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Understanding and exploring the value co-creation of cloud computing innovation using resource based value theory: An interpretive case study

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ABSTRACT

Research on the intrinsic mechanisms of how cloud computing ecosystems may enable value co-creation within business alliances and partnerships and their underlying mechanisms are scarce. Having identified this gap in the extant literature, and acknowledging that cloud computing is still taking off, our study seeks to explore and develop an understanding of the underlying mechanisms of value co-creation within business alliances of cloud computing providers and third-party enterprises. This study is informed by the Resource Based View (RBV) Theory and four layers of value co-creation to build on a qualitative case study using the interpretivist epistemological stance. In this study we illustrate how knowledge is shared between two firms and unpack the value co-creation process for the design and delivery of innovative cloud services. In terms of the RBV, it was discovered that reputation as a resource is valuable because it offers the smaller firms with the assets of global reach and a large partner network, which eventually may support in building its competitive advantage. For the larger organization the alliance offered the ability to provide clients with an innovation without additional facilities, and personnel.

1. Introduction

Since their advent Cloud Computing Technologies (CCT) have transformed every aspect of daily life, from being used as a storage facility to a revenue earning mechanism (Venters & Whitley, 2012). Recent forecasts suggest that the global cloud computing market size is expected to grow from USD 371.4 billion in 2020 to USD 832.1 billion by 2025, at a Compound Annual Growth Rate (CAGR) of 17.5 % during the forecast period, which is almost five to six times the rate of overall IT spending growth (ResearchandMarkets, 2020). CCT have taken off as they offer businesses benefits in the form of cheaper, faster, more scalable IT resources in the Cloud, which provides users with a better user experience (Kantaria, 2019). Studies have ranged from considering this innovation's capabilities and impact (Venters & Whitley, 2012), to delineating its revolutionary influence, making the case for 'a new paradigm' of computing (e.g., Marston, et al, 2011), while others recently acknowledge its potential to offer value co-creation opportunities between businesses and consumers (e.g., Das & Teng, 1996).

When considering the nature and definition of CCT, there are many definitions (Marston et al., 2011). Some refer to it as both a platform and type of application, which "dynamically provisions, configures, reconfigures, and deprovisions servers as needed" (Boss, et al, 2007: 2). From a business perspective, there appears to be an agreement that CCT are primarily a "service model where computing services (both hardware and software) are delivered on-demand to customers over a network in a self-service fashion, independent of device and location" (Marston et al., 2011: 177). As Venters and Whitley (2012) argue, in its simplest form, it is an outsourced shared resourced computing, where resources are pooled in external data centres and accessed over the internet.

Due to its diverse forms and understandings, CCT is researched in several ways such as, in terms of platform ecosystems (Hahn et al, 2016; Huntgeburth et al, 2015). CCT studies have used game theory to examine the performance of a type of CCT (SaaS) and an Infrastructure as a Service (IaaS) provider under diverse bilateral coordination strategies (Demirkan et al. 2010). Demirkan et al (2010) focused on a bilateral supply chain rather than on an ecosystem. Other CCT studies, e.g. Mohammed et al. (2010) used a reference model for a cloud value chain based on an analysis of existing cloud services. For the model, Porter's (1985) classical model, value networks, and value grids were applied that led to five cloud business models: Utility cloud, enterprise cloud, research grids, public cloud, and virtual cloud. Leimeister et al.

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(2010) concentrated on the identification and definition of actors and roles in cloud ecosystems where technology partners were identified that included independent software vendors, SaaS, platform-as-a-service (PaaS), IaaS, developer tools, and management or security services vendors and consulting partners encompassing system integrators, strategic consultancies, resellers, agencies, and value added resellers. Huntgeburth et al (2015) utilised a case study to develop a framework that organises and simplifies how value is created in diverse cloud systems. The common strand in all these studies is that they did not focus on the particularities of cloud ecosystems, which is identifying and explaining the benefits for partners when co-creating value for customers.

Cloud ecosystems can be defined as orchestrators' extended networks of numerous potentially loosely coupled, officially licensed partners to provide IT services (Markus and Loebbecke, 2013). The advantage is that the offering of capacities by a cloud ecosystem can exceed what can be provided by any single company. This was shown by Hans et al (2016) who employed the framework of Rai and Tang (2014) and empirical case data. With this framework, they advanced the field of business models of Cloud platform ecosystems by extending (value appropriation) and bridging (business model implementation through IT capabilities) previous work in this domain. Within the Information Systems (IS) arena, Yoo et al. (2012) highlighted the necessity for more research on the phenomenon of platform-centric ecosystems as platforms are evolving and mutating rapidly on a regular basis; thereby, leading to novel knowledge, which is also the case with CCT.

The combined offerings of Cloud platform ecosystems containing several stakeholders can exceed capacities and capabilities provided by a single company. This is important for international business and competitive strategy where it is suggested that firms are at a natural disadvantage when expanding into foreign markets. Thus, valuable upstream capabilities that compensate for entrants' lack of familiarity with local market conditions are required to penetrate foreign markets. The incentive for ecosystem participants lies in the generation of performance by leveraging complementary assets accessible through the platform (Adner and Kapoor, 2010).

We address this gap in the current literature on cloud ecosystems by examining the following research question in our paper: Is there value co-created in cloud ecosystems?

Having identified this gap in the extant literature, and acknowledging that CCT holds the potential to and is transforming individuals daily lives, operations, ways of conducting business and create and co-create value through and with technology, our study aims and seeks to explore and develop an understanding of the underlying mechanisms of value co-creation within business alliances of cloud computing providers and third-party enterprises. Our study is informed by the resource-based view theory (RBV) (Barney, 1991), as developed in the context of alliances, which specifically "suggests that the rationale for alliances is the value creation potential of firm resources that are pooled together" (Das & Tang, 2000; p. 31). The team is aware that RBV is criticised for being static, and utilising an inward looking approach that does not take into consideration external factors such as, geo-political factors, or exogenous shocks like the recent pandemic (Helfat and Peteref, 2003; Kapoor and Aggarwal, 2020), this team utilised the RBV theory because we employed it in conjunction with the co-creation theory. This allowed the external factors to be considered and the importance of alliances to be explained.

Further, the approach of a qualitative case study is adopted, which allows for the provision of a more holistic perspective towards: a) examining the role of the particular technology in the value co-creation process; b) investigating in depth an exemplar case, that of Cloud ltd[1] and one of its European partners, Special ltd[2]; thereby, uncovering and appreciating the perceptions of both parties in the alliance; and c) capturing newly emergent concepts, as identified from the participants' spontaneous responses; thereby extending the extant literature in the field of value co-creation.

In the following section the theoretical background to our study and examination of CCT from a business perspective, (IT-enabled) value co-creation studies and discussion of the resource-based view of alliances drives our initial understanding. Next, an overview of the method followed for this research is presented. Then, the interpretation of the empirical material along with our findings is explained. Finally, the study's conclusions, its limitations and consider its contributions for theory and practice are discussed.

2. Theoretical background

2.1. The resource-based view within the alliance context

Information technology and organisational performance are often linked by the Resource-Based View (RBV) theory of the firm (Wade & Hulland, 2004). To date, RBV has been used to explain firms value creation by integrating information technology, human resources, and relationship assets (Ross, et al, 1996); how a firm's sustained competitive advantage resides more in the organization's managerial skills related to IT than in the technology itself (Mata, et al, 1995), and how IT solely cannot create an advantage; rather, management is needed to leverage and exploit pre-existing business and human resources in the firm (Powell & Dent-Micallef, 1997).

With RBV, firms are heterogeneous bundles of resources. These resources can be tangible (e.g., financial assets), intangible (e.g., reputation) or a combination of both. Some resources can be valuable, yet rare, idiosyncratic, difficult to imitate, or non-substitutable (Zardini, et al, 2016). Firms possessing resources can develop strengths or core capabilities around them; thereby, differentiating themselves from their competition. Comparatively, there are instrumental resource characteristics for the sustained resource heterogeneity (Das & Teng, 2000). Namely, imperfect mobility is the difficulty and the nontrivial costs of moving certain resources from one firm to another, while imperfect imitability and imperfect substitutability refer to barriers that, by imitating or substituting can be used to obtain similar resources from elsewhere respectively (Barney, 1991).

Besides organisational performance, the RBV is often applied when studying strategic alliances (e.g., Edvardsson, et al, 2011). Strategic alliances constitute a way forward for many firms wanting to achieve growth, cost savings and the likes. Such alliances are quite common, but have diverse natures and are often found within the technology industry (Walter, et al, 2012) (e.g., Microsoft and Cognizant, Sharp and Foxconn, BT and Cisco). Forms of alliances include joint ventures, minority equity alliances, bilateral contract-based alliances and unilateral-contract based alliances. Table 1 briefly presents each type and its associated characteristics.

