How Firm Age and Size Influence Value Creation from Cloud Computing

Shailaja Jha
SP Jain Institute Of Management & Research, shailaja.jha@spjimr.org

Abhishek Kathuria
Indian School of Business, abhishek_kathuria@isb.edu

How Firm Age and Size Influence Value Creation from Cloud Computing

Completed Research Paper

Shailaja Jha
S.P. Jain Institute of Management & Research
Mumbai, Maharashtra, India
shailaja.jha@spjimr.org

Abhishek Kathuria
Indian School of Business
Hyderabad, Telangana, India
abhishek_kathuria@isb.edu

Abstract

Most studies of value creation from cloud computing have examined firms that are old in age and large in size. We theorize different value appropriation pathways from cloud computing dependent upon the age and size of a firm, such that there are different pathways for younger firms as compared to established firms, and smaller firms as compared to larger firms. We hypothesize that established firms gain more Business Performance from Enterprise Cloud Capability – a higher-order capability formed of three second-order cloud computing capabilities, through the mediation effect of Business Responsiveness, whereas younger firms gain more Business Performance directly from Enterprise Cloud Capability. We further hypothesize that smaller firms achieve higher Business Performance through the mediating effect of Business Scalability, whereas larger firms achieve more Business Performance directly from Enterprise Cloud Computing. Partial least squares analysis of matched pair survey data from 197 firms in India provides support for our theory.

Keywords: Cloud computing, responsiveness, scalability, firm performance, young firms, small firms, established enterprises, large enterprises.

Introduction

Digital transformation is a strategic imperative for firms in the post-pandemic world. Cloud computing represents a critical building block for digital transformation. Thus, the successful leverage of, and value creation from, cloud computing is essential. Several surveys and studies have established the positive impacts of cloud computing on organizational outcomes, such as firm performance (Battleson et al. 2016; Choudhary and Vithayathil 2013; Garrison et al. 2012). However, value creation from cloud computing is heterogeneous across organizations. This is because of the multifaceted nature of cloud computing technologies and heterogeneity in the characteristics of organizations that seek to leverage cloud computing.

The *National Institute of Standards and Technologies* defines cloud computing as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" (Mell and Grance 2011). Thus, cloud computing refers to a combination of several IT technologies developed over multiple decades. Such technologies include various hardware, virtualization, distributed computing, and delivery of "IT as a service" over the internet. Hence, to appropriately examine value creation from cloud computing, it is prudent to conceptualize a holistic, organizational-level variable that encapsulates the multitude of cloud computing technologies and the corresponding multitude of capabilities facilitated by these technologies.

Contingency Theory suggests that the achievement of organizational goals is a function of the fit between a firm's strategy, its competitive surroundings (Livari 1992), and a set of circumstances at a particular point in time (Luthans and Stewart 1977). Thus, organizational outcomes are dependent upon several contingency factors (Zott and Amit 2008). While firm size and firm age have been established as key contingencies for

organizational outcomes, most studies of value creation from cloud computing have been conducted in the context of firms that are old in age and large in size. Examinations of firms that are younger and smaller are rare. Accordingly, we draw on Contingency Theory to theorize that firm size and firm age explain differences between firms and the business performance they can appropriate from Cloud Computing.

Younger firms and smaller firms are economically important and constitute an important constituency for research examination. Younger firms are responsible for significant growth in U.S. employment, economic output (Haltiwanger et al. 2013), and innovation (Kortum and Lerner 2001). Smaller enterprises constitute 90% of all organizations globally. These play an essential role in both developed and developing economies, employing 47% of the workforce in the US alone, with a much larger share in developing economies (Nichter and Goldmark 2009). Smaller enterprises also constitute a significant portion of global economic output. Nonetheless, younger firms and smaller firms differ from established firms and larger firms. Smaller firms suffer from a lack of slack resources, which constrains their ability to grow during boom times and survive during duress. These notions are reinforced by research on the "liability of newness" and the "liability of smallness" (Stinchcombe 2000). New (small) organizations may have an inability to compete with established (large) organizations and have lower legitimacy.

Given such well-established differences across young and established, small and large firms, it is plausible that these differences include a difference in the business value creation from cloud computing. For example, post-COVID-19, digitization and cloud adoption saw an accelerated use of cloud-based products by small enterprises in India. *Gimbooks*, which offers cloud-based business management and accounting services to small firms in India, saw its platform grow 2X-3X times between March 2020 and June 2021. Thus, we seek to understand differences across young and established, small and large, organizations in leveraging cloud capabilities to achieve performance. Specifically, we pose two research questions:

RQ1: "How do younger and established firms differ in business performance from cloud computing?"

RQ2: "How do smaller and larger firms differ in business performance from cloud computing?"

To address these research questions, we conceptualize *Enterprise Cloud Capability* as a higher-order capability that is constituted by (formed of) three second-order capabilities identified in prior literature: *Cloud Technological Capability* (*CTC*), *Cloud Service Portfolio Capability* (*CSPC*), and *Cloud Integration Capability* (*CIC*) (Kathuria et al. 2018). We posit that *CTC*, *CSPC,* and *CIC* in conjunction form the *Enterprise Cloud Capability* and reinforce each other.

Our rationale for conceptualizing *Enterprise Cloud Capability* as a higher-order capability lies in the established notion that broader (higher-order) constructs are better predictors of phenomena spanning multiple domains. Our goal is to assess the appropriation of business performance, which is a broadly defined variable. Thus, a higher-order multi-dimensional construct — formally, a Hierarchical Component Model, for *Enterprise Cloud Capability* is a more parsimonious, comprehensible, and therefore appropriate model. Furthermore, *Enterprise Cloud Capability* is a holistic, organizational-level variable encapsulating the multitude of cloud computing technologies and corresponding capabilities facilitated by these technologies.

We theorize that *Business Responsiveness* mediates the link between *Enterprise Cloud Capability* and a firm's *Business Performance*, thus serving as the means for appropriation of business performance from cloud computing. Critically, we suggest that this mediation relationship is contingent upon firm age. We hypothesize that while younger firms achieve higher *Business Performance* directly from the use of *Enterprise Cloud Computing*, established firms achieve higher *Business Performance* through the mediating effect of *Business Responsiveness*. We further hypothesize that *Business Scalability* also mediates the link between *Enterprise Cloud Capability* and a firm's *Business Performance*, serving as another means for appropriation of business performance from cloud computing. Here, we suggest that the nature of this mediation relationship depends upon firm size. We hypothesize that smaller firms achieve higher *Business Performance* through the mediating effect of *Business Scalability*, whereas larger firms achieve more *Business Performance* directly from *Enterprise Cloud Computing*. Thus, in sum, we theorize different value appropriation pathways from cloud computing dependent upon the age and size of a firm, such that there are different pathways for younger firms as compared to established firms and smaller firms as compared to larger firms. Our research model in presented in Figure 1.

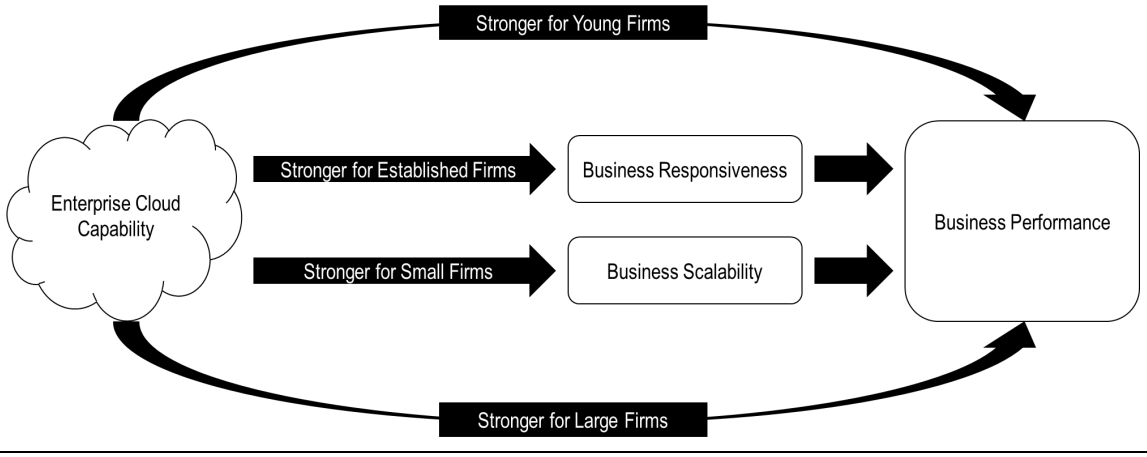

Figure 1. Research Model

To test our theory, we collected primary matched pair survey data from 197 firms in India. We consider respondent firms as young firms if they have been in operation for less than or equal to 5 years. Though some studies have defined firm age based on the time of market entry, most prior research has used the time of organization founding to conceptualize newness (Henderson and Cockburn 1994). Our study uses the latter definition for firm age. Thus, newly founded organizations (and not new units within an established corporation) are considered young firms. Also, we consider respondent firms as small firms if they have less than 100 employees (Chen and Hambrick 1995). Overall, our sample consists of equal numbers of young and established firms, while half of the firms are small, and the other half are large firms. Empirical analysis using partial least squares provides support for our primary thesis that there exist different value creation pathways from *Enterprise Cloud Capability* for younger and established, and smaller and large firms.

