proper level of slack is a cost-effective means to handle emergent needs in relation to international engineering projects (Huang and

Hsueh 2007). Fourth, according to Wefald et al. (2010) ESFs with a certain level of AHR are able to reduce employee turnover because employees are not required to work excessive hours on a routine basis when new services are introduced or customer demands change. A proper level of slack will give engineers time, space, and necessary support to actively participate in learning and knowledge creation activities, which is critical in bidding for innovative engineering projects (Chen and Huang 2010) and improving international reputation (Glückler and Armbrüster 2003).

On the other hand, after a number of years' internationalisation ESFs would obtain useful experience to deal with uncertainties abroad. A high level of AHR would become an increasingly heavy burden for ESFs because of the high cost of keeping qualified professionals. Voss et al. (2008) argued that AHR are highly rigid and often embedded in organisations, thus are very sticky. Resource "stickiness" is the extent to which slack resources can be quickly and opportunistically utilised to boost business expansion (Mishina et al. 2004). Once sticky resources have been allocated, they cannot be easily utilised in other areas. This is particularly the case for ESFs, as Davenport (2005, p.10) pointed out *"they (engineers) have high degrees of expertise, education or experience and the primary purpose of their jobs involves the creation, distribution or application of knowledge"*. Engineering expertise and knowledge are typically domain-specific, therefore can hardly be applied to other domains. For example, chemical engineers can hardly do mechanical engineering work if the market demand shifts toward the latter type of engineering services. ESFs often recruit and develop engineers with specific disciplinary skills, e.g. electrical, mechanical or chemical skills. Their skills and knowledge tend to be embedded in some specific tasks so it is difficult to deploy these skills across different task situations (Szulanski 2003). Hence we posit that when internationalisation reaches a mature stage, the stickiness of AHR would have a negative effect on ESFs' performance. H2 is developed based on these arguments.

- **H2: Absorbed slack human resources (AHR) have an inverted U-shaped moderating effect on the relationship between internationalisation and ESFs' performance.**

3.2.2 The moderating effect of other kinds of absorbed slack resources (OAR)

Other kinds of absorbed slack resources (OAR) are the recoverable non-human resources that are embedded in an organisation as excess resources and are difficult to

be re-deployed (Bourgeois 1981; Daniel et al. 2004). These resources are absorbed in operations (e.g. excess capacity) and have limited use for alternative purposes. Managers have less flexibility to use these resources quickly when they need them. Because of their discretionary characteristics, the most important role of OAR is to act as an "internal shock absorber" that prevents international service operations from disruption and synchronises an ESF's international work flows to improve their efficiency. Positive performance implications of OAR have been reported in literature, for example, Huang and Chen (2010) found that OAR positively moderate the relationship between technological diversification and innovation, and thus firm performance; and Gary (2005) suggested that without the cushion provided by these excess resources to buffer the internal and external pressures, ESFs' resources would be overextended and the costs of internationalisation may offset the benefits quickly. However, OAR's negative effects on firm performance have also been reported due to inconsiderate investments, an unnecessary waste of resources, or the delay of necessary reforms (Schemeil 2013).

We would like to extend this reasoning for considering that ESFs are more directly influenced by the economy circle than manufacturing firms due to their direct links to long-term, large-scale infrastructural investments. In the economic downturn, governments and investors will be very cautious to plan and approve this kind of mega projects to avoid pessimistic scenarios in the future, although they tend to increase long-term infrastructure projects to stabilise and accelerate economic growth in a booming time. When ESFs operate internationally the uncertainty and unpredictability of engineering service operations will sharply contrast the embedded nature of OAR. In addition, when external factors trigger the need for change, perhaps through a lower level of demand for engineering services, reductions in OAR may occur over a long period of time through downsizing (Wefald et al. 2010). In brief, although OAR may act as internal shock absorber to smooth the international expansion process by reducing conflicts and contention of internal resources, they may also negatively influence the I-FP relationship. Based on the above reasoning we develop the following hypothesis.

- **H3: Other kinds of absorbed slack resources (OAR) negatively moderate the I-FP relationship in such a way that high levels of OAR decrease firm performance resulting from internationalisation.**

3.2.3 The moderating effect of unabsorbed slack resources (USR)

Unabsorbed slack resources (USR) are the currently uncommitted resources that can be easily redeployed in an organisation (Singh 1986). Because of their easy-to-deploy nature, they are more likely to be used as additional resources to help ESFs implement international strategies, e.g. entering a new market, launching a new solution, etc. As mentioned earlier, internationalisation entails great costs, risks and uncertainties because international engineering projects are often large and complex. Voss et al. (2008) argued that some USR, such as financial reserves, retained earnings, and other liquid assets can ease capital restrictions and enable firms to generate new knowledge in advance of the actual need and pursue projects with uncertain outcomes. Huang and Chen (2010) pointed out that USR can isolate ESFs from external pressures, and provide necessary protection for them to maintain their aspirations and achieve ambitious strategic targets. Specifically, as USR are easy to be redeployed as needed, we would like to argue that these resources are conducive because they provide ESFs with readily available resources to invest across different geographic locations and business areas. This flexibility enables ESFs to transform USR into higher firm performance by capturing growth and optimisation opportunities as soon as they arise, and thus extracting the full benefit from internationalisation.

Although USR are conducive in the internationalisation process, a high level of USR can result in loose management control in an ESF, which in turn causes low productivity. There are several reasons for this. First, managers facing resource constraints will perceive a higher opportunity cost for their limited available resources (Wei et al. 2002); thus compared with managers with excess resources they tend to utilise the limited resources more cautiously and efficiently (Baker and Nelson 2005; George 2005). Second, the agency theory (Eisenhardt 1989) further points out that because managers and firm owners have different goals, managers may divert USR away from productive uses in order to pursue private and self-aggrandising benefits, making synergies across different business areas difficult to realise (Jensen 1998). With the progress of internationalisation, USR might be squandered as a result of the emerging constraints and the rising levels of difficulty and complexity in understanding and coordinating different business units across countries. Third, a high level of USR may reduce the pressure to utilise administrative resources efficiently across the geographic portfolio,

which could "hide" the rising complexity in the internationalisation process, eventually resulting in inefficient disposal of valuable resources and undermining an ESF's ability to coordinate different geographic units. In light of the above reasoning, we develop the following hypothesis.

- **H4: Unabsorbed slack resources (USR) have an inverted U-shaped moderating effect on the I-FP relationship.**

3.3 The conceptual model and hypotheses

Figure 1 shows a conceptual model to illustrate our theoretical developments. At the beginning we assume a positive linear I-FP relationship thanks to the knowledge-intensive feature of ESFs (H1). However, the coordination cost may increase with the progress of internationalisation due to the project-based feature of ESFs, which will hinder firm performance at the later stage of internationalisation. For this reason we further suggest an alternative inverted U-shaped curvilinear I-FP relationship (H1_alt), just in case that H1 is not accepted. In the situation that both H1 and H1_alt are rejected by our data, we will have to introduce an additional theoretical construct focussing on strategic resource decisions, to possibly explain the seemingly unreasonable phenomenon that ESFs expand their international businesses to get worse financial performance. The influences of strategic decisions on three types of slack resources were hypothesised with a particular attention to human resources to reflect the people-centric feature of ESFs- (i) absorbed slack human resources (AHR) have an inverted U-shaped moderating effect on the I-FP relationship (H2), (ii) other kinds of absorbed slack resources (OAR) have a negative moderating effect on the I-FP relationship (H3), and (iii) unabsorbed slack resources (USR) have an inverted U-shaped moderating effect on the I-FP relationship (H4).