As CCT are being considered in this study, literature regarding the use of IS and RBV was also considered. In IS RBV is problematic because the resources in RBV are difficult to define. IS researchers have identified resources as assets and capabilities that are available and useful in detecting and responding to market opportunities or threats (Christensen and Overdorf, 2000). Together, assets and capabilities define the set of resources available to the firm and identified in Table 2. Assets are defined as anything tangible or intangible processes a firm can use for creating, producing, and/or offering its products (goods or services) to a market. Capabilities are repeatable patterns of actions in the use of assets to create, produce, and/or offer products to a market (Sanchez et al.

[1] All names have been substituted to preserve anonymity.

[2] The partner is a supplier to the vendor and the firm's name has been again substituted for anonymity purposes.

Table 1
Types of strategic alliances.

Type	Description
Joint venture	Partners integrate their efforts but remain separate entities (Das & Teng, 2000). They are susceptible to opportunistic behaviour, because the partners gain access to tacit knowledge and skills (Das & Teng, 1996).
Minority equity alliance	Partners take an equity position in the others (Das & Teng, 2000). Opportunistic behaviour is controlled because there is shared ownership in the production of knowledge (Das & Teng, 1996). Equity arrangements are rather complicated; therefore, such alliances are usually long-term partnerships (Das & Teng, 2000).
Bilateral contract-based alliance	Partners pool their resources, collaborate continuously, and there is shared production of property rights (Das & Teng, 2000). These partnerships (e.g., joint R&D, joint production, and enhanced supplier partnership (Mowery, Oxley, & Silverman, 1996)) tend to be highly integrated. Bilateral contracts are often incomplete and more open ended (Das & Teng, 2000).
Unilateral contract-based alliance	Partners work independently and there is a transfer of property rights (Das & Teng, 2000). Unilateral contracts are very specific, with partners working in minimal coordination. Integration levels are relatively low (Mowery et al., 1996).

Table 2
RBV's resources in terms of assets and capabilities.

IS Resources identified from previous studies		
Assets	**Capabilities**	
Manage external relationships	IS technical skills	IS infrastructure
Market responsiveness	IS Development	IS planning and management
IS-business partnerships (manage internal relationships)	Cost Effective IS Operations	

Adapted from Wade and Hulland (2004).

1996). Assets can serve as inputs to a process, or as the outputs of a process (Srivastava et al. 1998) and can be either tangible (e.g., IS hardware, network infrastructure) or intangible (e.g., software patents, strong vendor relationships) (ibid). In contrast, capabilities transform inputs into outputs of greater worth (Amit and Schoemaker 1993; Capron and Hulland 1999; Schoemaker and Amit 1994). Capabilities can include skills, such as technical or managerial ability, or processes, such as systems development or integration.

As shown in Table 3 capabilities held by a firm can further be sorted into three types of processes, which is simply the conversion of an input into an output: inside-out, outside-in, and spanning (Day, 1994). Inside-out capabilities are deployed from inside the firm in response to market requirements and opportunities, and tend to be internally focused (e.g., technology development, cost controls). In contrast, outside-in capabilities are externally oriented, placing an emphasis on anticipating market requirements, creating durable customer relationships, and understanding competitors (e.g., market responsiveness, managing external relationships). Finally, spanning capabilities involving both internal and external analysis, are needed to integrate the firm's inside-out and outside-in capabilities (e.g., managing IS/ business partnerships, IS management and planning).

Table 3
Capabilities and processes

Outside-In	Spanning	Inside-Out
• External relationship management Market responsiveness	• IS-business partnerships IS planning and change management	• IS infrastructure IS technical skills IS development Cost effective IS operations

Source: Day (1994).

As we are using CCT, strategic alliances are considered where RBV suggests that the rationale for forming any type of a strategic alliance is the potential of value creation by pooling together partners resources (Das & Teng, 2000). This is possible because two or more firms become partners, share their knowledge and skills, and gain access to resources, which otherwise would be too time consuming or costly to develop on their own (Madhok, 1997). Additionally, imperfect mobility, imitability, and substitutability of resources support enhanced value-creation, further enabling the formation of strategic alliances (Barney, 1991). Therefore, the RBV is particularly useful for investigating strategic alliances as firms essentially form alliances to gain access to the other firms' valuable and imitable resources (Das & Teng, 2000).

2.2. Value co-creation in strategic alliances

For the purposes of this study, we adopt Han et al.'s approach to value co-creation where diverse actors (e.g., manufacturers and developers) collaborate in order to jointly design and develop innovative devices, products, services, standards and in doing so they manage to "create substantial economic value and opportunities for all parties involved in such a collaboration" (Han et al., 2012: 2). In this sense, value co-creation deals with the opportunities and processes of value creation across organisational boundaries, through mutually beneficial interactions among the organisations' actors (Kohtamäki & Rajala, 2016) and resource integration activities occurring when two or more organisations interact with one another (Chowdhury, et al, 2016).

When bi-directionality and joint activities transpire between two or more parties, the parties need to jointly formulate and evolve a value proposition; i.e., the perceived value and the value-in-use, and to be explicit about their expectations (Aarikka-Stenroos & Jaakkola, 2012; Woodruff & Flint, 2006). In this sense, and specifically within a B2B environment, value co-creation is vital for the continuous growth of organisations, as value itself requires the contribution of "multiple actors and involves complex interactions in business networks" (Chowdhury et al., 2016). Embarking into a value co-creation partnership within the context of a strategic alliance is particularly demanding. Enhanced collaboration, spontaneous and dialogical interactions are mandatory between the partners (Ballantyne, 2006) whilst offering access to one another's organizations, and there needs to be a deep appreciation of the possible risks, the expected benefits, and complete transparency with one another (Prahalad & Ramaswamy, 2004).

Understandably, there are multiple benefits in such projects, the first being, gaining access to complementary resources (Jaakkola & Hakanen, 2013).

However, most value co-creation studies to date highlight solely the benefits of the process (Chowdhury et al., 2016). Yet, recent literature suggests that there may be negative outcomes as well (e.g., Das & Teng, 2000). Such less favourable outcomes may be the result of the process itself, or due to the specific type of partnership; i.e., if it is ill defined (e.g., bilateral contract-based alliance) or allows one or more partners to exploit their role in the alliance (e.g., joint venture). On such occasions, the process may lead to asymmetrical results for the involved parties (e.g., Edvardsson et al., 2011), or lead to conflicts within and across organisations (e.g., Czarnitzki & Kraft, 2012). Further, during the value co-creation process, lack of transparency and information asymmetry could lead to ambiguity, opportunism and power plays, which eventually could lead to a negative impact (Chowdhury et al., 2016).

2.3. The layers of the value co-creation process

Value co-creation entails organisations pooling their resources to mutually benefit from each other's' skills and tacit knowledge. Therefore, the resources of an organisation may be found outside it and in its relationship with other organisations (Grover & Kohli, 2012). Along these lines, the relational value is determined by relationship-specific

assets, knowledge-sharing routines, complementary resources and capabilities and effective governance (Dyer & Singh, 1998). Drawing on the relational view and according to Grover and Kohli (2012), IT enabled value co-creation occurs across four different layers: the assets layer, the knowledge sharing layer, the complementary capabilities layer and the governance layer (Table 4). In other words, each of the value determinants indicates a value creation layer that is enabled, expanded, or created by IT (Mandrella, et al, 2016).

2.4. A layered approach to value co-creation through the resource based value of the firm: unifying the three approaches

The RBV has previously been applied for the examination of value co-creation in a B2B context. For example, in Information Systems and Strategy studies, Sarker et al. (2012) examined value co-creation in the B2B environment, focusing particularly on ERP systems. However, in that case, the authors focused on examining vendor-partners alliances and the aspects of selling, extending, and implementing packaged software. Next, certain aspects of the relational view; such as, for example, the governance layer, have been applied within the area of CCT as they perform well in explaining the governance structures guiding the relationships between cloud service providers and their clients (e.g., Polyviou et al., 2014).

In our study, we posit that the RBV view and the four layers of value co-creation concur with the conceptual underpinning of the value co-creation processes with and through CCT. Namely, these theoretical concepts, when combined, emphasise that to be competitive, organisations need to have resources that are valuable and difficult to imitate. Further, often such resources are often found outside the organisation, but accessible by alliances formed with others. In other words, by pooling their resources organisations can share their tacit knowledge and skills and gain access to previously unattainable resources. As a result, the formation of strategic alliances may be particularly attractive and most beneficial for value co-creation opportunities. Business venturing literature on alliances has long contended that building foreign sales is one of the key rationales for collaborating with other firms. However, there is little empirical evidence on the outcomes of alliances in general or on entrepreneurial firms' abilities to use alliances as vehicles for, specifically, foreign sales development (Leiblein and Reuer, 2004).