This study makes three main contributions to theory. First, our comparisons of younger and established firms and of smaller and large firms extend and enhance IT business value literature conducted in the context of established or large firms by uncovering firm age and firm size as contingency variables for the information technology and firm performance relationship. Second, by highlighting different value appropriation pathways, we suggest equifinality to value creation from cloud computing and thus add to the growing literature on cloud computing. Third, the study provides empirical evidence that a new or small firm's ability to leverage IT as a service, being able to "rent" IT from the cloud providers for a value offering, is correlated with positive business performance. Since doing so could enable survival of such firms, our results suggest that cloud computing may provide ways to counter the *"Liability of Newness"* and the *"Liability of Smallness"* afflicting young and small firms respectively. In sum, we affirm the notion that firm age and size matter for value creation from cloud computing.

Theoretical Background

Younger versus Established Firms

Literature on young firms is dominated by two overarching themes. The first theme is survival and performance of young firms and the second theme is the innovation that young firms bring to markets. The seminal paper on "Liability of Newness" (Stinchcombe 2000) held that "Younger organizations have a higher propensity to die than old organizations. The liability of newness occurs because young organizations must learn new roles as social actors, coordinate new roles for employees and deal with problems of mutual socialization of participants, because of their inability to compete effectively with established organizations and their low levels of legitimacy". Empirical studies of "*Liability of Newness*" have found consistent support for the theory. Negative correlations between age and firm survival persist.

Apart from survival, research suggests that younger firms have several advantages and disadvantages compared to established firms. Younger firms have been known to drive employment and output growth (Foster et al. 2016). Contribution of new or younger firms in economic growth has been found to be larger than the contribution of small firms (Haltiwanger et al. 2013). Young firms have been characterized by higher innovativeness (Kortum and Lerner 2001). Some studies have suggested that young firms that cannot use existing knowledge (Cohen and Levinthal 1990) and resources (Teece 1986) may have trouble innovating. However, research has pointed to the opposite as well. Young firms have been observed to be highly innovative because their innovative efforts do not cannibalize their existing products and organizational routines and structures that may come in the way of innovativeness (Henderson and Clark 1990). Young firms have also been seen to be more compatible with adopting radical innovation over incremental innovation. These firms are seen as more effective innovators in environments where a lack of resources is a benefit and worse in an environment where a lack of resources is a constraint (Katila and Shane 2005). Younger firms also tend to use resources creatively as they do not have specialized structures and routines that prevent firms from thinking about new uses of existing resources. They perform better under conditions of competitive ambiguity. Young firms may exploit markets that are too small or too hard for more established firms to tap (Christensen and Bower 1996), These firms may not be constrained by existing commitments, older organizational structure, or the constraints of serving existing customers or supplier relationships. These factors may propel them towards greater innovation.

Smaller versus Large Firms

According to research, smaller firms have various advantages and disadvantages when compared to larger firms. Small businesses have the benefits of having less bureaucratic procedures (Vossen 1998), the ability to provide personalized attention to individual customers (Rothwell 1989), a tendency to form alliances (Gomes-Casseres 1997), and better management of external relationships (Street and Cameron 2007). In contrast, larger companies may experience inefficiencies in managerial coordination and a more extended chain of command, leading to a loss of flexibility (Vossen 1998). Smaller firms, on the other hand, can make decisions quickly, are more motivated and committed, and adapt more quickly to changing markets.

Various factors hinder smaller firms from competing with large companies (Kale and Arditi 1998). Resource scarcity is the primary disadvantage of smaller firms, which includes a lack of both financial and managerial resources. Smaller firms lack financial support from creditors (Aldrich and Auster 1986) and have limited organizational slack (Azadegan et al. 2013), which restricts their strategic movements and ability to handle market uncertainties. They may have limited access to information (Chowdhury and Lang 1996) required for developing strong core organizational capabilities for instance, for marketing and managing strong supply chain relationships. Additionally, small businesses often struggle to attract qualified and competent personnel, resulting in managerial imperfections such as inflexibility, closed cultures, and nepotism (Kale and Arditi 1998). Lastly, they encounter challenges related to operational weaknesses, including undercapitalization, inadequate record-keeping and systems, poor cash flow management, limited access to information, and ineffective marketing tactics (Chowdhury and Lang 1996; Kale and Arditi 1998).

Information Systems Research on Young or Small Firms

There has been some research on the role of IS in young or small firms during the past millennium (Blili and Raymond 1993; Cragg and King 1993; Harrison et al. 1997). These studies have investigated factors enabling technology adoption, usefulness, advantages of IS, and IS implementation successes (DeLone 1988), overall IS appropriateness and effectiveness, in either young firms, or small firms. The attitude of the small business owner has been seen as an important factor in determining IS success. IS decision making in small firms has also been studied and post implementation issues and training and ongoing user support have been investigated (Harrison et al. 1997). Barriers to the adoption of eCommerce by young or small firms have also been examined, showing that established or large firms have benefitted more than young or small firms in both improved sales and costs savings (Riquelme 2002). The underlying reasons for these differences were insufficient resources, including limited financial funding, managerial availability, and in-house knowledge and skills.

Though young or small firms may have been traditionally reluctant to invest in IS, the recent decades have seen an increasing awareness and adoption of IS by both managers and owners in such firms. Young or

small firms have not only adopted IT for operational needs like reducing costs and increasing productivity as also for strategic reasons – e.g., for digital transformation or innovation (Dibrell et al. 2008), necessitating an examination of value appropriation from cloud computing by young or small firms. Being young means a firm has not yet been in operation for a long time and has not yet established processes, rituals, structure, and customer base, that enable its long-term existence and survival. When these milestones are covered the firm survives the selection process. Smallness and newness mean there is not enough slack, and the company still has to get over the initial threshold of survival and has to perform established rituals, structures, and processes.

Cloud Computing

We conducted a systemic literature review of the research in cloud computing by adopting the classification scheme of Yang and Tate (2012) and classified cloud research themes into business issues, conceptualization, domains and applications, and technology issues. Business issues include the business implications of cloud computing. The most commonly occurring research area (sub-theme) in this theme is about cloud adoption and factors that enable adoption in enterprises and individuals or constrain the same. Cloud adoption studies have also included studies on the business value of cloud migration.

Cloud conceptualization is another research theme. Papers that contribute to the foundations of cloud computing, which are the most cited conceptual cloud papers belong to this category (e.g., Armbrust et al. 2010; Buyya et al. 2009; Mell and Grance 2011; Yang and Tate 2012). Adding to the conceptualization stream of literature is research on the business impact and business value of cloud computing. These papers note that cloud computing helps organizations focus on core business, experiment with new business models, mitigate business risks, and create applications that work on mobile and social platforms (Iyer and Henderson 2012). Some researchers have also suggested that client evaluation and cloud service quality play a critical role in ensuring vendor continuance with a specific client (Benlian et al. 2011).

As cloud computing use in enterprises matures, there are increasing numbers of papers dealing with pricing and FinOps in the cloud (Dierks and Seuken 2022; Ma and Seidmann 2015). Cloud computing resources may be priced using different mechanisms, and research has considered how pricing and discounts can be optimized, thereby increasing the business value of cloud computing (Chen et al. 2021; Cheng et al. 2016; Demirkan et al. 2010). On the cost sub-theme, studies support the argument that cloud computing has lowered startup costs however long-term costs, as well as transparency in the costing structure remain a concern.