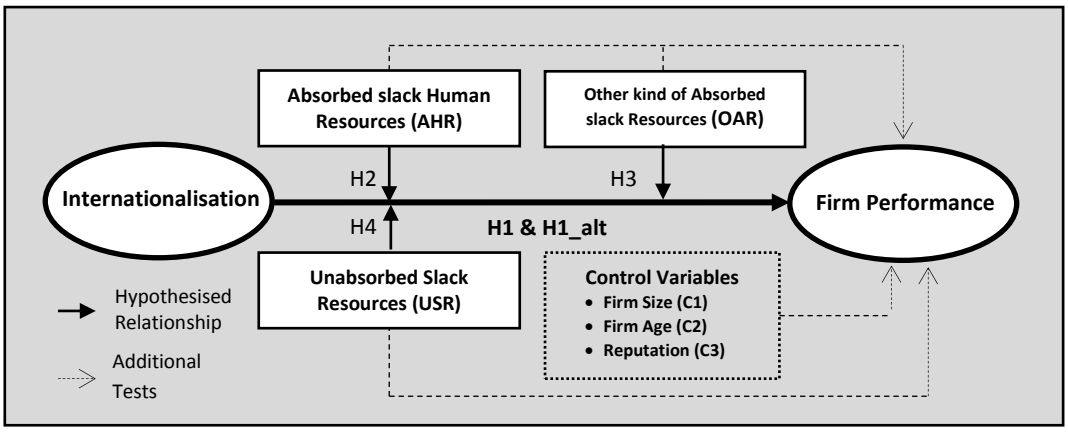

Figure 1. The conceptual model and hypotheses

4. Research Approach

4.1 Sample data

This research was based on a dataset of ESFs drawn from the OSIRIS database - one of the main databases consisting of information about listed and major unlisted/delisted companies around the world. Recent studies, e.g. Banalieva and Dhanaraj (2013) and Barroso and Giarratana (2013) suggested that OSIRIS consists of good quality and up-to-date data about internationalisation and firm performance. We developed a set of SIC codes to retrieve an initial list of ESFs from OSIRIS, including primary codes such as 5413 for Architectural, Engineering, and Related Services and 5414 for Specialised Design Services, as well as sub-level codes. The initial sample includes 2717 firms with complete financial records available from 2002 to 2013. We developed a software toolkit with Microsoft Excel VBA to automatically filter out unqualified entries in two steps. The 1st filtering was to exclude firms with less than 5 years' sales data because we would use this data to assess the degree of internationalisation. The 2nd filtering was to exclude firms with less than 5 years' data of employee numbers because we would use this data as a key indicator for AHR. 325 firms remained after this 2nd filtering. Six research assistants then manually checked the data by comparing them with information from the websites of these firms and updating the dataset if there was a difference or missing. After that, we manually removed firms without sales information by geographic regions since we would need that to indicate the degree of internationalisation, and gained the final sample of 242 firms.

Out of these 242 ESFs, 64 are US firms (26.45%), followed by Indian (25, or 10.33%), Australian (20, or 8.26%), Japanese (19, or 7.85%), Canadian (17, or 7.02%), UK (14, or 5.79%), Chinese (13, or 5.37%), Korean (12, or 4.96%), German (9, or 3.72%) and French (6, or 2.48%) firms. The remaining 43 (17.8%) firms in the sample are from many other countries. Details of the sample characteristics, including industry, average number of employees, average firm age and average degree of internationalisation (DOI), are shown in Table 2.

Table 2. Sample characteristics

Industry	Number of firms	Average number employees	Average firm age	Average DOI*
21311 Support Activities for Mining	11	11645	82	0.72
221310 Water Supply and Irrigation Systems	17	3762	76	0.23
23621 Industrial Building Construction	19	17619	39	0.48
237310 Highway,Street, and Bridge Construction	45	21328	47	0.43
2379 Other Heavy and Civil Engineering Construction	11	15740	83	0.39
5413 Architectural,Engineering, and Related Services	18	9668	65	0.61
5414 Specialised Design Services	7	512	39	0.26
541620 Environmental Consulting Services	20	6347	37	0.51
54169 Other Scientific and Physical, Engineering, and Life Science	22	4038	42	0.20
562 Waste Management and Remediation Services	21	5325	29	0.46
2371 Utility System Construction	28	6723	73	0.33
221320 Sewage Treatment Facilities	23	2389	28	0.24

* For DOI please see Section 4.2.1

4.2 Measures

4.2.1 Degree of internationalisation

A simple way to assess the degree of internationalisation has been based on two kinds of information: (i) the number of countries in which a firm had overseas business units in a given year and (ii) a firm's number of overseas subsidiaries in each year (Lu and Beamish 2004; Shin et al. 2017). Researchers sometimes will integrate these measures into a composite measure as suggested by Sanders and Carpenter (1998). This composite measure however has some critical pitfalls due to the high correlation between these single measures. For this reason, we decided to measure the degree of internationalisation with an improved method- the entropy method as suggested by Hitt et al. (1997), which can take into account both the depth and breadth of international expansion.

$$\text{Internationalisation} = \sum_{i} [GS_i * \ln(1/GS_i)]$$

Where GS_i is the proportion of a firm's sales obtained from geographic region *i* and $\ln(1/GS_i)$ is the weight of each geographic region.

4.2.2 Firm performance

The dependent variables used in the I-FP relationship studies usually include three types of accounting-based performance indicators: return on assets (ROA), return on sales (ROS) and return on equity (ROE). With reference to previous studies on the I-FP relationship in the services industry, we chose ROA as the measure of ESFs' performance (see Hitt et al. 2006). This was because ROA has been popularly used by ESFs and external analysts. Another consideration was that the influence of strategic decision on ESFs' performance has been more directly reflected by accounting profit rather than stock prices. We saw little necessity to use multiple indicators (i.e. ROA, ROS and ROE) because many researchers reached the same conclusion that there is a high consistency across these indicators in general and questioned the validity and necessity of using these interchangeable indicators as dependent variables (Contractor et al. 2003; Contractor et al. 2007; Grant et al. 1987; Lee 2013).

4.2.3 Moderating variables

Three moderating variables were considered in this study as introduced in the conceptual model: *AHR, OAR* and *USR*. With reference to earlier studies such as Greenley and Oktemgil (1998) and Mishina et al. (2004) we used the ratio of the number of employees to sales as the measure for *AHR.* The total number of employees is a measure close enough to indicate an ESF's human engineering resources because engineers account for a dominant portion of its workforce. In addition, we have to consider the practical difficulties in acquiring the exact number of engineers since that information is generally not available in public domains. By following the suggestion of Singh (1986) and Chen et al. (2012), we measured *OAR* by using the sum of an ESF's working capital minus the cost of employees and then divided by total sales; and *USR* were measured by the ratio of current assets to current liabilities.

4.2.4 Control variables

To empirically test the I-FP relationship and the moderating effects of slack resources on this relationship, we included three control variables: firm size (C1), firm age (C2) and firm reputation (C3). Firm size was considered because, as argued by Harris and Li (2009), large firms have more human and financial resources so it might be easier for them to use these resources to compete in international markets. Firm size has been measured by the natural logarithmic of the total number of employees (Zahra 2003) or the total sales (Gaur and Kumar 2009; Hitt et al. 1997; Lampel and Giachetti 2013; Lu and Beamish 2004). Lee and Habte-Giorgis (2004) suggested that using the total number of employees will lead to better results than using the total sales in empirical studies. We for this reason decided to measure C1 with the natural logarithmic of the total number of employees. C2, firm age, was considered because it is related to the level of experience and managerial competencies of an ESF in international expansion. It was measured by the natural logarithmic of the number of years a firm has been in business by following the suggestion of Singla and George (2013).