Further, we consider that CCT has opened opportunities for such alliances. The technology itself operates as a platform that allows increased collaboration across organisations. It allows: for the design and development of new products and services; increased innovation and creativity within and across teams, and the delivery of value along the value chain that exceeds cost effectiveness, and delivers competitive advantage (Marston et al., 2011). The flexibility and integration-related features of CCT allows organisations value creation by enhancing collaborations that benefit from business opportunities (Liu, et al, 2016). As a result, CCT, one of the technologies around which two or more organisations can actively collaborate for cooperation, together co-create value within the partnership.

Table 4
The layers of value co-creation through IT (Grover & Kohli, 2012).

Layer	Description
Assets layer	Relationship-specific IT skills and assets that enhance the partnership and each organisation on each own is unlikely to achieve equal value.
Knowledge sharing layer	It is facilitated by a series of ICT and leads to new relational arrangements, which in turns leads to new products and services.
Complementary capabilities layer	Unique IT skills that each partner has and shares within the partnership to create value.
Governance layer	Effective management of the partnership through the IT assets and may facilitate the control and implementation of the previous three layers

In this study, we present a general RBV theory of strategic alliances, situated within the CCT arena where the relational view and the four layers of value co-creation are used as a way of slicing our empirical material, organising our analysis and interpretations, and ultimately proffering our findings. Having established the theoretical basis of our study, we develop an empirically based understanding of alliances employing the case of a CCT provider, Cloud ltd, and one of its partners, Special ltd. Within the confines of their alliance, for the development of cloud-based services and products, the two partners have pooled their resources, which are, knowledge and finances among others. In this context, value co-creation emerges from sales, implementation, development and the customization of a software-based application, which is cloud-based and offered as Software as a Service (SaaS).

3. Methodological overview

3.1. Case background

As in Sarker et al (2012) we examine the phenomenon of value co-creation using the context of a service provider delivering solutions to client organizations through the alliances formed with its partners, which in this case is a Micro enterprise specialising in crowd sourcing. Cloud ltd is a leading service provider, with offices in the United States of America (USA), Canada, Europe, Africa, Middle East, South America and Australia. Its products and services are highly competitive and cloud computing enabled. The organization is accustomed to forming alliances with various types of organizations. For example, in Canada, USA and the UK, Cloud ltd's has partnered with logistics-focused companies.

Briefly, Cloud ltd allows its partners connections to its private cloud via an extranet. Thereafter, there are various services within the partner's environment, which suggest that data does not actually exit the partner's internal firewall environment. Cloud ltd then transports administrative information over the internet (extranet); therefore, the actual source data and production files of the partners remain within their firewall. According to Cloud ltd, its partners consider its propounded levels of security and encryption being *"so high that they have been fine with working everything via Cloud ltd's private cloud"* (i3[3]). This provision is largely an in-house development that involves using their applications for document management, various job ticketing and preflighting functions, some of the storefront capabilities, and MobileFirst for mobile components. The overall architecture is web-based, service-oriented, which follows the most recent approach services deployment. For the development of cloud-enabled products and services, Cloud ltd deployed several non-Cloud ltd external resources; for example, well skilled developers with e-commerce and e-business knowledge and high-performance cloud systems. Therefore, the development of the service has been a highly collaborative affair across various globally located developers.

In this study, we focus on the alliance formed between Cloud ltd and Special ltd, a Swedish, highly innovative IT, micro enterprise that was Cloud ltd's partner. Special ltd's CEO describes it as a small company with a turnover of 65 million euros that employs 130 individuals who are all employed when the required and desired skills are needed, which we viewed as a crowdsource due to Special offering clients individuals with required and needed skills of the time. We consider this partner to be critical to the supply of products and services of Cloud ltd because Cloud ltd can then provide bespoke services and ingrain its services with added value. Special ltd also assists Cloud ltd with training, customisation and support services. Through this alliance, Cloud ltd uses the knowledge and the human resources of Special ltd to create value using cloud computing technologies and provides a bespoke service that is *"a*

[3] The job descriptions of the interviewees have been codified according to Table 5.

Table 5
Interviewees' Profiles.

code	Organization	Job Description/Role
i1	Cloud ltd	Vice President
i2	Cloud ltd	General Manager 1 (Technology Offering)
i3	Cloud ltd	Business Strategy and Governance Expert
i4	Cloud ltd	Offer & Marketing Lead 1
i5	Cloud ltd	Offer & Marketing Lead 2
i6	Cloud ltd	Director 1
i7	Cloud ltd	Director 2
i8	Cloud ltd	Pre-Sales Manager
i9	Cloud ltd	Strategic Bid team Lead 1
i10	Cloud ltd	Strategic Bid team Lead 2
i11	Cloud ltd	Strategic Bid team Lead 3
i12	Cloud ltd	Strategic Bid team Lead 4
i13	Cloud ltd	General Manager 2
i14	Special ltd	Chief Executive Officer

first in the bespoke applications arena". This led to significant savings in the form of *"no development team costs, training of personnel and team members, scalability, more importantly, no legacy costs of Cloud ltd"* (i2). Further, as the collaboration grew stronger due to the CCT, there were no costs for additional devices or components and no rental costs for additional offices; thereby, offering a win–win situation to both partners.

When considering the alliance, the two partners formed a bilateral contract-based alliance with both inserting resources to the partnership. These are in the form of human, client outreach and knowledge resources, which, presently, is on a continual basis. If further training for using the bespoke application is required then Special ltd charges the relevant client the required fee, with the invoice being issued using Cloud ltd's credentials, and the training being provided by Special ltd: *"This is for those clients who care. There are those who don't care, but for all of them, we use Cloud's credentials so that they (the clients) don't expose themselves to Special ltd"* (i2). This suggests that for certain clients; namely, those whose business is considered more important for the alliance, Cloud ltd is responsible for the overall financial transactions as it is the larger and more prominent partner of the partnership.

Regarding the various bespoke applications for clients, there is normally a licensing fee between Cloud ltd and Special ltd, which is noted in the contractual agreement. However, the arrangements are dependent upon the project specifications provided to the partners. The partners advertise each other's services; have joint marketing and promotion activities, and joint production activities, which leads to an enhanced supplier partnership, and transparency and clarity to the partnership. Therefore, the partners are integrated in a tighter manner, and create intangible value in the form of virtual advertising (Mowery et al., 1996). The open-ended aspect of this partnership is curtailed by the existence of non-disclosure agreements specifying sharing of commercially sensitive information. This suggests that a certain amount of knowledge is envisaged to occur and/or transferred between the two partners, which could not be foreseen in detail beforehand. However, as the two firms are collaborating for the design and development of new and innovative products and services, they are guarded. Therefore, to ensure that any acquired knowledge resource will remain within the confines of the partnership, Intellectual Property Rights (IPR) are also ascertained as and when the organizations discuss the project scope and outcomes. For example, in the past, Cloud ltd worked with Special ltd on an application for the visually impaired. In that case, Cloud ltd was commissioned to execute the particular project but Special ltd held the IPR.

3.2. Method

The case study approach is defined as: "The classic case study consists of an in-depth inquiry into a specific and complex phenomenon (the 'case'), set within its real-world context" (Yin, 2013: 321). For this study, we sought to inquire into how cloud computing leads to an alliance of two organizations and the subsequent outcomes, which would not have been possible using a quantitative survey because the organizations workforce were not large enough to offer generalisations. Further, from our discussions, the case study approach was best because we were seeking to understand how cloud computing affects the organisation. Thus, the case study approach was used for two main reasons: first, our central aim was to understand and describe (Eisenhardt, 1989) how value co-creation occurs within the context of business alliances, and second, we wanted to explore this phenomenon in-depth within its natural context, and understand how it unfolds without defining a priori any relationships between its main elements (Cavaye, 1996).

The interpretivism approach for the particular research question is a natural choice; interpretivism entails that reality and whatever knowledge we have of it are products of the social processes enacted and experienced by the involved actors and therefore the studied phenomenon, in this case the value co-creation process, can be best understood by accessing the shared meanings and world of those generating it (Orlikowski & Baroudi, 1991). The benefit of an interpretive case study approach is that the researcher is better positioned to explain the meanings attached to technologies and processes, by considering these in tandem to the broader context and the actions and perceptions of the involved actors (Walsham, 1995).