Research has focused on legislation to establish appropriate legal frameworks that facilitate the adoption and development of cloud computing (e.g., Gray 2013; Joint and Baker 2011). These studies refer to the nonexistence of universal laws in cross-geography scenarios.

The technological issues category focuses on the technical details of cloud computing – for example, cloud computing performance, data management, data center management, software development, and service management have been studied (e.g., Winkler and Brown 2013). Papers have also analyzed security in the cloud and suggested safeguards (Choudhary and Zhang 2015). Pricing and licensing models have also been analyzed in detail (e.g., Choudhary 2007; Li et al. 2017). Research shows that in many cases, though the "renting" of IT services via the cloud becomes incrementally expensive, resulting in firms moving out of the cloud to their own data center, cloud technologies would have enabled early experimentation and establishing of a viable business model (Metz 2016).

On the domain front, there is sector-specific research on cloud-enabled business ecosystems. Depending on the contextual factors in an enterprise, cloud computing may generate business value and the path to value creation could be through decoupling, platformization, and recombination (Benlian et al. 2018).

Studies have also concentrated on cloud computing adoption by small firms as also young firms. Usage intention has also been researched (Benlian et al. 2011). Oliveira et al. (2014) discussed the adoption of cloud computing by small firms using the DOI and TOE perspectives. The study revealed firm size as a critical predictor of cloud computing adoption with larger firms having the resources to cover the risks and costs of emerging cloud computing use. Small firms need more know-how and resources for the implementation of cloud solutions. The ability to "rent" IT through the cloud has been studied to be associated with much higher rates of survival and performance among young manufacturing plants in the

US (Jin and McElheran 2017). Based on the nature of IT services investments, young plants with cloud-based implementations exhibited higher productivity than older plants with traditional IT. Cloud computing has thus provided an impetus to the startup boom (McKendrick 2011). This research shows that young firms learn to become efficient as they produce their products, accumulate critical knowledge on processes, and build managerial practices, and customers and supply chain partners.

Theoretical Development

Enterprise Cloud Capability

Prior research has conceptualized a hierarchy of cloud computing capabilities. We conceptualize *Enterprise Cloud Capability* as a higher-order composite capability that is formed of three second-order capabilities identified in prior literature: *Cloud Technological Capability* (*CTC*), *Cloud Service Portfolio Capability* (*CSPC*), and *Cloud Integration Capability* (*CIC*) (Kathuria et al. 2018). We posit that *CTC*, *CSPC,* and *CIC* in conjunction form the *Enterprise Cloud Capability* and reinforce each other.

Note that our conceptualization of *Enterprise Cloud Capability* as a higher-order composite capability composed of these three second-order capabilities is consistent with, and not contradictory to, the underlying relationships conceptualized in the prior work. Instead, our conceptualization extends the prior theorization, such that the composite higher-order capability is formed of second-order capabilities, which have these hierarchical relationships amongst themselves. The presence of these underlying relationships does not preclude the existence of a higher-order capability at the enterprise level that is composed of these capabilities.

As defined in prior literature, *CTC* is the capacity of a firm to deploy cloud-based platforms that are available on-demand via the internet to serve consumers via the pooling of resources in a scalable and measurable manner (Kathuria et al. 2018). This capability is formative and encapsulates essential characteristics of cloud computing: on-demand, broad network access, resource pooling, rapid elasticity, and measured service (Mell and Grance 2011). This capability reflects the quality of the cloud infrastructure for how scalable, elastic, and stable it is.

Prior research conceptualizes *CSPC* as a second-order construct that comprises *Cloud Market Offerings Capability (CMOC)* and *Cloud Service Offerings Capability (CSOC)* (Kathuria et al. 2018). *CMOC* reflects a firm's ability to align its cloud service with other provider's external offerings. *CSOC* is the ability to enable service by dynamically committing resources based on business needs. This is enabled by dynamic discovery, resource pooling, and orchestrating all IT resources.

CIC is defined as the ability of a firm to maintain consistency between its cloud-enabled functionality and data and legacy system's functionality and data (Rai et al. 2006). *CIC* is also a second-order construct and comprises *Cloud Legacy Consistency Capability (CLCC)* and *Cloud Legacy Synchronization Capability (CLSC)* (Kathuria et al. 2018). *CLCC* is defined as the degree to which application functionality and application data elements are common across the cloud and legacy applications in the firm. *Cloud Legacy Synchronization Capability (CLSC)* is defined as the degree to which cloud and legacy functionality and application data are updated and synchronized with each other in real time.

Prior research has established that enterprise flexibility, a higher-order construct formed of responsiveness and scalability, partially mediates the effect of cloud computing capabilities (e.g., *CPSC* and *CIC*) on firm performance (Kathuria et al. 2018; Mann et al. 2016). Accordingly, per this rationale, we posit that the effects of *Enterprise Cloud Capability* are mediated by responsiveness and scalability.

Enterprise Cloud Capability and Business Performance

We posit that *Enterprise Cloud Capability* has a direct effect on *Business Performance* due to two mechanisms: operational and process improvements due to enhanced information management and service improvements due to enhanced service design and maintenance (Kathuria et al. 2018).

Furthermore, we theorize that *Enterprise Cloud Capability* has an indirect effect on Business Performance through *Business Responsiveness*. *Business Responsiveness* is the firm's ability to quickly manage its resources to cope with expanding or diminishing business needs and is achieved through predictive change

management processes (Tiwana and Konsynski 2010). Responsiveness enables the ability to adapt rapidly and cost-efficiently in response to the changes in the business environment. It includes sensing and responding ability, whereby one can sense environmental changes and respond appropriately to them.

Enterprise Cloud Capability enhances the sensing capacity of organizations by enabling them to receive information from supply chain and customer applications in a ubiquitous manner. *Business Responsiveness* also allows a firm to respond to changes in the business environment by quickly reallocating and reconfiguring organizational strategies, resources, and processes (Tiwana and Konsynski 2010). It is achieved through through analysis of performance-relevant metrics, which is enabled by *Enterprise Cloud Capability*.

An elastic portfolio of cloud services at a firm level (i.e., *Enterprise Cloud Capability*) enables it to adapt its services to meet changes. Firms that use the cloud to design and deploy service offerings will be able to sense business opportunities and provide innovative offerings with the leverage of cloud computing faster than if they were dependent on traditional On-Premises IT. Consequently, their ability to sense and respond is enhanced. Second, responsiveness is also enhanced by the alignment and interoperability of cloud systems with the offerings of market participants. In conjunction with the above rationale, we posit the following:

H1: Business Responsiveness mediates the positive effect of Enterprise Cloud Capability on Business Performance.

Further, we theorize that *Enterprise Cloud Capability* has an indirect effect on *Business Performance* through *Business Scalability*. *Business Scalability* is the firm's ability to quickly manage its resources to cope with expanding or diminishing business needs and is achieved through predictive change management processes (Tiwana and Konsynski 2010). A scalable portfolio of cloud services at a firm level (i.e., *Enterprise Cloud Capability*) enables it to adapt its services to meet changes. Firms that use the cloud to design and deploy service offerings will be able to register changes in demand and the environment. Cloud will enable them to ramp up and ramp down infrastructure resources in use in response to the requirements from the environment. While business responsiveness stresses on quick sense and response, business scalability is primarily concerned with the ramping up and down of infrastructural resources in response to organizational or environmental needs. The flexibility-deriving mechanisms of responsiveness and scalability are entirely different. In conjunction with the above rationale, we posit the following hypothesis:

H2: Business Scalability mediates the positive effect of Enterprise Cloud Capability on Business Performance.