C3, firm reputation determines how different stakeholders perceive its past actions and future prospects (Barnett et al. 2006). The factor is important for ESFs in at least three aspects: (1) reputation is more easily to exploit in international engineering operations because it can be utilised simultaneously in multiple markets at no additional expenses or at a very low cost (Podolny 1993; 1994); (2) reputation enables ESFs to attract and hire best employees (Greenwood et al. 2005); and (3) reputation enables ESFs to charge premiums because of their 'reputable brand names' (Krishnan and Schauer 2000). C3 was measured by using business media data as suggested by Deephouse (2000). The FACTIVA database was used. Names of the 242 ESFs were used as keywords for searching within five major international publications from 2002 to 2013, including *Economist*, *Forbes*, *The Wall street Journal*, *Financial Times*, and *Fortune*. The result included 324,503 articles mentioning these firms. The assessment of these articles began with two researchers reading 100 randomly selected articles to develop a coding scheme to count positive media reports and negative ones (for details of the coding scheme please see Appendix 2). The two researchers used the same coding scheme to access these 100 articles independently and compared their results. The coding scheme was refined until a 0.9 inter-reliability rate was reached, i.e. these two researchers reached the same result on at least 90 out of 100 articles. With this coding scheme, all the articles were assessed to get the numbers of positive and negative ones for each

company in each year. Firm reputation was measured by the number of positive media reports (logged) in our analysis because it is less correlated with firm size.

In addition, dummy variable *Year* was introduced to test the influence of time scale.

4.3 The Model

The hypotheses (H1-4) were tested by using repeated observations on the same set of cross-sectional units with different time series. The data has a cross-sectional time series structure with each firm as an unbalanced panel that spans over a period of at least 5 years. Considering that using the ordinary least squares (OLS) model to estimate panel data may lead to biased results due to unobserved heterogeneity (Greene 2012), in this study we used generalized linear models (GLM) which can transform original variables to satisfy the standard least-square assumptions and modified emergence of autocorrelation and heteroskedasticity problems in time series data (Gujarati 2004). The following model was used to conduct panel data analyses:

$$Y_{it} = \alpha D_{i,t-1} + \beta X_{i,t-1} + u_i + \varepsilon_{it} \quad (1)$$

Where $D_{i,t-1}$ is a row vector of year dummy variables, $X_{i,t-1}$ is a row vector of explanatory variables, u_i is the firm-specific residual, and ε_{it} is a standard residual (mean 0, uncorrelated with itself, u_i and the X matrix, homoskedastic). This model can be estimated by fixed-effects models. Echoing previous studies such as Hitt et al. (2001), we conducted the Hausman test (Hausman 1978), and the result indicated that fixed effects models are better than random effects models for our dataset. In summary, the following is a list of all the variables used in this research.

- Firm *Performance*: measured by Return of Assets (ROA)
- Degree of *Internationalisation:* measured by the entropy method which takes into account both the depth and breadth of international expansion
- *Absorbed slack human resources (AHR):* measured by the ratio of the number of employees to sales
- *Other kind of absorbed slack resources (OAR):* measured by the sum of a firm's working capital minus the cost of employees and then divided by total sales
- *Unabsorbed slack resources (USR):* measured by the ratio of current assets to current liabilities
- *Firm Size (C1):* measured by the natural logarithmic of the total number of employees

- *Firm Age (C2):* measured by the natural logarithmic of the number of years a firm has been in business
- *Firm Reputation (C3):* measured by the number of positive media reports (logged).

Specific empirical design is as follows:

- *Model* 1 tests the relationship between three control variables (e.g. firm size (C1), firm age (C2) and firm reputation (C3)) and Firm Performance.
- *Model 2(1)* tests the effect of Internationalisation on Firm Performance.
- *Model 2(2)* tests the effect of Internationalisation^2 on Firm Performance.
- Model 3 tests the moderating effect of absorbed slack human resources (AHR) on the I-FP relationship.
- *Model 4* tests the moderating effect of other kind of absorbed slack resources (OAR) on the I-FP relationship.
- *Model 5* tests the moderating effect of unabsorbed slack resources (USR) on the I-FP relationship.
- *Model 6* is an overall model including all independent variables.
- *Model 7* is an additional model comparing the effect of unabsorbed slack resources and the effect of absorbed slack human resources on firm performance.

5. Results

Table 3 presents an overview of the variables, including the means, standard deviations, and correlations for variables used in this study. The result indicates that that all the bivariate correlations are lower than 0.3. This low level of correlation is unlikely to produce biased estimators for the coefficients of the independent variables. Considering that the coefficient estimators may still have high standard errors leading to difficulties in obtaining significant coefficients of the correlated variables, we checked the collinearity using Variance Inflation Factors (VIF). The highest VIF is 1.15 in our analysis, which is far below the suggested threshold 10 as suggested by Neter et al. (1990). We therefore concluded that multi-collinearity is unlikely to cause a problem in this study.

Table 3. Descriptive statistics and correlation matrix

	Mean	Std. dev	1	2	3	4	5	6	7
Internationalisation	0.4019	0.2707							
Firm size	12015	26798	0.1392						
Firm reputation	124.0837	286.6188	0.2495	0.2254					
Firm age	47.7226	39.2041	0.2720	0.1562	0.1578				
Performance	3.6545	14.5871	0.0701	0.0879	0.1484	0.1385			
USR	2.1171	2.3562	-0.1252	-0.1493	-0.0517	-0.2177	-0.1044		
AHR	0.0068	0.0112	-0.1271	-0.0133	-0.1354	-0.1582	-0.1346	0.1475	
OAR	0.1558	0.7348	0.0375	-0.0291	-0.0127	-0.0203	-0.0121	0.0590	-0.1193

Table 4 shows the coefficient estimates for the interaction effects of ESFs' internationalisation and slack resources on their performance. Model 1 contains the dummy variable year and three control variables, i.e. *firm size*, *firm age* and *firm reputation*. *Internationalisation* and *squared Internationalisation* are included from Model 2(1) and Model 2(2) respectively. The three moderating variables, i.e. AHR, OAR, and USR, are included in the regression analysis one at a time in Model 3, 4 & 5 respectively. Model 6 includes all the dummy, control, main and moderating variables. Results of the F-test and the p-value are included to indicate the statistical significance of the models.

Results from Model 1 suggest that firm size has positive influence on the performance of ESFs, which is in consistent with literature (e.g. Elango et al. 2013; Lin et al. 2011; Singla and George 2013); firm age has a negative effect on firm's performance, which is consistent with literature (e.g. Berger and Udell 1995; Evans 1990; Lin et al. 2011). The results also show a positive effect of firm reputation on performance. We would like to clarify that firm age does not reflect the length of its internationalisation experience, which may have a more direct impact on performance. We attempted but were not able to get that data even through manually checking annual reports of the firms. This suggests an interesting research area to investigate when the data is available about the year and length of an ESF started its internationalisation strategy.

Results from Model 2(1) and Model 2(2) show that the coefficient of internationalisation^2 is not statistical significant but the degree of internationalisation is negatively related to the performance of ESFs, and the negative relation remains all the way through from Model 2 to Model 6. ***Both H1 & H1_alt are therefore not supported.***

Model 3 studies the moderating effect of absorbed slack human resources (AHR). The significant coefficient of internationalisation - AHR^2 indicates that ***H2 is supported***. That is, AHR have an inverted U shape moderating effect on the I-PF relationship.

Model 4 investigates the moderating effect of other kinds of absorbed slack resources (OAR) on the I-FP relationship. The coefficient of internationalisation – OAR is not statistically significant. ***H3 is therefore not supported***.