Paradigmatic sampling was employed to study in depth an exemplar and unique case (Palys, 2008), which lends itself to studying how cloud computing can support value co-creation between a provider and its partners. Specifically, Cloud ltd was selected because it is a global leader for providing technology products and services, best known for its content management and outsourcing services, and currently offering cloud computing solutions as a service. The particular firm has numerous global partnerships, which have been developed from and because of its cloud computing infrastructure. The first author has a long-established relationship with Cloud ltd and has been immersed in the firm for an extended period, which began with knowledge transfer projects.

3.2.1. Data collection

The empirical material was collected from our prolonged engagement with Cloud ltd and involved using interviews, archival data and documentary evidence, such as annual reports and minutes of meetings. This process occurred for seven months when the principal researcher was working as a researcher in Cloud ltd. These were coupled with onsite observations and field notes developed over an extended period with regards to everyday working practices espoused by senior and middle management. We also capitalised on our accumulated knowledge with regards to Cloud ltd's operations due to the earlier formed relationship. Therefore, we used material derived from several sources, which ensured triangulation and in turn, our study's internal validity (Miles & Huberman, 1994).

For the interviews, we followed the guidelines for theoretical sampling, where, to achieve maximum variation in relevance and coverage the researcher needed to interview individuals from all involved parties (Eisenhardt, 1989). Snowball sampling along with convenience sampling was also used. This meant that contacts were requested to seek participants who were involved with the CCTs, and drawn from mainly, marketing, finance and IT departments. Further, following the theoretical sampling approach, the interviewees were "selected based on the provisional analysis of previous interviews" (Robinson, 2014, p. 35), on the basis of their knowledge, understanding and involvement in designing and developing cloud-based products and services and with the aim to further our understanding regarding the emerging value co-creation processes. To this end, we interviewed individuals from the cloud provider, which is an established and leading CCT company, Cloud ltd, and its Swedish partner, Special ltd. This approach also ensured another point for triangulating our data; data triangulation entails that the researcher collects accounts from different participants,

from different sites, who are quite likely to hold different viewpoints with regards to the same events, with the aim to cross examine the validity of facts (Banister, Burman, Parker, Taylor, & Tindall, 1994; Guba & Lincoln, 1989). As a result, we interviewed 14 different individuals (Table 5), who were dealing with client organizations, had experience and/or knowledge of the provided cloud computing services and included General Managers, Vice-Presidents, Chief Executive Officers and members of the team.

The interviews followed an open-ended structure, with each interview duration varying between 30 min to up to 2 h, and being largely face to face, but with some electronically conducted (e.g., through e-mail, VoIP) or over the telephone interviews. Some interviews had to be rescheduled due to the participants' daily workload, or repeated, to acquire additional information or clarifications. This led to 30 interviews inclusively. Theoretical saturation was achieved after assessing, interpreting, and re-assessing the empirical material while collecting it. This brought the realisation that no further interviews were necessary since no new concepts were emerging and the extant concepts were well developed.

For the empirical material analysis, a bottom-up approach following the interpretive paradigm was applied (Walsham, 1995). This approach allowed us to investigate people-technology interactions within their broader context, and shared and co-constructed meanings and understandings (Orlikowski & Baroudi, 1991). In detail, by inquiring into the actions and perceptions of the various stakeholders, the value co-creation aspect being developed between the two partners using cloud computing was better studied. In doing so, our empirical material was continuously inquired in order to identify any concepts and linking them to emerging ones and the literature. This involved both authors cross comparing between the collated material from the interviews, the archival documents and so forth (Eisenhardt, 1989).

The extant literature had a central role when collecting, analysing and interpreting our empirical material. Namely, the coding procedure was built around a coding scheme that was derived from the extant literature, and referred to previous work on value co-creation, cloud computing, alliances and partnerships. As discussed, we used the relational view as our primary coding scheme in order to organise the collated material, and the four proposed layers of value co-creation for inquiring into the material and guiding our own interpretations. Further, our own interpretations were informed by the RBV, which is enriched by the literature on strategic alliances and cloud computing business perspectives. Table 6 presents an example of the interpretation process. The first order data denotes the interviewee's constructs, and the second order, based on our analysis and the extant literature are concepts of our own interpretations (Walsham, 1995).

Table 6
Example of the Interpretation Process.

Main concept	First-order data	Second-order concepts
Alliance Governance Governance mechanisms are considered important and may be either self-enforcing (trust, goodwill, commitment) or contractual-based (legal arrangements) (Poppo & Zenger, 2002).	With regards to how each party's interests are ensured: *"We have non-disclosure agreements specifying that commercially sensitive information cannot be used"* (i2).	Legally binding non-disclosure agreements govern sensitive Intellectual Property Rights matters and help deal with the openness of the partnership (bilateral contract-based alliance). This means that the alliance can collaborate more freely and form trust perceptions, without worrying about IPR since these are handled by the contractual agreements.
Exchange: Co-Creating Value through Bartering (Swapping) Bartering co-creation entails that two participants create value by pooling resources and/or competencies that the other partner needs so as to effectively serve its clients (Sarker et al., 2012).	*"Cloud ltd will benefit from us as we have very good insight into how IT will develop. For example, we work with X in Sweden. I have had a close relationship with X for about 10 years, so we tried to bring the X experience to Cloud ltd. We think that Cloud can benefit enormously by understanding how X is acting. By doing so, Cloud will grow, which is good for us."* (i14). *"We are providing enhancements with Special ltd that clients would need in providing a better service for their clients, but this also helps with their personal productivity as we help them [clients] to work in a better way in the organization."* (i2)	Bartering surfaces when the two firms exchange knowledge, experiences and insights drawn from different fields. Both firms, in this specific context, need each other as each firm has unique knowledge that the other needs to create a value-added service/product for their clients in the most effective (cost/time/quality) way.

4. Interpretation and results

4.1. Co-creating value through cloud computing: a resource-based view

Co-creation entails a symbiotic relationship (Kohli & Grover, 2008), and within alliances the process is multidimensional, implying consideration to both tangible and intangible values (Sarkar, Aulakh, & Madhok, 2009).

Our findings showed that Cloud ltd collaborated with Special ltd to coproduce and customise cloud-enabled services and products, which could not be developed otherwise. During this process, the firm provided the required bespoke client services. Therefore, we view this as value co-creation enabled by IT; namely, CCT in the form of Software as a Service, because the bespoke applications are provided based on what Cloud ltd terms as a 'licence' arrangement between them and Special ltd. As mentioned earlier, our contribution lies in offering a platform ecosystem perspective that is allowing not only the platform, but also various capabilities that would not have been available had this alliance not occurred.

That is, focusing on the pooled resources of the partners, *an intangible resource is that of reputation along with that of global reach.* As stated by Special ltd's CEO: *"We are happy to have an agreement with Cloud ltd. It is a large player. It is very difficult for small players like us to be heard in the market, so Cloud ltd will promote us. Further, Cloud ltd is in the large accounts business. It prides itself to be a deliverer of Value-Added Services. It is the only service supplier that can guarantee a Service Level Agreement in Europe or globally due to the global account manager"*. In other words, Special ltd's reputation is leveraged by providing Cloud ltd the platform development, training and such services. In return, Special ltd obtained a global reach and a large network of partners, both of which are valuable but otherwise unattainable. Owing to Special ltd's affiliation with Cloud ltd, Special ltd's CEO managed to secure his position with other organisations' Boards: *"Due to Cloud, I am now on the Board of Y. If I wasn't working with Cloud, it would have been much more difficult to get that position"* (i14). This suggests that from this collaboration, not only did he manage to raise his firm's profile, but also his own, which further increased awareness of Special ltd and its intangible asset of reputation. This provides an insight into the first benefit of the CCT ecosystem that is: the provision of additional products and services. Without this alliance, Cloud ltd was offering only the product of CCT's SaaS. Now, with the alliance, Cloud ltd is offering Special ltd a raised profile that will allow it to obtain a wider database of clients, a position in the Boards of established organizations and the recognition of being an affiliate of

Cloud ltd.

Next, following Wade's and Hulland's approach to the RBV we queried our empirical material for outside-in and inside–out resources (Wade & Hulland, 2004). Table 7 shows the Outside-in resources that are externally oriented and deal with the establishment of partnerships, and the understanding of the competition. Inside-out resources are used from inside the firm to respond to market requirements. Along these lines, and the dimension of 'outside-in' resources, Cloud ltd recognised that, for its market understanding and for its large client base, a value added service was necessary in the form of a bespoke or customized set of products and services. This bore the form of bespoke applications. As the General Manager of Cloud ltd said *"apps are economical and useful"*, which makes good business sense because its clients can make a profit from value added products and services, and in turn, Cloud ltd can also make a profit. Special ltd holds deep knowledge and expertise of the application development market, experts that can develop and implement the applications. Due to its experiences with application development, the firm is also quite aware of the derived challenges of meeting clients' requirements. Thus, Cloud ltd partnered with Special ltd to acquire this required expertise in application development, which is the outside resource that Cloud ltd brought into the alliance. Cloud ltd also possessed the required *'inside-out resources*' in the form of human resources, large sales, marketing, and consultancy teams (also known as the go-to-market division), with a good and deep insight of client requirements. These teams were then aligned with rare, imitable and non-substitutable resources, resulting from the collaboration between Cloud ltd and Special ltd, and provided Cloud ltd with a rarity; i.e., a bespoke application service, which was novel for the sector.