We further theorize that young firms may accrue more business performance benefits directly from *Enterprise Cloud Capability*. Recent literature suggests that younger firms take better advantage of technology. Younger firms have been known to leverage cloud computing and other new-age technologies, thereby providing legitimacy and scalability to these firms. The benefits cloud computing provides firms is unprecedented, and anecdotal evidence suggests that start-ups are leveraging the cloud to experiment and scale rapidly in ways that may be transformative for them as well as the economy in which they operate (Manyika et al. 2011). Firms in the early stage of lifecycle dynamics encounter uncertainty of demand and the lowest ability to meet the same (Jovanovic 1982). Inexperience makes it difficult to discern risky irreversible decisions. Lowering the costs of learning through experiments (Kerr et al. 2014) enhances the likelihood of investing in projects with high real-value options (Ewens et al. 2018). This constraint becomes relevant for decisions over complementary inputs such as IT, as well. The lower upfront investment costs as well as the ability to scale up and down IT expenditure through cloud technologies will be more valuable for firms in their early years. Later as risks and uncertainties get resolved with years of operation, firms can maximize IT value through capital investments. Thus, investments in cloud capabilities will tend to have higher impacts for younger firms.

On the contrary, we posit that established firms may accrue more *Business Performance* from the *Business Responsiveness* benefits of *Enterprise Cloud Capability*. Responsiveness enables the ability to cope with unpredictable changes and survive threats in the environment. Established firms suffer from resource dependencies and competing priorities that result in artificial shortages of IT resources. *Enterprise Cloud Capability* creates the wherewithal to circumvent IT resource shortages, thereby being able to grasp business opportunities better. Hence, we offer the following hypotheses:

H3a: The direct effect of Enterprise Cloud Capability on Business Performance is stronger for young firms compared to established firms.

H3b: The effect of Enterprise Cloud Capability on Business Performance mediated through Business Responsiveness is stronger for established firms compared to young firms.

We further theorize that small firms may accrue more business performance benefits from *Business Scalability*. Scalability refers to the idea of a system in which every application or piece of infrastructure can be expanded to handle the increased load. A paucity of resources forms one of the constraints on the business performance of small firms. *Enterprise Cloud Capability* creates the wherewithal to circumvent IT resource shortages, thereby enabling high gains in *Business Performance* for small firms. On the other hand, large firms may not witness such a fillip as they may not benefit from an elastic availability of IT resources as they would always have a critical mass of slack resources and thus would already be accruing these benefits. Hence, we offer the following hypotheses:

H4a: The effect of Enterprise Cloud Capability on Business Performance mediated through Business Scalability is stronger for small firms compared to large firms.

H4b: The direct effect of Enterprise Cloud Capability on Business Performance is stronger for large firms compared to small firms.

Methodology and Analysis

Sampling and Data Collection

To test our hypotheses, we developed two survey instruments and conducted a cross-sectional matched-pair field survey of organizations in India. India is a major emerging economy with a rapidly growing cloud services market consisting of a large number of users of cloud computing services. All three hyperscalers – *Amazon Web Services*, *Microsoft Azure*, and *Google Cloud Platform*, have an Indian region presence and support two or more availability zones. The investment of hyperscalers in India is considerable, and they are making an immense effort to enable large-scale cloud adoption. Many Indian firms have migrated part or all aspects of their application portfolio to the cloud. Many firms practice the "cloud-first" strategy where new applications primarily get built on the cloud rather than being on-premise. Thus, India is an appropriate context for our study and forms the context or source of data for an increasing number of studies in IS and beyond (e.g., Karhade and Kathuria 2020; Kathuria and Karhade 2019; Kathuria et al. 2020; Kathuria et al. 2023; Kathuria et al. 2018; Kathuria et al. 2016; Saldanha et al. 2021).

The questionnaires were developed by adapting or adopting scales from extant literature. The description and definition of cloud computing from the *National Institute of Standards and Technology* served as the basis for the scales for the measure of *Enterprise Cloud Capability* developed in and adopted from prior research (Kathuria et al. 2018). After cross-validation, per norms of extant research conducted in India (e.g., Pradhan et al. 2021; Ramakrishnan et al. 2018; Ramakrishnan et al. 2022), the items were localized through the *back-translation method*. Multi-lingual research assistants translated the questionnaires into local languages, and another translated them back into English. The original and back-translated questionnaires were then compared to ensure conceptual equivalence. To assess content validity, we interviewed four senior executives about their interpretation of the questionnaire items. Items were revised and then used to conduct a pre-test with four senior IT executives and two academic experts, followed by a pilot test with a small convenience sample from the targeted population. The instruments were refined and finalized after assessing reliability, convergent and discriminant validity, and predictability.

To minimize the effect of confounding factors due to uneven economic development prevalent in an emerging economy, we followed a sampling strategy of drawing our sample from firms located near two emerging commercial hubs in western and southern India. Specifically, we collated the business, industry, and city directories of the two metropolitan agglomerations, which resulted in an initial sample of organizations. We then removed inactive organizations with no filings with India's Ministry of Corporate Affairs in the prior two years, resulting in a sample of active organizations. We then contacted each organization via telephone to validate the directory information and removed organizations that did not have business operations in either of the two commercial hubs. This resulted in a validated sample of organizations.

We collected *matched-pair data* through anonymous surveys of volunteering organizations administered using a *dual online-offline mode* - an online and in-person methodology developed to collect primary data in India (Kathuria et al. 2018). This methodology enables increased response rates and data reliability during survey administration and has been used extensively in prior studies that collect data in India (e.g.,

Khuntia et al. 2019; Ning et al. 2020; Ning et al. 2019; Ramakrishnan et al. 2020a; Ramakrishnan et al. 2020b).

Specifically, first, in the *online mode*, trained local research assistants sent emails to firms soliciting participation. These invitations explained the study's purpose and benefits and incentivized participation by promising a summary of our findings and a small souvenir. Second, the research assistants made two follow-up calls to confirm participation and collect the contact details of two potential respondents. These steps validated that organizations conducted business via the Internet at these locations and resulted in increased participation rates due to the follow-up calls. Third, in the *offline mode*, surveys were administered by the research assistants in person during onsite visits. These visits enabled the research assistants to address confidentiality concerns, thereby improving response rates. The assistants were also able to physically verify that the firm met eligibility criteria and that respondents were authentic.

Separate questionnaires were administered to collect the independent and dependent variables. The first questionnaire, containing questions on the independent variable *Enterprise Cloud Capability*, was administered to top-ranking IT executives. The second questionnaire, containing questions on mediating - *Business Responsiveness* and *Business Scalability*, and the dependent variable - *Business Performance*, respectively, was administered to the top-ranking executives in the firms. Control variables and firm characteristics were measured in both questionnaires.

After dropping incomplete responses, the final sample had 197 firms hailing from multiple industries such as manufacturing, IT and services, food, and healthcare. Firms operating for 05 years, or less than 05 years, were classified as young firms, which constitute above 40% of our sample. Organizations with less than 100 employees were categorized as small firms, and small firms constitute half of our sample. Response bias is not a significant concern with no differences between participating and non-participating firms.

Addressing Common Method Bias

We followed a comprehensive research design to minimize the threat of common method bias. We undertook two steps each prior to and during data collection. First, we used different scales (5- and 7-point Likert scales) to measure the independent and other variables (Kathuria et al. 2018; Podsakoff et al. 2003). Second, we used a matched pair design to separate the sources of information. *Enterprise Cloud Capability* related variables were collected from the top-ranking IT executive in the firm, whereas the other variables, which are related to business contingencies and outcomes, were collected from the senior-most business executive in the firm. This well-established approach has been adopted in several prior IS studies (Kathuria et al. 2018; Tiwana and Kim 2015).

We then performed two post-hoc analyses after collecting the data to assess common method bias (Podsakoff and Organ 1986). First, we performed Harman's one-factor test, in which no single major factor emerged. Only 39% of the variance was accounted for by the largest factor. Second, we applied the partial correlation method, in which the highest factor from a factor analysis was added to the PLS model and did not produce a significant change in the variance explained. Together, the test results suggest that common method bias is not a concern.

Overall, our collective *a-priori* and *post-hoc* approach mitigates concerns regarding common method bias within the constraints of primary data collection in our context.

Variables

Measures for the variables that form *Enterprise Cloud Capability* were adopted from prior literature (Kathuria et al. 2018). For example, *CLSC* was measured as a three-item formative construct that captured the organization's cloud systems synchronized functionality, synchronized data, and communicated with legacy systems in real time (Kathuria et al. 2018). Similarly, *CLCC* was formed of four items that assessed the commonality of key data elements, consistency of data, definitions of key functional elements, and

consistency of functional elements stored across cloud and legacy applications (Kathuria et al. 2018). A similar measurement approach was taken for all the elements of *Enterprise Cloud Capability*.