Table 4.Results of the GLM analysis (firm performance as the dependent variable)

Variables	Performance							
	Model 1	**Model 2(1)**	**Model2(2)**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model7**
Firm size (C1)	4.944254* (5.72831)	5.04728* (11.28653)	2.00321 (7.93787)	5.188314* (6.41347)	5.126739* (12.71132)	5.415267* (9.45872)	5.569058* (6.73480)	4.387484* (16.35528)
Firm age (C2)	-6.618318* (7.90019)	-6.0401129 (17.20983)	-4,23854* (16.90127)	-4.913303* (9.89110)	-6.322566* (17.42356)	-5.208886** (6.91241)	-4.187086* (5.36783)	-3.876946* (12.99773)
Firm reputation (C3)	0.9384622* (13.46452)	0.8616956* (16.15630)	1.07438** (14.75031)	1.057797 (11.28673)	0.8706395* (13.16421)	1.047862* (8.28757)	1.240784 (3.09176)	0.964264** (13.50312)
Internationalisation		-3.452005* (13.07574)	-4.37941* (16.34435)	-5.125074* (6.18754)	-3.769776 (12.32415)	-5.110981* (6.17823)	-5.959294** (7.96342)	-4.368941** (16.30206)
Internationalisation^2			-0.00014749 (1.09047)				---	---
AHR				0.14856* (8.66741)			0.15158* (4.17283)	0.1738* (12.19513)
AHR^2				0.35472 (13.12181)			0.64791** (10.71295)	0.563732* (13.44257)
Inter'n - AHR				1.89e-02* (12.03448)			2.7e-02 * (0.35469)	---
Inter'n - AHR^2				-1.27e-02* (18.78152)			-1.32e-02* (0.68154)	---
OAR					-2.660224		2.122151	---
OAR^2					-3.31738		2.878324	---
Inter'n - OAR					2.511582		-7.760424	---
Inter'n - OAR^2					1.238767		3.287664	---
USR						1.855949* (9.44013)	1.840643* (10.96475)	1.773722* (11.87253)
USR^2						1.345428 (12.67453)	0.986763* (9.87254)	1.002713* (12.36428)
Inter'n -USR						1.699036* (11.57629)	1.682342* (12.96433)	---
Inter'n - USR^2						-0.2100042* (0.17683)	-0.2073226* (13.74321)	---
Dummy variable: Year	controlled	Controlled	controlled	controlled	Controlled	controlled	controlled	Controlled
R^2	0.1009	0.1038	0.0982	0.1251	0.1069	0.1210	0.1387	0.1024
Adjusted R^2	0.0925	0.0897	0.0934	0.1172	0.0928	0.1173	0.1209	0.0985
F-Value	29.21	22.93	8.8421	14.40	15.96	24.68	14.53	17,36

N=1914; ***p<0.001, **p<0.01, *p<0.05

Robust Standard Errors are within parenthesis

Model 5 tests the moderating effect of unabsorbed slack resources (USR) on the I-PF relationship. The significant coefficient of internationalisation – USR^2 indicates that ***H4 is supported.*** That is, USR have an inverted U shape moderating effect on the I-FP relationship. Additionally, the result also indicates that USR have a positive effect on firm performance, and the influence is much stronger than AHR. This has been further confirmed by the additional test in Model 7.

Model 6 includes all variables that may affect firm performance. The result strongly supports H2 and H4 and disapproves H1, H1_alt and H2. Both Model 2 and Model 6 support the negative effect of internationalisation on ESFs' performance. For H3, the results of both Model 4 and Model 6 are not statistically significant, which suggests an interesting research issue for further investigation.

In order to examine the robustness and accuracy of the estimates, we conducted some additional tests. As suggested by Ketechen and Palmer (1999), we used an alternative measure of firm performance (i.e. ROS) to substitute the one used in our model, i.e. ROA. The results of these tests are shown in Appendix 3, from which we can see that all relationships in the study hold after we use ROS. Overall, the results of our additional analyses by using ROS support our main findings as well as indicating that our results are robust.

4. Discussions

These results contribute to our understanding of the I-FP relationship for global engineering services by clarifying the moderating effects of slack resources. The negative I-FP relationship for ESFs provides an important amendment to the existing I-FP theories. This finding is in contradiction to the U-shaped I-FP relationship for general service firms claimed by Capar and Kotabe (2003), the three-state sigmoid I-FP relationship for general service firms identified by Contractor et al. (2003), or the positive I-FP relationship for professional service firms found in Hitt et al. (2006). It echoes our earlier statement to re-examine the existing theories to address the particularity of a specific type of services instead of providing a generic theory for different service sectors. Our theoretical explanation is that the different form of I-FP relationship for ESFs results from their distinctive features. Especially, international

engineering projects are often of large scale and high value. ESFs make commitment to such mega projects for long-term strategic reasons, such as investing in engineering capabilities, developing emerging markets and challenging the home markets of competitors, rather than for short-term financial payoffs only. ESFs would then be prepared to continue supporting international expansion for potential long-term benefits; for example, many large ESFs are expanding their operations to China to benefit from the high quality and low cost engineering talents. We would also like to point out another possibility for this negative I-FP relationship. Large scale engineering projects often have a long lifecycle. For this reason, our dataset covered a time span of 12 years, which is longer than Caper and Kotabe (2003) 3 years, Contractor et al. (2003) 6 years, and Contractor et al. (2007) 5 years. We may need to extend the time span even longer to observe some possible turning point in the I-FP relationship due to the long lifecycle nature of international engineering projects. That however will lead to more challenges by introducing macro level variables to examine the influence of the broader global economic context. In brief, our study extends the existing theories of the I-FP relationship for a particular type of services of increasing importance in the modern economy. This paper provides an integrative theoretical model based on the existing IB literature focussing on the I-FP studies in the service sector, and incoroprating a comprehensive set of factors as moderating variables and control variables which may have some significant influence to the I-FP relationship due to the distinctive business model of global engineering services.

Our findings clarify the influence of strategic resource decisions on the I-FP relationship. Particularly, absorbed slack human resources and unabsorbed slack resources have significant inverted U-shape moderating effects on the I-FP relationship, although the effect of unabsorbed slack resources is much stronger. This suggests the existence of an optimal level of slack resources. Before reaching this optimal level, the increase of absorbed slack human resources and especially unabsorbed slack resources would enhance the performance of global engineering services. After this optimal level, the increase of absorbed slack human resources and unabsorbed slack resources would undermine the performance of global engineering services. The moderating effect of other kinds of absorbed slack resources is unclear, as indicated by the insignificant results from Models 5 & 6. This suggests an interesting research question for further investigations in the future. A promising direction is to explore optional measures for

other kinds of absorbed slack resources of service firms, for example by using fixed assets based measures. To do that, we will have to cope with challenges in accessing the required data, since many service firms tend to improve their operational and financial performance through hiring specialised equipment and expensive facility (through collaborative arrangements with partners) rather than owning them. As the result, fixed tangible assets in their accounting reports are often very small and sometimes even not reported in public domains.

A take away message for managers, especially to senior decision makers of an ESF is to bear in mind the negative I-FP relationship for global engineering services, i.e. ESFs in general are not able to achieve the expected financial payoffs from international expansion. Managers will very likely be disappointed if short-term financial return is the most important target in their management regime. Investments for international expansion can only pay off when other longer-term strategic objectives outweigh short-term financial performance, e.g. developing strategic capabilities in a new operations context, or accessing international engineering resources. Nevertheless decision-makers should be cautious when expanding their engineering service operations abroad, as their performance tends to deteriorate with the increasing degree of internationalisation. This is because global engineering services are knowledge-intensive, project-based and people-centric and usually have a long lifecycle. All these factors will introduce great risks and uncertainties, which may result in project disruptions, increased costs and potential losses. So a rigorous risk management approach must be embedded in ESFs' decision making process for international growth.

Another takeaway message is that managers should make a good use of the inverted U-shaped moderating effects of absorbed slack human resources and unabsorbed slack resources on the I-FP relationship. Absorbed slack human resources and especially unabsorbed slack resources may help to ease the pressure of a declining performance at the early stage of internationalisation. However, when internalisation reaches the mature stage, increasing absorbed slack human resources and unabsorbed slack resources will further jeopardise firm performance. Our suggestion is to enhance resource sharing within an ESF and collaborating with local partners in the process of internationalisation. This often provides more flexibility for ESFs to effectively manage their absorbed slack human resources and unabsorbed slack resources in the search for

an optimal level, and thus leading to an improved firm performance. At the point that managers have to make a choice between absorbed human slack resources and unabsorbed slack resources, the latter will lead to a stronger and quicker result.

5. Conclusion

In this paper we studied the I-FP relationship for global engineering services and the influence of strategic decisions on three types of slack resources. The distinctive features of engineering service operations were identified, and their influence on the I-FP relationship was discussed. An integrative model composed of four theoretical links (H1-4) was developed, and empirically tested with a dataset of 242 ESFs. Our study suggested a negative I-FP relationship for global engineering services. Both absorbed slack human resources and unabsorbed slack resources have significant inverted U-shaped moderating effects on the relationship.