Having identified the resources that are required for and brought into the alliance, the next section explains the three ways that co-created value occurred.

4.1.1. Exchange: co-creating value through bartering (Swapping)

Bartering co-creation involves two participants developing value by providing resources and/or competencies that the other partner needs to effectively serve clients (Sarker et al., 2012). The value of an enhanced service; i.e., the bespoke application service, is made possible due to Special ltd's knowledge resources specific to cloud technologies and applications: *"We are providing enhancements with Special ltd that clients would need in providing a better service for their clients, but this also helps with their personal productivity as we help them [clients] to work in a better way in the organization"* (i2). At the same time, Special ltd created value by increasing its reputation due to the alliance. In terms of Special ltd's growth, its CEO mentioned that because of this alliance *"our ambition's to have half a million devices connected to us by next year and we launched this a year ago"*. Further, Special ltd provided Cloud ltd with insights regarding the latest or future advances in cloud technologies. This is due to Special ltd's other alliances with firms in South East Asia and Sweden, both of which are very technologically savvy countries: *"Cloud ltd will benefit from us as we have very good insight into how IT will develop. For example, we work with X in Sweden. I have had a close relationship with X for about 10 years, so we tried to bring the X experience to Cloud ltd. We think that Cloud can benefit enormously by understanding how X is acting"* (i14).

This means that there is a competitive advantage forming within the alliance as a two way (bi-directional) process with knowledge flowing and shared between Cloud ltd and Special ltd. Owing to the alliance's pooled human and knowledge resources, both firms can learn of new developments, while the accessed and shared knowledge can then be implemented with the help of a large clientele network of the larger, global organization (Cloud ltd) to either offer bespoke services or to an increase in growth. This can be described as knowledge spill over, which involves a leakage of knowledge specific to cloud computing and applications development through voluntary exchange of information due to joint research ventures (Czarnitzki & Kraft, 2012). This way, the partners manage to improve their own products and services; e.g., in terms of design and, as Special ltd's CEO suggested, the firm believes that the acquired knowledge from previous projects with other firms can be used in this new venture, which suggests a leak. This leak enriches their pool of knowledge and is shared with Cloud ltd to create a novel valuable service or product for Cloud ltd. This is termed as a 'combinatorial innovation' as Special ltd has many diverse workers due to crowdsourcing and these online communities of app developers are allowing their members to build on Special ltd's contributions to cocreate new content resulting from their novel experiences with Cloud and Special ltd's needs and requirements (Yoo et al, 2012; Faraj et al. 2011). This combinatorial innovation has an important implication of modularity (Baldwin and Clark, 2000). That is, the pervasive digital technologies, in this case the CCT apps modules are mostly designed without fully knowing the "whole" design of how each module will be integrated with another (Gawer 2009). Therefore, when the app was initially designed, it was not known how it could be integrated with other capabilities. As Yoo et al (2012) explained, when a smartphone is initially purchased, a user is not aware of its potential. However, as familiarity, awareness and knowledge increase, apps are added to the device and multiple other functions of the smartphone begin. For instance, as advanced innovations are occurring, smartphones offer apps that measure an individual's footsteps, heartbeat, blood pressure and sleep patterns; thereby offering a wellbeing and healthcare service that would not have been possible without the apps, knowledge awareness and experience. The same thought process was pursued by Cloud ltd as i2 explained: "*We are developing these apps to ensure that we are not limited only to our service and manufacturing functions. Instead, just as in real life, apps such as, Uber have come along and offered more functions that just a cab service, but also a food and grocery delivery service. We also feel our app will offer and provide for much more.*" This also implies that the apps that are combinatorial innovations offer a boundaryless product as the app evolves and mutates with experiences, knowledge and awareness. This diffusion of the app is different to the Diffusion of innovations S curve (1983) that is compared to the image of "wakes of innovation" to capture the ever-changing landscape of the innovations from the various heterogeneous communities (Boland et al, 2007).

Table 7
Applying RBV to Special and Cloud ltd.

Outside-In	Spanning	Inside-Out
• External relationship management: Cloud and Special ltd relationship Market responsiveness: With mobility proliferating daily life, apps were becoming popular within the market. Cloud ltd recognised this and saw an opportunity to respond to the market's demand with its CCT offerings, but needed a partner, which appeared in the form of Special ltd. They offered cost effective and efficient services and products.	• IS-business partnerships: Cloud ltd specialised in forming alliances. It also offered global recognition to Special ltd.IS planning and change Management: Less change management required in both organisations, but planning was needed more in Cloud ltd as there were more individuals involved with this project.	• IS infrastructure: CCT offered by Cloud ltd.IS technical skills: App development and implementation experience provided by Special ltd IS development: Generally, Cloud ltd offered IS development, but Special ltd provided App development, training and knowledge of app development. Cost effective IS operations: Special ltd provided cost effective app development

4.1.2. Addition: Layering and co-creation

When a bespoke application is created for a Cloud ltd client, the client is charged a fee that includes the cost for the value-added service. The overall fee paid to Special ltd is calculated by determining the numbers of applications per device per month, and depends on the required work: *"This amount is the resultant fee charged to the customer/*

device per month and yes, there is a license behind it. The fee and license is purely for the app. Customer charges for the device and all other services are separate. The scope of the app is covered in a Statement of work (SOW) between Cloud ltd and the customer, and a second Supplier Statement of Work (SSOW) between ourselves and Special ltd. The reason for the two fee level relates to two different device types. One is for Cloud ltd's Asian offices and the other is for the rest of the world offices. The development cost for each device type (+profit) is then divided by the number of devices that will be licensed in that region" (i8). Further, as mentioned before, when training and support are required, Special ltd charges the client for the additional services using Cloud ltd's credentials. This means that partnering with Special ltd has led to Cloud ltd not investing in any extra facilities for the development team, or in designing training and support activities for their clients. Thus, they are experiencing significantly lower costs than had they formed internal teams for providing the services.

Special ltd also benefited as it achieved greater returns from it actively building a global reach and accessing Cloud ltd's clientele. Further, due to Special ltd's success at providing quality products and services, it has built its reputation within Cloud ltd, which would have been significantly more difficult outside the alliance. Cloud ltd's General Manager mentioned that the relationship with Special ltd was formed because of Special ltd's relationship with the company and its reputation for providing a good, quality service in other departments. Further, despite being "a small organization", Special ltd is "*getting heard*" (i14); thereby, making its mark in the applications arena, which would have been difficult based solely on its own reputation. This has also led to Special ltd offering apps to various other firms, which it would not have anticipated or foreseen.

Thus, it follows that through layering, a revenue stream transpired for both parties. In the case of the smaller company, there are intangible values in addition to the monetary aspect: the firm's reputation within the applications market, their client base and global reach are growing. This also means that the app has evolved and mutated Further, Special ltd has been promoted to a Cloud ltd's partner status, which means that it is able to advertise its partnership with Cloud on its own website, and to advertise it being the first to provide a particular service, which is considered an added value for them and an issue that so far has not been acknowledged in previous literature.

Our analysis also revealed that Special ltd has brought unique, rare and complementary resources to the alliance in the form of Ricardian rents (Peteraf, 1993), which occur when firms have a rare and complimentary bundle of resources. In turn, this allows for value creation and rents (profits) (Das & Teng, 2000); however, once these resources are imitated or owned by another alliance or sets of firms, there is no longer a created value (Madhok & Tallman, 1998). This is explained as follows: Presently, Special ltd has unique human and knowledge resources for applications development, which is something Cloud ltd needed and wanted at a certain time. What is apparent is that knowledge sharing when developing applications according to the clients' requirements is bi-directional with knowledge flowing from Special ltd to Cloud ltd. The return in value to Special ltd is access to the rare resource of reputation and global reach offered by Cloud ltd, both being complementary and rare; thereby fulfilling the requirements for the Ricardian rent. Until such time that this alliance outcome is not imitated or owned by some other firm, the profits that can be made, are in line with the Ricardian rents concept.