Business Responsiveness was measured as a five-item reflective construct adopted from prior literature (Kathuria et al. 2018; Tiwana and Konsynski 2010). The items captured the firm's ability to be responsive to environmental changes by quickly reallocating and reconfiguring its organizational resources, processes, and strategies. *Business Scalability* was measured as a five-item reflective construct adopted from prior literature (Kathuria et al. 2018; Tiwana and Konsynski 2010). The items captured the firm's ability to be scalable in response to environmental changes by enlarging or reducing its organizational resources, processes, and strategies. *Firm Age* was measured as the number of years of operation of the firm. Organizations operating for 05 years, or less than 05 years, were classified as young firms. *Firm Size* was measured as the number of full-time employees of the firm. Organizations with less than 100 employees were classified as small firms. *Business Performance* was measured using a four-item reflective construct adopted from prior research (Hult et al. 2005). The scales reflect whether the firm had increased revenue, enhanced profit margin, increased ROI, improved competitive advantage, reduced customer churn, and increased rate of customers switching from competitors over the past three years (Khuntia et al. 2021).

We collected five control variables. We controlled for a firm's resource endowment by controlling for whether it is privately owned or publicly listed and whether it is a foreign or domestic firm. We also measured strategic focus as a four-item measure of business strategy. We measured IT intensity as the firm's investment in IT as a percentage of its sales. Finally, we controlled for industry-level effects.

Analysis and Results

We performed partial least squares (PLS) analysis using Smart-PLS 4 to validate the measurement model and test the hypotheses (Ringle and Sarstedt 2016). We used PLS, which is a second-generation structural equation modeling technique because it makes no data normality assumptions and assesses the measurement model within the context of the theoretical model. Furthermore, PLS estimates interrelated dependence relationships and handles second-order formative constructs better than covariance-based SEM. Finally, PLS caters to comparisons of multiple data groups through the PLS Multi-Group Analysis assessment that enables the testing of significant differences in group-specific parameter estimates.

Measurement Model Assessment

We adopted a four-step approach to determine the psychometric adequacy of our measures. This approach followed a methods roadmap from prior research (Kathuria et al. 2018) and used separate procedures to assess the validity (both convergent and discriminant) and reliability of the reflective and formative constructs.

First, for all measures, we conducted a principal components analysis with varimax rotation. This generated the expected number of factors, with high loadings (above 0.70) and low cross-loadings (below 0.30). Items with low loadings were dropped.

Second, we assessed the reflective constructs of *Business Responsiveness*, *Business Scalability*, and *Business Performance*. We ran a confirmatory factor analysis to evaluate reliability. Cronbach's alphas were above the minimum recommended values with significant factor loadings ($p < 0.01$) (Nunnally 1978), suggesting sufficiently high reliability. We also evaluated internal consistency reliability through the composite reliability scores, which were above 0.90 for all three variables. Convergent validity was assessed through average variances extracted. These were greater than 0.50 and higher than the highest shared variance between all possible pairs of constructs for each construct. Outer loadings of all retained indicators were significant and above 0.70. We assessed discriminant validity via cross-loading analysis and the heterotrait-monotrait ratio. Outer loadings of the indicators always exceeded the cross-loadings on other constructs. The heterotrait-monotrait ratio was less than the conservative threshold of 0.85 for conceptually distinct constructs.

Third, we assessed the formative constructs related to *Enterprise Cloud Capability*. We evaluated convergent validity by performing redundancy analysis. The path coefficients were all above the suggested value of 0.70 when comparing the formative constructs' correlations. Multicollinearity is not a concern as the Variance Inflation Factors for the variables and all indicators were less than the threshold of 5. We also

evaluated outer weights, signs, and magnitudes for each indicator to assess convergent and discriminant validity. Overall, the model showed a reasonable reliability and validity measure and provided a satisfactory fit for the data across all indices (Hansen 1999).

Finally, we assessed the construct validity of the higher-order formative constructs. First, we evaluated whether the first-order indicators reliably measured the second-order constructs by testing for the existence of a statistically significant path coefficient between the first-order dimensions of each second-order construct, which represents the weights in the case of formative constructs. Statistically significant path coefficients support the proposed second-order formative constructs. Second, we repeated this evaluation for the third-order formative construct of *Enterprise Cloud Capability*. Significant path coefficients between CTC ($\beta = 0.90$, $t = 21.6$, $p < 0.01$), CSPC ($\beta = 0.92$, $t = 36.1$, $p < 0.01$), CIC ($\beta = 0.93$, $t = 31.4$, $p < 0.01$) and *Enterprise Cloud Capability* support the psychometric adequacy of the model. Furthermore, there are significant but not high correlations among the first-order or second-order constructs. Thus, we conclude that the proposed third-order formative construct of *Enterprise Cloud Capability* was supported. Altogether, these steps validate the measurement model's psychometric adequacy.

Structural Model Assessment

To assess the structural model, we calculated the statistical significance of the parameter estimates by conducting a bias-corrected and accelerated bootstrapping procedure with replacement using 5,000 subsamples. For this purpose, we created group data in two sets. In one set we created two data groups – one containing young firms (with less than or equal to five years of operation), and the other containing established, older firms. In the other set, we created two different data groups – one containing small firms (with employee base of less than 100 employees) and the other containing large firms. We conducted two PLS Multi-Group Analysis (PLS-MGA) to test if the data groups have significant differences in their group-specific parameter estimates (Henseler et al. 2009; Sarstedt et al. 2011) (displayed in Figures 2 and 3).

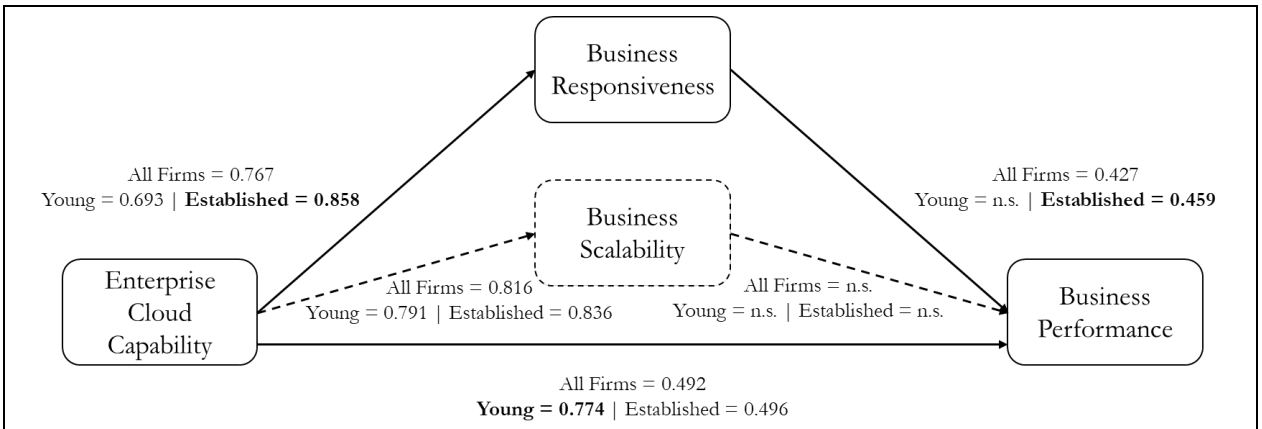

Figure 2. Assessment of Structural Model for Younger and Established Firms

Referring to Figure 2, we observe a positive direct effect of *Enterprise Cloud Capability* on *Business Performance* (beta = 0.492, $p < 0.01$) for all firms in our sample. We further observe a positive effect of *Enterprise Cloud Capability* on *Business Responsiveness* (beta = 0.767, $p < 0.01$) and *Business Responsiveness* on *Business Performance* (beta = 0.427, $p < 0.01$) for all firms in our sample. This implies that the effect of *Enterprise Cloud Computing* on *Business Performance* is partially mediated by *Business Responsiveness*. **Hence, H1 is supported.**

Referring to Figure 3, we observe a positive direct effect of *Enterprise Cloud Capability* on *Business Performance* (beta = 0.769, $p < 0.01$) for all firms in our sample. However, we observe that this relationship

is not mediated by *Business Scalability* for all firms as the relationship between *Business Scalability* and *Business Performance* is not significant (beta = 0.046, n.s.). **Hence, H2 is not supported.**

We then interpret the results of the PLS-MGA procedure. When analyzing differences across young and established firms, the PLS-MGA results showed a statistically significant difference in the path coefficients across groups for all the hypothesized paths in the structural model (p-value < 0.01 for all hypothesized paths), and no significant difference across non-hypothesized paths. Specifically, in Figure 2, we observe that the direct effect of *Enterprise Cloud Capability* on *Business Performance* is stronger for young firms (beta = 0.774, p < 0.01) as compared to established firms (beta = 0.496, p < 0.01). **This provides support to H3a**.