In so doing, we make three significant contributions. First, we contribute to the growth of research on firm internationalisation within the context of the varied and novel business models that characterise much of the contemporary global economy (Amit and Zott 2012; Kastalli and Van Looy 2013). We examine the implications of internationalisation for financial performance in the context of engineering service firms, whose business models differ significantly to the manufacturing models studied in most internationalisation research. Second, we contribute to the development of theorisation in relation to the internationalisation-firm performance relationship, by proposing a new theoretical construct focussing on strategic resource decisions as a key moderator of the relationship in the context of service firm internationalisation. We build on prior research to propose that firms' strategic choices in deploying resources in the contexts that ESFs operate in are critical to successful internationalisation for service businesses. This, we argue, provides an especially fertile ground for future research. Third, we provide significant new insights for ESFs and their leaders and managers, especially in relation to the need to consider the role of the interdependencies between their business models and their strategic resource decisions in relation to the likely impacts of their internationalisation on their performance. To be specific, we would like to remind decision-makers to balance the need for long-term strategic gains and short-term financial payoffs, and at the same

time make a suggestion to use slack resources to effectively leverage strategic growth and performance in the process of internationalisation.

We have been advised to advance our theoretical understanding of service firms by focussing on a specific type of service operations (Løwendahl 2005; Von Nordenflycht 2010; Lewis and Brown 2012). We followed this insightful suggestion and focussed our studies on ESFs which represent a distinctive business model of service firms. This has helped us to avoid empirical obstacles from different types of services and then more precisely capture the essential governing forces over the I-FP relationship (Delios and Beamish 1999; Hennart 2007; Powell 2014). However, our focus on ESFs leaves some further questions regarding the types of slack resources and the dynamics in deploying them. For example, in some service sectors slack resources can be easily recombined for multiple service offerings, while in other service sectors recombining slack resources is very difficult. The types of service operations determine the flexibility of redeploying slack resources. Therefore, as suggested by Von Nordenflycht (2010), the next step is to develop a theoretically robust typology to possibly extend our findings in a wider range of services firms based on some generalizable features of service firms. Our study suggests three such features: knowledge-intensive, project-based, and people-centric. To be specific, our findings confirm a negative I-FP relationship in general. This unnecessarily dismisses the positive influence of the knowledge-intensive feature. A possible explanation is that international engineering operations are highly project-based. The coordination cost of such complex and uncertain projects are so high that it overtakes the benefit from the knowledge-intensive feature. To continue this line of investigations, it will be useful to develop an index to reflect various degrees of the knowledge-intensive and project-based features. We can then study their varying impacts on the I-FP relationship and thus extending our findings to a wider range of service firms with different degrees of knowledge-intensity and project-based operations. Furthermore, considering that service operations require a high degree of interaction and value co-creation between service providers and customers, our findings on slack human resources are expected to have a generic implication for service firms. Nevertheless, the emergence of Artificial Intelligence and Internet-based service provision may lead to a greater reliance on technology infrastructure and thus challenging the people-centric feature of service firms. It will then be useful to

investigate the impact of people-centric vs. technology-centric features for such new forms of service operations.

In addition to the above suggestions, we would also like to suggest some more important research directions for the future. First, we did not consider how long ESFs have adopted the internationalisation strategy due to data availability. We used firm age as a control variable instead, which however was not able to indicate its influence on the I-FP relationship as our results indicate. We would encourage IB scholars to use the period of internationalisation as a control variable which may have a more direct link to performance through perhaps large-scale surveys. Second, we did not take into account the country effect on the I-PF relationship because the majority of global engineering service providers are from a few dominant developed countries (for example, nearly all the world's largest ESFs are from the developed countries). In the process of internationalisation, ESFs in different countries may have different strategic choices for economic, cultural or historical reasons, thus leading to different forms of I-FP relationships. We therefore would like to call for further studies to understand the influence of such contextual factors. Third, we have mentioned the impact of long-term, large-scale projects in international service operations. In reality, service firms are trying to maintain a dynamic portfolio of projects of different scales and cycles. When such operational level of data is available, we can carry out very valuable studies to understand the impact of project cycles and their implications for resource deployment. In addition, slack might present at different levels of an organisation. This opens up a series of interesting research issues around resource sharing, allocation and deployment at subsidiary vs. firm levels for which the agency theory and the resource constrains theory will be able to provide useful guidance. Last but not the least, considering the fact that the nature of this study is a grounding effort to identify and understand the generic trends in global engineering services, we would like to suggest some micro-level case studies to further investigate the behaviours and the cause-effect consequences of an ESF's internationalisation decisions in further detail.

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Appendix 1: Summary of empirical I-FP studies in mainstream business management journals*

Empirical studies	Degree of Internationalisation (I)		Firm Performance (FP)		Sampling	Analytical method	Key moderator or control	Results (I-FP relationship)
	Dimensions	Measures	Types	Measures				
Vernon (1971)	Single; sales-based	FSTS	Accounting based financial indicators	ROS/ROA	187 large US manufacturing firms in 1964	Comparative (MNE vs Non-MNE): *t*-test	None	Positive
Severn and Laurence (1974)	Single; Assets-based	Dummy variable/FATA	Accounting based financial indicators/ economic profit	ROA (Before and after tax)/ economic profitability	62 US MNEs from Fortune 500 and 70 US domestic firms in manufacturing industries	Comparative: *t*-test and OLS regression (Cross-section)	R&D intensity	No significant relationship, but intervened by R&D intensity
Hughes *et al.* (1975)	Single; sales-based	FSTS	Market based financial indicators	Risk adjusted returns	46 US MNEs and 50 US non-MNEs (1970–1973)	Comparative (MNE vs Non-MNE): χ^2 test	None	Positive
Siddharthan and Lall(1982)	Single; sales-based	FSTS	Operational indicator	Firm growth	The 500 and 100 largest US and non-US MNEs in 1972	N/A	Firm size; advertising intensity; R&D intensity	Negative
Kumar (1984)	Single; sales-based	FSTS	Accounting based financial indicators	ROA	672 UK firms (1972–1976)	Comparative and multivariate regression	Firm size; lagged ROA; industry	Not significant
Dunning (1985)	Single; sales-based	FSTS	Accounting based financial indicators	ROS	188 large UK MNEs in 1979	N/A	N/A	Not significant
Rugman*et al.* (1985)	Single; sales-based	FSTS	Accounting based financial indicators	ROE	154 largest MNEs from US, Europe, Japan, Canada and developing nations	N/A	N/A	Not significant
Yoshihara (1985)	Single; sales-based	FSTS	Accounting based financial indicators	ROE	118 largest Japanese firms	Comparative	None	Not significant
Michel and Shaked (1986)	Single; sales-based	FSTS (20% as threshold)	Market based financial indicator	Risk-adjusted Returns (i.e. Sharpe, Jensen and Treynor measures)	58 US MNEs and 43 non-MNEs (1973–1982)	Comparative (MNE vs non-MNE): *t*-test	None	Negative
Shaked (1986)	Single; sales-based	FSTS (20% as threshold)	Accounting based financial indicators	ROA/insolvency probability	58 US MNEs and 43 non-MNEs (1980–1982)	Comparative (MNE vs non-MNE): *t*-test	None	No difference in terms of average ROA; insolvency probability lower for MNEs
Buehner (1987)	Single; sales-based	Sales-based Herfindahl index/ FSTS	Market and accounting based financial indicators	Risk-adjusted returns/ROS/ROA	40 largest West German firms	GLS regression (cross-section) and partial correlation	Firm size; growth; leverage; product diversification	Positive in general
Grant (1987)	Single; sales-based	FSTS	Operational indicator/accounting based financial indicators	Sales growth/ROS/ ROA/ROE/profit	304 large British manufacturing firms (1972–84)	Multivariate regression (FSTS lagged by 4 years)	Firm size and industrial effects	Positive in general; in addition, suggestive evidence that overseas production increased profitability