Although there is a monetary aspect emerging from the firms' profits, and despite the close integration of the two partners and their close collaboration, when applying the layering approach, there is no produced or exchanged learning value between the two firms. Instead, a learning value is missing from layering value co-creation (Kale & Singh, 2009), which is similar to Sarker et al.'s findings (Sarker et al., 2012). This suggests that although there may be value in the form of financial resources, there is no learning process occurring in the layering co-creation that could lead to improvements. Therefore, it is not possible to create, in the long term, a niche product or service. As a result, any value of the alliance will be most likely short lived because eventually rival firms will identify the niche or the unique aspect of the alliance and copy or imitate it; hence eliminating any rental potentials.

4.1.3. Synergistic integration: co-creating value through amalgamation: combining two firms

Considering the co-created value by amalgamating two firms, our findings show that Cloud ltd and Special ltd: 1) work together in a mutually reinforcing manner; 2) have surrendered some of their own autonomy; 3) trust each other to do what is in the interest of the alliance; and 4) have invested in the alliance rather than look for gains out of it (Sarker & Sahay, 2003). This is a diverse form of value co-creation as, in this alliance, both partners bring both complementary and supplementary resources, which, if handled together, can lead to new products and services with substantially more value potential than what each alliance partner can generate on its own (Das & Teng, 2000).

Cloud ltd recognised that it presently lacks a unique talent of cloud-based application development, which is provided by Special ltd. From the General Manager, it was clear that Cloud ltd recognised that certain applications would lead to a novel and enhanced service for their clients and complement their existing products and services. For this complementary aspect, it was found that rare, amiss, complementary resources of knowledge and human resources existed within Special ltd. Therefore, it was concluded that Special ltd's resources should be integrated in a seamless manner to complement Cloud ltd's existing products and services. Thus, in this alliance, the two firms fused together their knowledge, financial and property resources, which is a contrast to the financial, layering mode of co-creating value.

What is distinct and important for this form of value co-creation is the collaborative spirit that needs to be maintained as each side gives up on its own autonomy; thereby, trusting one another and by working together on a joint project, investing in the relationship. Knowledge sharing is bi-directional as both sides exchange information about the developed product. Special ltd has to reveal information of how the product is developed, and, in turn, Cloud ltd has to share the knowledge about how the particular product will be endorsed; but, should certain tests, including IT capability, functionality and security, be passed. This process led to Cloud ltd's Certification programme (named X Building Program). Following this, the applications were then included as an added service offered by Cloud ltd, and not as an application service provided by Special ltd; thus, appearing as an applications development service on Cloud ltd's website. As a result, Cloud ltd entered, indirectly and with the help of Special ltd, a diverse market, which was previously off its limits. This was possible by collaboratively developing added value products that are now highly competitive and which are no longer in the testing phase.

Regarding Special ltd, by combining its resources, the firm managed to secure a differentiating factor owing to the endorsement of Cloud ltd, which is the certification program that only selected partners have access to. Cloud ltd is a very structured organization that continuously and intensively promotes its quality standards and emphasises processes and documentation. It also maintains a very high quality for the provided products and services. This meant that any partner organization had to maintain certain standards prior to becoming a partner, which were authenticated, verified and employed for any development processes. Further, the standards of each partner organization was advertised on Cloud ltd's websites; thereby, ensuring quality assurance to clients. Therefore, when referring to, particularly Special ltd, this suggests that from such exposure, the relationship of the two firms is also acknowledged, which supports Special ltd's further recognition and legitimation.

The pooled knowledge resources further supported the synergistic integration of the two firms. Special ltd's knowledge in IT and application development, along with Cloud ltd's knowledge of the content market sector were *combined*, and as a result of the quality standards of the certification program (knowledge and human resources), it led to, when considering development and processes, the two firms speaking

the same language. This provides, at least, in the short to medium term, market power to the partners and supplements the alliance. For the participants in both teams, this also leads to a value in terms of novel skills and better understanding of the two firms and their functions. The value is in the form of attaining new knowledge in terms of technical compatibility, better documentation and certifications related to development and methodologies.

4.1.4. Absorptive capacity

Combining the inside-in and outside-in resources led to the emergence of absorptive capacity. Absorptive capacity may be viewed as a set of organizational routines and processes used by firms to acquire, assimilate, transform, and to exploit knowledge for producing a dynamic organizational capability (Zahra & George, 2002). Therefore, in this case as shown in Fig. 1, Cloud ltd identified that for competitive advantage, the requirement of the firm was to have a niche or unique selling point. Being in the cloud computing market, Cloud ltd realised that applications were the arena that would allow the firm to achieve its competitive advantage. Yet, this required a need and knowledge of cloud-based applications. This was acquired by Cloud ltd partnering with Special ltd. Special ltd, conversely, was looking for an experienced firm on data analytics, an expert in marketing, sales and promotions and had a large, global client network. In other words, both firms needed what the other had to offer. Thereafter, through synergistic integration and bartering, the pre-existing knowledge became integrated with the newly offered knowledge. Integration occurred while value got co-created by bartering. By collaborating with Special ltd, Cloud ltd could now meet the requirements for a novel product or service and being at the receiving end of knowledge exchange. Combining forces meant that both organizations could "learn how to do things together" and offer more to one another and their clients. What was also clear is that knowledge sharing and learning capability were occurring; i.e. Cloud ltd offered more to Special due to its size, reputation, data analytics specialisation. Although for Cloud, Special provided reduced costs in terms of seeking developers for the applications, the knowledge for application development and the opportunity to enter a foreign market that did not involve large investments. Therefore, although the additive mode was unidirectional, it was usually not coordinated or synchronised. On the other hand, the synergistic mode demands mutuality in learning, where both sides share, learn, and enhance their own capabilities in a significant way. Not surprisingly, self-reinforcing mechanisms appear to be more salient for synergistic integration, given that both partners depend on each other to be effective. Due to synergistic integration, the two firms trusted one another with the exchanged knowledge, which then

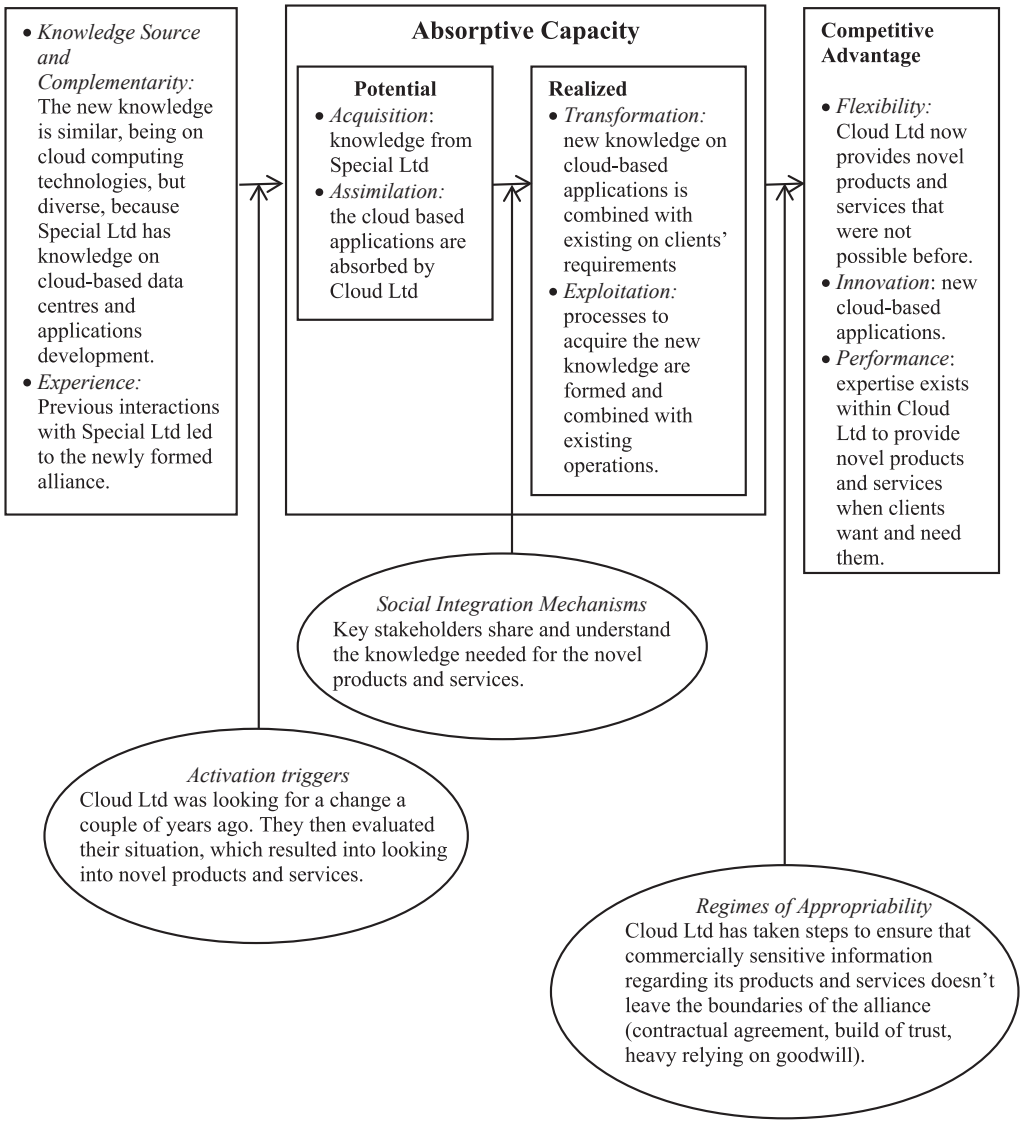

Fig. 1. Absorptive capacity
(adapted from Zahra & George, (2002)).

led to a transformation where the knowledge on the new cloud-based application (from Special ltd) was combined with the knowledge for the required product or service (from Cloud ltd). This was then exploited to form a new product that provided a novel competency for Cloud ltd, and was exploited to the maximum (Spender & Grant, 1996).