We further note from Figure 2 that the mediation relationships are stronger for established firms (beta = 0.858, p < 0.01 and beta = 0.459, p < 0.01) as compared to young firms (beta = 0.693, p < 0.01 and beta = 0.111, n.s.). On further investigation, the PLS results demonstrated that the mediation relationship (total indirect effect) was stronger for established firms (beta = 0.393, p < 0.01) as compared to young firms (beta = 0.074, n.s.) to the extent that the mediating effect became non-significant for young firms. Hence, **H3b is supported**.

When assessing differences across small and large firms, the PLS-MGA results also showed a statistically significant difference in the path coefficients across the two groups for all the hypothesized paths in the structural model (p-value < 0.05 for the path from *Enterprise Cloud Capability* to *Business Scalability* and p-value < 0.01 for all other paths). There were no differences across small and large firms for the non-hypothesized paths. Specifically, in Figure 3, we observe that the mediation relationship (total indirect effect) is stronger for small firms (beta = 0.313, p < 0.01) as compared to large firms (beta = 0.026, n.s.) to the extent that the mediating effect is non-significant for large firms. We further note that the individual mediation paths are stronger for small firms (beta = 0.885, p < 0.01 and beta = 0.354, p < 0.01) as compared to large firms (beta = 0.772, p < 0.01 and beta = 0.012, n.s.). **Hence, H4a is supported**. Finally, we observe that the direct effect of *Enterprise Cloud Capability* on *Business Performance* is stronger for large firms (beta = 0.859, p < 0.01) as compared to small firms (beta = 0.543, p < 0.01). **Hence, H4b stands supported**.

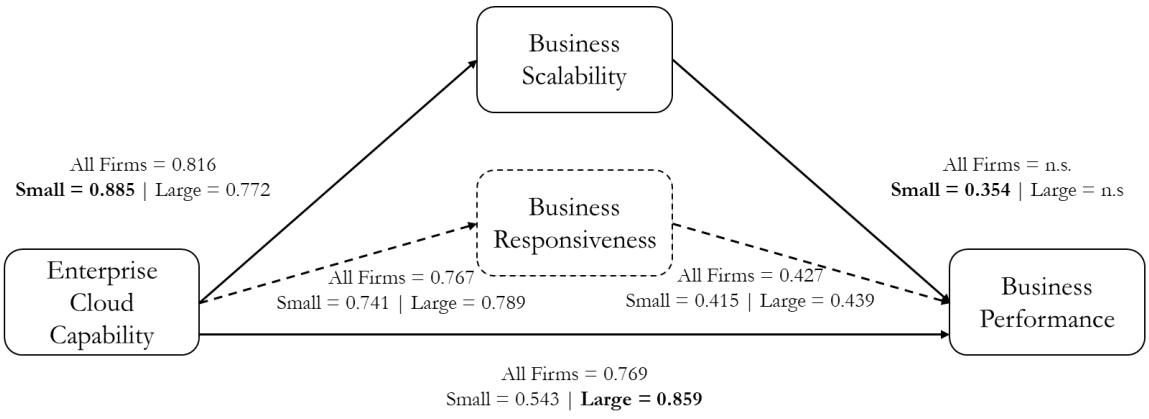

Figure 3. Assessment of Structural Model for Smaller and Large Firms

We conduct three robustness analyses (results omitted for brevity). First, we assess a simple path model with *Firm Age* and *Firm Size* as moderators along the mediated and direct pathways. Sub-sample analysis provides similar results to our main analysis. Second, we conduct a PLS_MGA analysis with four groups (young and small, young and large, old and small, old and large). Again, we find results that are similar to our main results. Third, we conduct a hierarchical regression analysis with two moderators – *Firm Size* and *Firm Age* with similar results. These robustness analyses dispel any concerns related to the endogeneity of firm age and firm size.

Overall, our results demonstrate support for our primary hypothesis that the value creation pathways from *Enterprise Cloud Capability* differ across small and large firms, younger and more established firms.

Discussion

Theoretical Contributions and Managerial Implications

This study makes three main contributions to theory. First, our comparisons of young and established firms, and of small and large firms, extend and enhance IT business value literature conducted in the context of established and large firms by uncovering firm age and size as contingency variables for the IT and firm performance relationships. This allows us to reinterpret prior established relationships between information technology and business outcomes considering the effect of firm age and size. Second, this research adds to the sparse literature that exists on value appropriation from cloud computing. The study seeks a deeper understanding of the transformative value of cloud computing and its impact across firms of differing ages and sizes. By highlighting different value appropriation pathways for younger and more established, older firms, as also small and large firms, we establish equifinality in cloud computing value. Third, the study provides empirical evidence that a new or small firm's ability to leverage IT as a service, being able to "rent" IT from the cloud providers for a value offering, is correlated with positive business performance. Since doing so could enable survival of such firms, cloud computing may provide ways to counter *"Liability of Newness"* and *"Liability of Smallness"* afflicting young and small firms, respectively.

Our study suggests that young and established firms derive *Business Performance* from *Enterprise Cloud Computing* through different value creation pathways. Small and large firms also derive business performance through different value creation pathways. This implies that managers need different strategies for deriving maximum value from *Enterprise Cloud Computing*, depending upon the size and age of their organization. While enabling *Business Responsiveness* could be an applicable value creation pathway for managers of established firms, the same pathway may not be applicable for managers of young firms. Such managers will receive more direct benefits of cloud implementations. Similarly, while enabling *Business Scalability* could be an applicable value creation pathway for managers of small firms, the same pathway may not be applicable for managers of large firms. Both the above results suggest that managers may need to develop approaches, implementation plans, and expectations while being cognizant of the age and size of their firms. Scalability and responsiveness are two different facets of flexibility. Managers would benefit by spending more effort in analyzing which route works for them.

The moderators of firm size and age show contingent effects and provide managers guidance on how they should exploit their current situation selectively. "One size does not fit all": selectiveness of action in achieving outcomes becomes important. Cloud is an outsourcing relationship between the user organization and the cloud service providers, as well as managed service providers. By analyzing the attributes and importance of client's resources, cloud vendors can use the insights offered by this study to better guide clients in choosing appropriate exploitation mechanisms from their cloud-based IT environments. This will enhance their customer satisfaction.

Limitations and Future Research

While our research is based on strong theory, the cross-sectional nature of this study hinders causal testing of intertemporal dependencies. The design of this study can only ascertain association and does not allow causal inference. Future studies could be conducted to assess the sequential causality. Second, our study was conducted in the GREAT context of India (Karhade and Kathuria 2020), where on the one hand IT maturity may be lower than the developed economies like the US, but on the other hand, economic growth rates are higher. Future researchers can examine our proposed relationships across contexts and economies as sociotechnical relationships may differ contextually (Dasgupta et al. 2021; Karhade et al. 2020).

In conclusion, firm characteristics determine how firms gain *Business Performance* from *Enterprise Cloud Capability*. These value creation pathways differ based on firm age and firm size. Established firms gain from a mediating pathway through *Business Responsiveness*, whereas younger firms gain *Business Performance* directly; small firms gain from a mediating pathway through *Business Scalability*, whereas large firms gain *Business Performance* directly from *Enterprise Cloud Capability*.

References

Aldrich, H., & Auster, E. R. (1986). Even Dwarfs Started Small: Liabilities of Age and Size and Their Strategic Implications. *Research in Organizational Behavior*.

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., & Stoica, I. (2010). A View of Cloud Computing. *Communications of the ACM, 53(4)*, 50-58.