Grant *et al.* (1988)	Single; sales-based	FSTS	Accounting based financial indicator	ROA	304 large British manufacturing firms (1972–84)	Multivariate regression (FSTS lagged by 4 years)	Industrial effects; firm size; leverage	Profitability encourages overseas expansion, which in turn generates increased profit
Daniels and Bracker (1989)	Two but examined separately; sales-and assets based	FSTS/FAFA	Accounting based financial indicator	ROS/ROA	116 US firms in Forbes 1984 (1974–83)	ANOVA	Industrial effects	Inverted J curve
Geringer*et al.* (1989)	Single; sales-based	FSTS	Accounting based financial indicator	ROS/ROA (standardized)	100 largest MNEs from US and Europe respectively (1977–1981)	ANOVA	None	Inverted J curve ('threshold of Internationalisation')
Kim *et al.* (1989)	Single; sales-based	Sales based entropy index capturing product and market diversification	Accounting based financial indicator	Growth of ROA and ROS/instability of ROA and ROS	62 US MNEs (1982–1985)	Comparative: *t*-test	None	Indeterminate; contingent upon the relatedness of business diversification
Collins (1990)	Single; sales-based	FSTS	Market based financial indicators	Average rate of return, Jensen measure	133 US firms from Fortune 500 (1976–1985)	Comparative: *t*-test	None	Insignificant between MNEs with presence in developed countries and domestic firms; negative if MNEs with main presence in less developed nations
Morck and Yeung (1991)	Single; count-based	No. of subsidiaries/ No. of nations hosting subsidiaries	Market based financial indicator	Tobin's Q	1644 US firms (1980–81)	Multivariate regression (cross-section)	Leverage; firm size; labour growth	Internationalisation has no direct or marginal negative impact but enhances the impact of R&D and advertising on Tobin's *q*
Kim *et al.* (1993)	Single; sales-based	Sales based entropy index capturing product and market diversification	Market based financial indicator	Risk-adjusted ROA	125 largest US MNEs in 1982 Forbes survey	Comparative: ANCOVA and multivariate regression(cross-section)	Industrial effect	Positive
Sullivan (1994)	Single; index-based	Multi-item index	Accounting based financial indicator	ROS/ROA	75 most international US manufacturing firms in 1990	ANOVA	None	Horizontal S
Al-Obaidan and Scully (1995)	Single; categorical	Dummy variable	Economic efficiency	Scale efficiency/ technical efficiency	44 largest petroleum enterprises (1976–1982)	Deterministic and stochastic frontier production function (pooled data)	Government ownership; extent of vertical integration	MNEs are about 3% higher in scale efficiency but 10% lower in technical efficiency compared with non-MNEs

Tallman and Li (1996)	Two but examined separately; sales-based; count-based	FSTS/no. of foreign countries hosting subsidiaries	Accounting based financial indicator	ROS	192 US. manufacturing MNEs in 1987	Multivariate regression (cross-section)	Firm leverage; industry growth	Marginal positive relationship
Hitt*et al.* (1997)	Single; sales-based	Sales-based entropy index	Accounting based financial indicator	ROA/ROS; R&D intensity	295 US. manufacturing firms (1988–1990)	Multivariate regression (cross-section)	Product diversification; capital structure	Inverted U shaped curve; Positive relationship between Internationalisation and R&D intensity
Katrishen and Scordis (1998)	Single; count-based	Index based on no. of host countries weighted by degree of commitment	Cost efficiency	Operating expense	93 insurance companies from 15 countries (1985–1992)	GLS regression (random effect)	Financial assets; diversity; reinsurance; ownership	The ratio of operating expense to total income accelerates with the international diversity
Qian (1998)	Single; sales-based	FSTS	Accounting based financial indicator	ROE	164 US industrial firms (1981–92)	Multivariate regression (cross-section)	Firms size; industrial effects; lagged ROE	Positive with FSTS above 15%; indeterminate with FSTS below 15%
Delios and Beamish (1999)	Single; count-based	No. of subsidiaries/ No. of host countries	Accounting-based financial indicators	ROA, ROS, and ROE	399 Japanese manufacturing firms (1991–1995)	Partial least squares (PLS) regression (simultaneous analysis of item-construct relationships along with complex causal paths)	Product diversity; R&D, and advertising intensity, financial leverage, industrial profitability, industrial growth rate and concentration	Positive
Gomes and Ramaswamy (1999)	Single; index-based	A composite index generated by principal component analysis of FSTS, FATA and country scope	Accounting based financial indicator/ cost-efficiency indicator	ROA/Operating costs to sales (OPSAL)	95 US. manufacturing firms (1990–1995) in the industries of chemicals, drugs, computers etc.	Multivariate regression (cross-section time series)	Firm size and industrial effects	Inverted U shaped curve between Internationalisation and ROA; U shaped curve between Internationalisation and OPSAL
Geringer*et al.* (2000)	Single; sales-based	The ratio of sales by foreign subsidiaries to total sales	Accounting based financial indicator/ operational indicator	ROS/sale growth	108 Japanese manufacturing firms (1977–1993)	Time series cross-sectional LSDV regression	Firm size; leverage; industrial effects	Negative (positive) with ROS (sales growth) as dependent variable. However, the relationship only holds for 1977–1991 rather than the entire period
Zahra *et al.* (2000)	Multiple but examined separately	Multiple measures (e.g. No. of foreign countries, cultural diversity, etc.)	Accounting based financial indicator/ operational indicator	ROE/sale growth	321 US new ventures (mail survey)	Multivariate regression (cross-section taking into account time lag)	Firm age; international experience; mode of entry; lagged ROE (sales growth)	Positive in general
Lu and Beamish	Single;	No. of subsidiaries/	Accounting based	ROA	164 small and	GLS regression	Export; firm size;	U shaped curve;

(2001)	count-based	No. of host countries	financial indicator		medium sized Japanese firms (1986–1997)	(time series cross-section)	R&D intensity; product diversity; joint venture	exporting moderates the relationship negatively
Pantzalis (2001)	Single; count-based	No. of foreign regions or subsidiaries in developed (or developing) countries	Market based financial indicators	Tobin's Q and excess Q	420 US MNEs in 1990	Multivariate regression (cross-section)	Firm size; leverage; R&D and advertising intensity; ownership; corporate business focus; industry effects	Market value of MNEs with operations in developing countries is significantly higher than that of MNEs without operations in developing countries
Ramirez-Aleson and Espitia-Escuer (2001)	Single; count-based	Categorical measure (no. of invested countries); entropy index based on the no. of foreign subsidiaries	Accounting and market based financial indicators	Ratio of net operating profit to net operating assets (ROA)/Tobin's Q	103 Spanish nonfinancial firms (mostly manufacturing) (1991–1995)	*t*-test/GLS regression (time series cross-section)	Firm size; industry effects	Insignificant with ROA but positive with Tobin's Q as dependent variable
Kotabe*et al.* (2002)	Single; income-based	Foreign income/ total income	Accounting based financial indicator/ cost-efficiency indicator	ROA/ratio of sales to operating costs (OPSALINV)	49 US manufacturing firms (1988–1993)	Time series cross-sectional regression	R&D intensity; advertising intensity; firm size; industrial effects	R&D intensity and advertising intensity jointly moderate the M–P relationship positively
Qian (2002)	Single; sales-based	FSTS	Accounting based financial indicator	ROS	71 US small and medium-sized manufacturing firms (1989–1993)	OLS regression	Firm size; firm age; R&D, and advertising intensity; product diversification; financial leverage	Positive; Moderate product diversification moderates I-FP relationship positively
Capar and Kotabe (2003)	Single; sales-based	FSTS	Accounting based financial indicator	ROS	81 major German service firms (1997–1999)	OLS regression	Firm size; industrial effect	U curve
Contractor *et al.* (2003)	Single; index-based	3-component index (FSTS, foreign to total employees, ratio of foreign to total offices)	Accounting based financial indicators	ROS/ROA	103 largest service companies (1983–1988)	Time series cross-sectional regression	Firm size; Industrial sector effect, and home country effect	Horizontal S-shaped curve (esp. the knowledge-intensive sub-sample)
Goerzen and Beamish (2003)	Two dimensions (international asset dispersion and country environment diversity) simultaneously examined	Sales-based entropy index; Entropy indices based on political, economic, and cultural index	Market-based financial indicators	Jensen's Alpha; Sharpe's measure; Market to book ratio	580 Japanese MNEs in 1999	Structural equation modelling	Product diversity; proprietary assets; industry profitability; firm size; capital structure; international experience	Positive between International asset dispersion (IAD) and performance; negative between country environment diversity (CED) and performance; interaction between IAD and CED is positively related to performance
Ruigrok and Wagner (2003)	Single; sales-based	FSTS	Accounting based financial indicator/ cost-efficiency indicator	Pre-tax ROA/ operating costs to total sales (OCTS)	84 largest German manufacturing firms (1993–1997)	Pooled cross-section time series regression	Firm size; industrial effect	U curve for ROA; inverted U curve for OCTS