Fig. 2 depicts the process of value co-creation enabled by CCT between the two firms. It needs to be clarified that, as in previous studies (e.g., Sarker et al., 2012), without the use of IT, in this case, CCT, value co-creation would not have been possible. Specifically, without the use of CCT, the identified human, knowledge and financial resources would exist on their own and separately within both firms. With the two firms recognising a need and identifying an extant gap in the market for cloud-based applications requiring bespoke products and services, a collaboration effort emerged that led to a successful combination of the resources. In what follows, from our data collection, we present the cloud enabled value co-creation enabling mechanisms.

4.1.5. Alliance governance

Alliance governance mechanisms are considered particularly important and may take two different forms. 1) Self-enforcing mechanisms that include trust, goodwill and commitment, or, 2) Contractual arrangements between the firms (Poppo & Zenger, 2002). In the alliance of Cloud ltd and Special ltd, trust has a central role. Cloud ltd was using CCT knowledge that was possible thanks to Special ltd. This knowledge was acquired from relationships with other partners. Therefore, in the first instance, Cloud ltd placed its trust in Special ltd and expected the shared knowledge to be truly innovative, applicable and true. Second, trust is continuously emphasised, where Cloud ltd *"trust[s] that Special ltd will not reveal our information to its partners"* (i2). A member of the Strategic bids team further commented that Cloud ltd had to trust its partners. Citing an example, on a previous occasion, a certain organization was withholding information from them and their client, which caused them project completion delays. In turn, in certain instances this

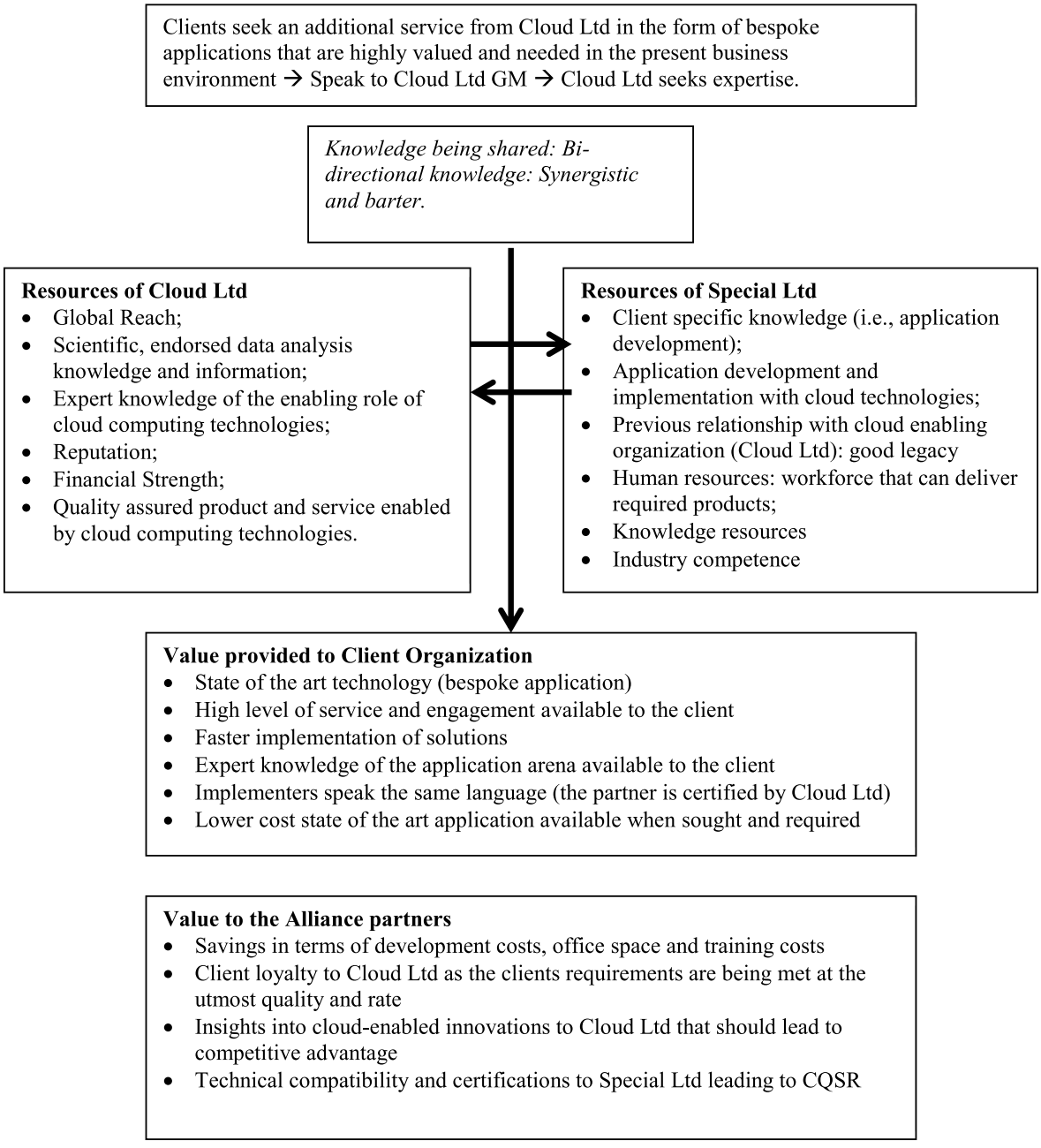

Fig. 2. The value co-creation process between Cloud ltd and Special ltd.

brought about the end of those alliances. However, it was mentioned that if there was a good relationship and rapport built between Cloud ltd and the client, then the contract could be renegotiated, renewed and the project completed. Thus, it follows that value is derived primarily from the good standing of the relationship and the trust between the partners rather than the financial resources pooled within the alliance.

A further safeguard against opportunism, which facilitates value co-creation by amalgamation in particular, is the activation of contractual agreements that ensures any *"commercially sensitive information is not shared or disclosed to anyone"* (i2). This strengthens the formulation of trust between the partners and acts as a mechanism for governing the alliance and is particularly pertinent when synergistic integration occurs as the two sides are then in synergy rather than in isolation.

4.2. Enablers of the co-creation mechanisms

4.2.1. Technology related collective strength

Once the value co-creation within alliances was identified, the next step was to determine the enablers of the co-created value. For this, collective strength aspect was pertinent (Das & Teng, 2000), because it suggested that all the resource endowments of the alliance such as, technology or knowledge are critical for success. While considering the collective IT capability of the alliance, the two partners provided complementary resources that include knowledge transfer and learning, which is consistent with prior literature (Das & Teng, 2000; Simonin, 1999): *"Cloud ltd has the technical and scientific knowledge in the form of sophisticated text data analytic tools that is provided by their research centre that has high level developers, Special ltd has a good business development and packaging applications and app cloud. Therefore, by combining the two, we can provide more advanced services than what we currently provide."* (i14). Cloud ltd shared its data analytics knowledge, which is complementary to Special ltd's expertise and knowledge resources. Ie. Cloud's data analytics tools knowledge, together with Special ltd's cloud computing application development knowledge were currently being exchanged between the partners, which led to a positive co-created value. Davenport and Prusak (2000) suggest that firms in alliances need to share their knowledge, assimilate it and internalise it (depicted in Fig. 2). This, in turn provides the alliance with collective IT capability, assists it with the additive mode and provides a future competitive advantage. Along these lines, the CEO of Special ltd mentioned the absorption of Cloud ltd's knowledge, while combining it with their knowledge regarding cloud-based application development and supporting Cloud ltd by providing their clients with more advanced services.