Azadegan, A., Patel, P. C., & Parida, V. (2013). Operational Slack and Venture Survival. *Production and Operations Management, 22(1)*, 1-18.

Battleson, D. A., West, B. C., Kim, J., Ramesh, B., & Robinson, P. S. (2016). Achieving Dynamic Capabilities with Cloud Computing: An Empirical Investigation. *European Journal of Information Systems, 25*, 209-230.

Benlian, A., Kettinger, W. J., Sunyaev, A., & Winkler, T. J. (2018). The Transformative Value of Cloud Computing: A Decoupling, Platformization, and Recombination Theoretical Framework. *Journal of Management Information Systems, 35(3)*, 719-739.

Benlian, A., Koufaris, M., & Hess, T. (2011). Service Quality in Software-as-a-Service: Developing the Saas-Qual Measure and Examining Its Role in Usage Continuance. *Journal of Management Information Systems, 28(3)*, 85-126.

Blili, S., & Raymond, L. (1993). Information Technology: Threats and Opportunities for Small and Medium-Sized Enterprises. *International Journal of Information Management, 13(6)*, 439-448.

Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. (2009). Cloud Computing and Emerging IT Platforms: Vision, Hype, and Reality for Delivering Computing as the 5th Utility. *Future Generation Computer Systems, 25(6)*, 599-616.

Chen, M.-J., & Hambrick, D. C. (1995). Speed, Stealth, and Selective Attack: How Small Firms Differ from Large Firms in Competitive Behavior. *Academy of Management Journal, 38(2)*, 453-482.

Chen, S., Moinzadeh, K., & Tan, Y. (2021). Discount Schemes for the Preemptible Service of a Cloud Platform with Unutilized Capacity. *Information Systems Research, 32(3)*, 967-986.

Cheng, H. K., Li, Z., & Naranjo, A. (2016). Research Note—Cloud Computing Spot Pricing Dynamics: Latency and Limits to Arbitrage. *Information Systems Research, 27(1)*, 145-165.

Choudhary, V. (2007). Comparison of Software Quality under Perpetual Licensing and Software as a Service. *Journal of Management Information Systems, 24(2)*, 141-165.

Choudhary, V., & Vithayathil, J. (2013). The Impact of Cloud Computing: Should the IT Department Be Organized as a Cost Center or a Profit Center? *Journal of Management Information Systems, 30(2)*, 67-100.

Choudhary, V., & Zhang, Z. (2015). Research Note—Patching the Cloud: The Impact of SaaS on Patching Strategy and the Timing of Software Release. *Information Systems Research, 26(4)*, 845-858.

Chowdhury, S. D., & Lang, J. R. (1996). The Decline of Small Firms: A Preliminary Investigation into the Concept of Complacency. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration, 13(4)*, 321-331.

Christensen, C. M., & Bower, J. L. (1996). Customer Power, Strategic Investment, and the Failure of Leading Firms. *Strategic Management Journal, 17(3)*, 197-218.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly, 35(1)*, 128-152.

Cragg, P. B., & King, M. (1993). Small-Firm Computing: Motivators and Inhibitors. *MIS Quarterly, 17(1)*, 47-60.

Dasgupta, A., Karhade, P., Kathuria, A., & Konsynski, B. (2021). Holding Space for Voices That Do Not Speak: Design Reform of Rating Systems for Platforms in Great Economies. *Proceedings of the Hawaii International Conference on System Sciences*.

DeLone, W. H. (1988). Determinants of Success for Computer Usage in Small Business. *MIS Quarterly, 12(1)*, 51-61.

Demirkan, H., Cheng, H. K., & Bandyopadhyay, S. (2010). Coordination Strategies in an SaaS Supply Chain. *Journal of Management Information Systems, 26(4)*, 119-143.

Dibrell, C., Davis, P. S., & Craig, J. (2008). Fueling Innovation through Information Technology in SMEs. *Journal of Small Business Management, 46(2)*, 203-218.

Dierks, L., & Seuken, S. (2022). Cloud Pricing: The Spot Market Strikes Back. *Management Science, 68(1)*, 105-122.

Ewens, M., Nanda, R., & Rhodes-Kropf, M. (2018). Cost of Experimentation and the Evolution of Venture Capital. *Journal of Financial Economics, 128(3)*, 422-442.

Foster, L., Haltiwanger, J., & Syverson, C. (2016). The Slow Growth of New Plants: Learning About Demand? *Economica, 83(329)*, 91-129.

Garrison, G., Kim, S., & Wakefield, R. L. (2012). Success Factors for Deploying Cloud Computing. *Communications of the ACM, 55(9)*, 62-68.

Gomes-Casseres, B. (1997). Alliance Strategies of Small Firms. Small Business Economics, 9, 33-44.

Gray, A. (2013). Conflict of Laws and the Cloud. *Computer Law & Security Review, 29(1)*, 58-65.

Haltiwanger, J., Jarmin, R. S., & Miranda, J. (2013). Who Creates Jobs? Small Versus Large Versus Young. *Review of Economics and Statistics, 95(2)*, 347-361.

Hansen, B. E. (1999). Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference. *Journal of Econometrics, 93(2)*, 345-368.

Harrison, D. A., Mykytyn, P. P., & Riemenschneider, C. K. (1997). Executive Decisions About Adoption of Information Technology in Small Business: Theory and Empirical Tests. *Information Systems Research, 8(2)*, 171-195.

Henderson, R., & Cockburn, I. (1994). Measuring Competence? Exploring Firm Effects in Pharmaceutical Research. *Strategic Management Journal, 15(S1)*, 63-84.

Henderson, R. M., & Clark, K. B. (1990). Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. *Administrative Science Quarterly, 35*, 9-30.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The Use of Partial Least Squares Path Modeling in International Marketing. In R.R. Sinkovics & P.N. Ghauri (Eds.), *New Challenges to International Marketing* (pp. 277-319). Emerald Group Publishing Limited.

Hult, G. T. M., Ketchen Jr, D. J., & Slater, S. F. (2005). Market Orientation and Performance: An Integration of Disparate Approaches. *Strategic Management Journal, 26(12)*, 1173-1181.

Iyer, B., & Henderson, J. C. (2012). Business Value from Clouds: Learning from Users. *MIS Quarterly Executive, 11(1)*.

Jin, W., & McElheran, K. (2017). Economies before Scale: Survival and Performance of Young Plants in the Age of Cloud Computing. *Rotman School of Management Working Paper*, 3112901.

Joint, A., & Baker, E. (2011). Knowing the Past to Understand the Present–Issues in the Contracting for Cloud Based Services. *Computer Law & Security Review, 27(4)*, 407-415.

Jovanovic, B. (1982). Selection and the Evolution of Industry. *Econometrica: Journal of the Econometric Society*, 649-670.

Kale, S., & Arditi, D. (1998). Business Failures: Liabilities of Newness, Adolescence, and Smallness. *Journal of Construction Engineering and Management, 124(6)*, 458-464.

Karhade, P., & Kathuria, A. (2020). Missing Impact of Ratings on Platform Participation in India: A Call for Research in Great Domains. *Communications of the Association for Information Systems, 47(1)*, 19.

Karhade, P., Kathuria, A., Dasgupta, A., Malik, O., & Konsynski, B. R. (2020). Decolonization of Digital Platforms: A Research Agenda for Great Domains. *In The Role of e-Business During the Time of Grand Challenges. WEB 2020. Lecture Notes in Business Information Processing* (pp. 51-58). Springer.

Kathuria, A., & Karhade, P. P. (2019). You Are Not You When You Are Hungry: Machine Learning Investigation of Impact of Ratings on Ratee Decision Making. *In The Ecosystem of e-Business: Technologies, Stakeholders, and Connections: 17th Workshop on e-Business, WeB 2018, Santa Clara, CA, USA, December 12, 2018, Revised Selected Papers 17* (pp. 151-161). Springer.

Kathuria, A., Karhade, P. P., & Konsynski, B. R. (2020). In the Realm of Hungry Ghosts: Multi-Level Theory for Supplier Participation on Digital Platforms. *Journal of Management Information Systems, 37(2)*, 396-430.

Kathuria, A., Karhade, P. P., Ning, X., & Konsynski, B. R. (2023). Blood and Water: Information Technology Investment and Control in Family-Owned Businesses. *Journal of Management Information Systems, 40(1)*, 208-238.