Li and Qian (2004)	Single; index-based	3-component index (FSTS, FATA, foreign to total employees); sales-based entropy	Accounting based financial indicator	ROS and ROA	167 largest US firms on Fortune 500 list (1991–1997)	OLS regression	Firm size; R&D intensity; Financial leverage; country GNP growth; GNP per capita	Reflecting an inverted U curve
Lu and Beamish (2004)	Single; count-based	Composite index based on no. of subsidiaries and no. of countries	Accounting and market based financial indicators	ROA; Tobin's Q	1489 Japanese firms (1986–1997)	GLS random effect regression	R&D and advertising intensity; size; exchange rate; product diversity; export intensity; capital structure	Horizontal S-curve; R&D intensity and advertising intensity moderates the I-FP relationship positively
Thomas and Eden (2004)	Three dimensions: market penetration, production presence, country scope	Composite index based on FSTS, FATA, and no. of foreign countries	Accounting and market based financial indicators	ROA, ROE; Excess and average market value	151 US manufacturing firms	White-corrected OLS regression, and Spline analysis	R&D intensity; Administrative costs/sales; Size; financial leverage; industry control	A mixture of nonlinear results; weak evidence of S-curve using Spline analysis
Annavarjula*et al.* (2005)	(*De facto*) single; index-based	Multi-item index	Accounting-based financial indicator	ROE	197 relatively large US manufacturing firms	Generalized linear model (GLM)	R&D, and advertising intensity; capital intensity; market to book value ratio; product diversity; firm size	Positive; Market to book value positively moderates I-FP relationship
Li (2005)	Single; sales-based	FSTS	Accounting-based financial indicator	ROS	574 American service firm (1997–2001)	Feasible GLS regression	Size; business diversity; capital intensity; market share; financial leverage; growth and downsize; industry control	Horizontal S-curve for the whole sample; Home region oriented strategy positively moderates I-FP relationship
Hitt*et al.* (2006)	Single; count-based	Entropy index based on number of foreign offices and number of lawyers	Self-reported and unaudited data from *American Lawyer*	ROS	72 largest US law firms (1992—1999)	GLS regression	Firm size; leverage; location in NYC; service diversification; domestic geographic dispersion; prior performance	Positive and inverted U curve; human capital positively moderates I-FP; Relational capital does not have a moderating effect on I-FP
Contractor *et al.* 2007	Single; sales-based	FSTS	Accounting-based financial indicator	ROA; ROE; ROS; tested separately	269 Indian firms (142 manufacturing and 127 service firms, 1997 –2011)	Two-stage GLS regression	Firm size; firm age; a dummy variable for industry sub-sectors	U curve; service firms gain the positive benefits sooner than manufacturing firms

Chang and Wang (2007)	Single; sales-based	Sales-based entropy Index and the sales-based Herfindahl index	Market-based financial indicator	Tobin's Q	2402 US firms (including both manufacturing and service firms; 1996-2002)	Comparative; GLM on pooled data and GLM on 7-year averaged data	Product diversification; firm size; leverage; R&D intensity; effect of country scope; industry effect	Inverted U curve; Related product diversification positively moderates I-FP; Un-related product diversification negatively moderates I-FP
Ruigrok*et al.* (2007)	Single; sales-based	FSTS	Accounting-based financial indicator	ROA	87 Swiss multinational companies in manufacturing industries (1998-2005)	Panel data analysis; *t*-test; ANOVA	Firm size; industry effect	S-curve; firms with extreme degrees of internationalisation face lower average performance and higher average performance variation.
Zhou *et al.* (2007)	Two; scale-based	Outward-internationalisation measured by: (1) aggressively seek foreign markets; and (2) develop alliances with foreign partners Inward-internationalisation measured by: (1) utilized advanced management skills from foreign countries; (2) utilized advanced and new technology fromforeign countries; and (3) utilized foreign direct investment.	Three self-reported financial indicators	Export growth; profitability growth; total sales growth	129 manufacturing SMEs in Zhejiang, China	Structural equation modelling	*Guanxi* network as a mediating factor; Firm age; firm ownership; competition Intensity; market uncertainty; technology complexity	Outward-internationalisation orientation is significantly related to all of the three performance measures; Inward-internationalisation orientation is significantly related to both export performance sales performance but not to profitability performance ; Guanxi network mediates I-FP
Hsu and Pereira (2008)	Single; Survey-based	FSTS; FATA; FPTP	Survey-based	ROS; ROI; ROE	110 US MNEs	Multivariate regression	Moderating variables: social learning; technological learning; marketing learning; Control variables: firm size; technology uncertainty; market uncertainty	Positive; marketing learning and social learning positively moderate I-FP

Pangarka (2008)	Two but tested separately; sales-based	DOI_1 = (1 X % of sales from SE Asia) + (2 X % of sales from rest of Asia) + (3 X % of sales from rest of the world); DOI_2 = Foreign sales/[(% of sales from SE Asia)^2 + (% of sales from the rest of Asia)^2 + (% of sales from Europe)^2 + (% of sales from the Americas)^2 + (% of sales from the rest of the world)^2]	Accounting-based financial indicator	Composite measure including six items: ROS, growth in sales, foreign profits, growth in profits, ROA, experience and knowledge gained from foreign operations	94 SMEs in Singapore	Multivariate regression	Firm size; capability; Host market attractiveness	Positive
Qian *et al.* (2008)	Single; Regional diversification rather than DOI; count-based	Entropy measure of regional diversification	Accounting-based financial indicator	ROA and ROS	189 large US firms (1996 to 2000)	GMM	Multinationality; firm size; firm age; firm leverage; firm risk; R&D intensity, product scope; industry effect	Positive when regional diversification is low to moderate; curvilinear and negative when regional diversification is moderate to high
Lin *et al.* (2011)	Three dimension: foreign sales; foreign production; geographic dispersion; both sales-based and count-based	Composite measure covering FSTS, FATA and geographic dispersion	Accounting-based financial indicator	ROA	197 Taiwanese high-manufacturing firms (2000-2005)	GLS regression	Moderating variables: high-discretion slack; low-discretion slack; attainment discrepancy; Control variables: firm age; firm size; insider shareholding; degree of diversification; R&D intensity	Negative; high-discretion slack; low-discretion slack and attainment discrepancy positively moderate I-FP
Hsu *et al.* (2013)	Single; sales-based	Composite index based on FSTS, FATA, and no. of foreign countries	Accounting-based financial indicator	ROA	187 Taiwanese SMEs covering eight industries (food and beverage, plastics, textiles, electric machinery, chemicals and biotechnology, rubber, information and electronics, and other miscellaneous industries, 2000-2009)	GLS regression	CEO attributes as moderating variables; Control variables including firm size, debt ratio, R&D intensity, product diversity and sub-industry effect	Positive when using FSTS/FATA; inverted U curve when using number of countries; CEO's attributes have different types of moderating effect on I-FP
Tsai (2014)	Single;	FSTS	Accounting-based	ROA	155 Taiwanese firms	Multivariate	Firm size; firm age	S curve; R&D intensity