Kathuria, A., Mann, A., Khuntia, J., Saldanha, T. J., & Kauffman, R. J. (2018). A Strategic Value Appropriation Path for Cloud Computing. *Journal of Management Information Systems, 35(3)*, 740-775.

Kathuria, A., Saldanha, T. J. V., Khuntia, J., & Andrade Rojas, M. G. (2016). How Information Management Capability Affects Innovation Capability and Firm Performance under Turbulence: Evidence from India. *Proceedings of the International Conference on Information Systems*.

Katila, R., & Shane, S. (2005). When Does Lack of Resources Make New Firms Innovative? *Academy of Management Journal, 48(5)*, 814-829.

Kerr, W. R., Lerner, J., & Schoar, A. (2014). The Consequences of Entrepreneurial Finance: Evidence from Angel Financings. *The Review of Financial Studies, 27(1)*, 20-55.

Khuntia, J., Kathuria, A., Andrade-Rojas, M. G., Saldanha, T., & Celly, N. (2021). How Foreign and Domestic Firms Differ in Leveraging It-Enabled Supply Chain Information Integration in Bop Markets: The Role of Supplier and Client Business Collaboration. *Journal of the Association for Information Systems, 22(3)*, 6.

Khuntia, J., Kathuria, A., Saldanha, T. J., & Konsynski, B. R. (2019). Benefits of It-Enabled Flexibilities for Foreign Versus Local Firms in Emerging Economies. *Journal of Management Information Systems, 36(3)*, 855-892.

Kortum, S., & Lerner, J. (2001). *Does Venture Capital Spur Innovation?* Emerald Group Publishing Limited.

Li, S., Cheng, H. K., Duan, Y., & Yang, Y.-C. (2017). A Study of Enterprise Software Licensing Models. *Journal of Management Information Systems, 34(1)*, 177-205.

Livari, J. (1992). The Organizational Fit of Information Systems. *Information Systems Journal, 2(1)*, 3-29.

Luthans, F., & Stewart, T. I. (1977). A General Contingency Theory of Management. *Academy of Management Review, 2(2)*, 181-195.

Ma, D., & Seidmann, A. (2015). Analyzing Software as a Service with Per-Transaction Charges. *Information Systems Research, 26(2)*, 360-378.

Mann, A., Kathuria, A., Khuntia, J., & Saldanha, T. (2016). Cloud-Integration and Business Flexibility: The Mediating Role of Cloud Functional Capabilities. *Proceedings of the Americas Conference on Information Systems*.

Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Hung Byers, A. (2011). Big Data: The Next Frontier for Innovation, Competition, and Productivity. *McKinsey Global Institute*.

McKendrick, J. (2011). How Cloud Computing Is Fueling the Next Startup Boom. In *Forbes*.

Mell, P. M., & Grance, T. (2011). The NIST Definition of Cloud Computing (SP 800-145. ed.). *National Institute of Standards & Technology*.

Metz, C. (2016). The Epic Story of Dropbox's Exodus from the Amazon Cloud Empire. *Wired Magazine Business Section*.

Nichter, S., & Goldmark, L. (2009). Small Firm Growth in Developing Countries. *World Development, 37(9)*, 1453-1464.

Ning, X., Khuntia, J., Kathuria, A., & Karhade, P. (2020). Ownership and Management Control Effects on It Investments: A Study of Indian Family Firms. *Proceedings of the International Conference on Information Systems*.

Ning, X., Khuntia, J., Kathuria, A., & Konsynski, B. R. (2019). Artificial Intelligence (Ai) and Cognitive Apportionment for Service Flexibility. In *The Ecosystem of e-Business: Technologies, Stakeholders, and Connections: 17th Workshop on e-Business, WeB 2018, Santa Clara, CA, USA, December 12, 2018, Revised Selected Papers 17* (pp. 182-189). Springer.

Nunnally, J. (1978). Psychometric Theory (2nd Edition). New York: McGraw.

Oliveira, T., Thomas, M., & Espadanal, M. (2014). Assessing the Determinants of Cloud Computing Adoption: An Analysis of the Manufacturing and Services Sectors. *Information & Management, 51(5)*, 497-510.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology, 88(5)*, 879-903.

Podsakoff, P. M., & Organ, D. W. (1986). Self-Reports in Organizational Research: Problems and Prospects. *Journal of Management, 12(4)*, 531-544.

Pradhan, A., Kathuria, A., & Khuntia, J. (2021). Partner Informedness, Relational Capability, and Performance of Small and Large Firms. *Proceedings of the Americas Conference on Information Systems*.

Rai, A., Patnayakuni, R., & Seth, N. (2006). Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities. *MIS Quarterly, 30(2)*, 225-246.

Ramakrishnan, T., Kathuria, A., & Khuntia, J. (2018). Business Analytics Capability and Supply Chain Management. *Proceedings of the Americas Conference on Information Systems*.

Ramakrishnan, T., Kathuria, A., & Khuntia, J. (2020a). An Empirical Investigation of Analytics Capabilities in the Supply Chain. In *Smart Business: Technology and Data Enabled Innovative Business Models and Practices: 18th Workshop on e-Business, WeB 2019, Munich, Germany, December 14, 2019, Revised Selected Papers 18* (pp. 56-63). Springer.

Ramakrishnan, T., Khuntia, J., Kathuria, A., & Konsynski, B. (2022). IoT Value Creation through Supply Chain Analytics Capability. *Proceedings of the International Conference on Information Systems*.

Ramakrishnan, T., Khuntia, J., Kathuria, A., & Saldanha, T. J. (2020b). An Integrated Model of Business Intelligence & Analytics Capabilities and Organizational Performance. *Communications of the Association for Information Systems, 46(1)*, 31.

Ringle, C. M., & Sarstedt, M. (2016). Gain More Insight from Your Pls-Sem Results: The Importance-Performance Map Analysis. *Industrial Management & Data Systems, 116(9)*, 1865-1886.

Riquelme, H. (2002). Commercial Internet Adoption in China: Comparing the Experience of Small, Medium and Large Businesses. *Internet Research, 12(3)*, 276-286.

Rothwell, R. (1989). Small Firms, Innovation and Industrial Change. *Small Business Economics*, 51-64.

Saldanha, T., Kathuria, A., Khuntia, J., & Konsynski, B. (2021). It's a Dangerous Business, Going out Your Door: Overcoming Institutional Distances through IS. *Proceedings of the International Conference on Information Systems*.

Sarstedt, M., Henseler, J., & Ringle, C. M. (2011). Multigroup Analysis in Partial Least Squares (Pls) Path Modeling: Alternative Methods and Empirical Results. In *Measurement and Research Methods in International Marketing, M. Sarstedt, M. Schwaiger and C.R. Taylor (eds.)*. Emerald Group Publishing Limited, pp. 195-218.

Stinchcombe, A. L. (2000). *Social Structure and Organizations*. Emerald Group Publishing Limited.

Street, C. T., & Cameron, A. f. (2007). External Relationships and the Small Business: A Review of Small Business Alliance and Network Research. *Journal of Small Business Management, 45(2)*, 239-266.

Teece, D. J. (1986). Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy. *Research Policy, 15(6)*, 285-305.

Tiwana, A., & Kim, S. K. (2015). Discriminating IT Governance. *Information Systems Research, 26(4)*, 656-674.

Tiwana, A., & Konsynski, B. (2010). Complementarities between Organizational IT Architecture and Governance Structure. *Information Systems Research, 21(2)*, 288-304.

Vossen, R. W. (1998). Relative Strengths and Weaknesses of Small Firms in Innovation. *International Small Business Journal, 16(3)*, 88-94.

Winkler, T. J., & Brown, C. V. (2013). Horizontal Allocation of Decision Rights for on-Premise Applications and Software-as-a-Service. *Journal of Management Information Systems, 30(3)*, 13-48.

Yang, H., & Tate, M. (2012). A Descriptive Literature Review and Classification of Cloud Computing Research. *Communications of the Association for Information Systems, 31(1)*, 2.

Zott, C., & Amit, R. (2008). The Fit between Product Market Strategy and Business Model: Implications for Firm Performance. *Strategic Management Journal, 29(1)*, 1-26.