	Sales-based		financial indicator		(2011)	regression	industry effect	and learning capacity positively moderate I-FP
Powell (2014)	Single; count-based	Count ofhost countries where a firm maintains offices in an observation year divided by the sample maximumnumber of host countries across all observation years.	Accounting-based financial indicator	Profits-Per-Partner (PPP); Revenue-Per-Lawyer (RPL); downside risk on PPP; downside risk on RPL	102 US largest law firms (1986 to 2008)	OLS regression	Firm age; firm size; ratio of associates to partners; international experience; environmental complexity etc.	S curve; firm-specific optimal levels of internationalisation exists so we need MA-P relationship.
Shin et al. (2017)	Single; count-based	The mean of two ratios (0 to 1): [the number of foreign affiliates/the max number in samples], and [the number of countries/the max number]	Accounting-based financial indicator	ROA, with robustness test of ROE	1082 Spanish micro service firms over an eight-year period 2005-2012	Feasible generalised least square regression	Firm age, Firm size, Indebtedness, Entry Mode	Inverted U-Shaped relationship for knowledge intensive micro service firms; U-shaped relationship for capital intensive micro service firms.

FSTS: Ratio of foreign to total sales; FATA: Ratio of foreign to total assets; ROS: Return on sales; ROA: Return on assets; ROE: Return on equity.

*This list has been adopted from Li (2007). We have updated the list by adding the empirical I-FP studies appearing in Grade 3 and Grade 4 journals in the Association of Business Schools' Academic Journal Guide 2015 from 2005 onwards

Appendix 2- Coding Scheme

Step 1: We used the names of the companies as keywords to search within five major international publications from 2002 to 2013, including *Economist, Forbes, The Wall street Journal, Financial Times,* and *Fortune* in the FACTIVA database. The result covered 324,503 articles mentioning these 242 firms.

Step 2: We randomly selected 100 reports. Two researchers read the 100 reports independently, and identified and recorded the positive and negative terms. Positive terms include, e.g. "profit", "great", "excellent", "better", etc. Negative terms include, e.g. "lower", "loss", "tumble", "worse", etc. The two researchers discussed the use of these positive and negative terms, and made an initial coding scheme. For each report, when a positive term appears, the valence score +1; when a negative term appears, the valence score -1. If the valence score is a plus figure, then the report is a positive one. If the valence score is minus figure, then the report is a negative one.

Step 3: We then randomly selected 200 reports from the rest. Using the initial coding scheme, we found that the accuracy rate was only 60% by applying this initial coding scheme in these 200 reports. We then analysed the reasons: the initial coding scheme did not consider (1) the weights for the positive and negative terms; (2) the use of exclamation marks in the reports; (3) the use of negative and double negative verbs in the reports. After identifying the reasons for the low accuracy rate, we developed additional criteria for coding- when a negative/positive verb appears, the valence score -/+1; when an exclamation mark appears, the weight doubled.

Step 4: We then again randomly selected 200 reports from the rest. Using the new coding criteria the two researchers worked out the valence scores of the 200 reports independently. We found 180 reports' valence scores matched. The inter-reliability reached 0.9. This confirmed the validity of the new coding criteria.

Step 5: According to the new coding criteria, we developed the coding scheme to work out the valence scores of all reports. We used the number of positive media reports (logged) in our analysis because it is less correlated with firm size.

Appendix 3. Robustness Test*

Variables	Models (measured by ROS)								
	Model 1	Model 2(1)	Model2(2)	Model 3	Model 3 (without firm size)	Model 4	Model 5	Model 6	Model7
Firm size(C1)	4.945281* (7.68423)	5.048307* (11.07389)	2.004237* (13.54012)	5.189341* (8.76584)	---	5.127766* (8.27624)	5.416294* (19.14323)	5.570085* (19.75322)	4.388511* (16.43219)
Firm age(C2)	-6.617293* (1.86415)	-6.0390879** (7.05321)	-4.622829** (5.97523)	-4.912278* (6.17745)	-5.743281* (13.32589)	-6.321541 (9.55317)	-5.207861* (6.99810)	-4.186061* (15.72462)	-3.875921* (12.98137)
Firm reputation(C3)	0.9401342* (13.44651)	0.8633676 (12.11942)	1.076052* (13.72419)	1.059469* (13.65274)	1.001924 (12.97368)	0.8723115* (12.19764)	1.049534** (13.43291)	1.242456** (13.79543)	0.965936** (13.93480)
GDP per capita	0.0004371* (4.87254)	0.0003245* (3.98761)	0.0005116 (2.11705)	0.0003359* (2.00973)	0.0007645* (10.68003)	0.0006006* (12.65808)	0.0007101 (2.98509)	0.0005034* (11.28791)	0.0003783 (12.95891)
Internationalisation		-3.449215* (12.10956)	-4.37662* (16.02692)	-5.122284* (16.18273)	-6.734210* (12.98773)	-3.766986 (12.85719)	-5.108191** (6.96542)	-5.956504 (7.84328)	-4.366151* (16.98643)
Internationalisation^2			-0.00008651 (3.14721)					---	---
AHR				0.14965* (2.01765)	0.11032* (12.56920)			0.15267* 12.78431	0.17489** 13.90412
AHR^2				0.35703 (3.00112)	0.43061* (12.87539)			0.65022* (0.99840)	0.566042** (3.73718)
Inter'n-AHR				0.041* (12.68247)	0.03176* (12.58935)			0.0481* (12.74765)	---
Inter'n-AHR^2				-0.014* (0.29543)	-0.0093* (2.96349)			-0.015* (2.99216)	---
OAR						-2.660195		2.12218	---
OAR^2						-3.317002		2.878702	---
Inter'n-OAR						2.512562		-7.759444	---
Inter'n-OAR^2						1.238864		3.287761	---
USR							1.856058* (12.68091)	1.840752* (11.74907)	1.773831* (11.87916)
USR^2							1.347226* (12.78918)	0.988561* (12.01127)	1.004511* (12.65804)
Inter'n-USR							1.699797*	1.683103*	---

							(11.09160)	(11.99728)	
Inter'n-USR^2							-0.2099052** (3.75134)	-0.2072236** (3.87115)	---
Dummy variable: Year	controlled	controlled	controlled	controlled	controlled	controlled	controlled	controlled	controlled
R^2	0.1022	0.1051	0.07644	0.1264	0.1135	0.1082	0.1223	0.1401	0.1037
Adjusted R^2	0.0972	0.0876	0.0643	0.1109	0.1007	0.0980	0.1107	0.1296	0.0928
F-Value	30.54	24.26	6.84	15.73	18.87	17.29	26.01	15.86	18.45

N=1914; ***p<0.001, **p<0.01, *p<0.05

Robust Standard Errors are within parenthesis

* Based on the reviewers' comments, we have also done two additional tests in Appendix 3. **First**, we included GDP per capita in the empirical model when we conducted the test of robustness. Our results show that in general there is a positive relationship between GDP per capita and firm performance, although this positive relationship is very weak. We believe that this finding can be explained by the knowledge-intensive nature of engineering services. When we look at the development of engineering services globally, most of the established engineering services firms are in developed countries (as shown in our sample) where GDP per capita is relatively high. Engineering services are based on advanced knowledge and technologies, which are mostly concentrated on developed countries. This relationship is like: developed countries (higher GDP per capita) → advanced knowledge/technologies→stronger ESF performance. We do not include this in the body text of the paper, as it is an additional test and we do not have a hypothesis for this relationship in our literature review. We therefore place this additional note here. **Second,** we removed firm size from Model 3 and re-run the model because the variable "number of employees" has been used twice in Model 3. The results are shown in the Model (without firm size). From the results we can see that H2 is consistent in both models.

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