A second factor for collective strength is the simplicity of the technology, which in this case is the new cloud-based applications forms that led to the alliance (Keil & Tiwana, 2006). Simplicity is the degree of difficulty experienced in using and adapting the technology platform (Aiman-Smith & Green, 2002) and it appears to be of paramount importance and a central factor in the acceptance process of Cloud ltd: *"We would expect to have a demonstration of the app before and we would want to make sure that the client feels that the app is user accepted. So it has to be user friendly, easy to use, as well as the look and feel of the app being simple. We would also want the technical way (*e.g.*, does it connect with my ERP system, does it look after the requirements? is it fast enough?) dealt with, as we have the business (usability, look and feel, simplicity) and technical (…) to consider for a customer. For them, there are pre-defined style guides on our site, anyway and we would want them to be consistent. This would be our acceptance process" (i8).*

Additionally, the adaptability aspect has emerged from our findings as an additional point of strength. Adaptability has been described "the extent to which a technology is malleable to changing (or different) requirements" (Sarker et al., 2012, p. 332). In our study, this emerged from the two partners' interaction and collaboration, which ensures that they understood the changing client requirements and could meet them, by adapting and/or updating their products and applications accordingly. This, however, emphasises the critical aspect of this alliance, and the collective strength of both firms: *"If X (Cloud's technology expert) can define the statement of work, requirements and share it with the rest of my team and Special ltd, then, if Special ltd can add to the new development, but according to the way we want it, we can do business" (i8).* Briefly, Cloud ltd has numerous clients, with diverse requirements, where application development then requires a certain level of adaptability according to the clients' needs, which are typically summarised as simplicity and ease of use, both for the firm and the client. Based on these features, Cloud ltd seeks collaboration with Service ltd and co-creates value within the alliance.

5. Discussion

Our study provides a deep understanding of how value enabled by CCT in the form of SaaS may be co-created. Based on a case study, rich descriptions were provided of the different ways that value could be co-created within the alliance of two firms, and specifically in the instance of a bilateral contract-based alliance. Drawing from the RBV, the necessary resources were illustrated and a detailed account of the enablers for value co-creation, both for the alliance and the participating firms was proffered. Previous CCT studies lacked such an understanding as there was more emphasis on the application of the various types of frameworks. Huntgeburth et al (2015) was amongst the few studies of RBV and CCT that was found and also considered a CCT ecosystem exchange, but unlike this study's emphasis on one large organization and an SME as well as a SaaS perspective, Huntgeburth (2015) emphasised several CCT ecosystems exchanges. As the alliance of our two organizations is still in the early stages, it was discovered that our study considers the complimentary resource, whilst Huntgeburth offered both substitution and complimentary resources.

With regards to the resources that were yielded by the alliance, our research showcases that the *resource of reputation* is powerful; thereby leading to an alliance of a smaller firm with a larger one. Reputation as a resource is valuable because it offers the smaller firm with the assets of global reach and a large partner network, which eventually may support in building its competitive advantage. These assets are considered valuable and worthwhile to access, but otherwise unattainable for a small firm. An added value is that the smaller firm can raise its status by leveraging its partner's name and capitalising on the partnership, which is somewhat different to previous findings. For example, Sarker et al. (2012) found that the resource of brand helped in allowing the smaller partner to become shortlisted more easily; in our case however, reputation led to an exponential progress for the smaller firm and no additional benefit to the larger organization.

Thereafter, we identified the outside-in resources, which involved the larger firm seeking the knowledge and expertise on cloud-based applications from the smaller firm. In turn, Cloud ltd offered the inside-out resources in the form of expertise and knowledge regarding human resources, large volume sales, marketing and consultancy teams with an expert insight into client requirements.

In Table 8 a classification of the resources according to the scheme put forth by the RBV for strategic alliances is offered. Namely, we identified the types of resources and their imperfections that prevent them from being transferred and acquired by the other firm. For instance, in terms of imperfect mobility, Special ltd has a dedicated team that is assigned to the bespoke application development Cloud requires. Due to the associated costs such as, the salaries, relocation costs, or living costs, it would not make much sense business-wise, at least at this stage of testing the product and service in the market, for Cloud ltd to headhunt the entire Special ltd team, or to form a new, similar team within Cloud ltd. This suggests that, for the moment, there is imperfect mobility.

This was followed by identifying and explaining the three categories of co-created value emerging from the alliance: layering, bartering and amalgamation. In this case, bartering and amalgamation led to an

occurrence of the sharing of knowledge and learning, which we identified as absorptive capacity. Layering, on the other hand, led to financial resources to be exchanged as requirements of the cloud-based applications were detailed to Special ltd. This, however, meant that there was no knowledge exchange. Thus, in the short term, for financial gains, and to satisfy client requirements and needs, a layering arrangement co-creates value. For the longer term, to obtain knowledge, and to achieve absorptive capacity that includes assimilation, the bartering and amalgamation forms of co-created value are more appropriate.

Finally, when considering the co-created value enabled by cloud technologies, a firm's resources may span its boundaries and lie in its relationship with other firms. Along these lines, Grover and Kohli (2012) have proposed that IT enabled value co-creation occurs across *the assets layer, the knowledge sharing layer, the complementary capabilities layer and the governance layer*. Table 9 summarises our findings following this view and by investigating the IT investments, the enablers and the value co-creation dimensions).

To summarise, *the assets layer* identifies *how* the assets of the two firms are combined to form the co-created value. In this case, the assets that Special ltd had were the data centres and the dedicated CCT team that Cloud ltd needed. In turn, Cloud ltd had assets in the form of products and services enabled by cloud computing as well as an expert

Table 8
Classification of resources according to characteristics and types (()).

Resource characteristics	Resource types	
	Property-based resources (Legally protected by documents, policies, or standards and the like).	*Knowledge-based resources* In the short term, knowledge can be protected, as there is not enough time to learn and share the knowledge. As time passes, changes can occur and the resources may no longer be imperfect.
Imperfect mobility	*Human resources* Knowledge in the form of trained and informative partner (Special ltd). The workforce of Special ltd cannot be recruited due to size and costs associated with salaries, or training.	*Organisational resources* (e.g., culture) Innovative, strategic and collaborative workforce (Special ltd and Cloud ltd). In time, as the organizations grow, knowledge and learning grow; therefore, culture and functions could change and become to an extent, similar.
Imperfect Imitability	*Contracts, copyrights* Cloud ltd created safeguard mechanisms in the form of contracts that specified the copyrights and non-disclosure agreements. These are specific to Special ltd and Cloud ltd's relationship.	*Technological and managerial resources* In Special ltd and Cloud ltd, a managerial team is formed that is exclusive to the relationship; therefore, not easily imitated. However, it can be transient in cases where the organizations grow and more workers are employed with the managerial resources expanding. In turn, they could gain more technological resources that may then lead to no longer a technological and managerial resource being exclusive to the relationship.
Imperfect Substitutability	*Physical resources* The distribution channels that have been established by both Special ltd and Cloud ltd are exclusive to the relationship; thereby, preventing any substitutions.	*Technological and managerial resources* Same as above.

adapted from Das & Teng, 2000

Table 9
The Co-created Value from CCT: Assets, Complementary Capability, Knowledge Sharing and Governance Layers.

	IT Investments	Enablers	Value co-creation
Assets Layer	Investment by the two firms in terms of data centres, hardware and software providing the cloud-based technologies for the development teams in Special ltd and the marketing and sales teams in Cloud ltd.	• Incentives: For Special ltd the incentive is knowledge of data analytic tools, large partner network, expert knowledge of marketing and sales and Cloud ltd's endorsement. For Cloud ltd, the incentive is the expertise provided by Special ltd's team, which ensures scalability. General IT and organizational infrastructure in both firms: Special ltd: data centres, a dedicated team to provide Cloud ltd's required services. Cloud ltd has a team dedicated to the alliance.	Cloud-based applications (products) and services, standards specific for a novel and unique product and service to Cloud ltd's clients.
Complementary Capability Layer	Special ltd had the skills and knowledge on cloud-enabled products and services that allows Cloud ltd to obtain competitive advantage and a data centre (IT functionality). This synergistically complemented Cloud ltd's existing SaaS resources, extensive client database, ways for endorsing products and services, and an expert marketing and sales department.	• Experience: Cloud ltd had previous links with Special ltd, so trust was formed. Partner information: For Special ltd, this implies that from its affiliation with Cloud ltd, the firm is officially recognised as a Partner. Also, due to the alliance, Special ltd accessed a large partner network. General IT and organizational structure: The teams of the two firms understand and speak the same language and work together using the same processes.	IT enabled capabilities: quality assured, bespoke cloud-based applications that are developed by Special ltd but implemented in Cloud ltd's client space and endorsed by it.
Knowledge Sharing Layer	Sharing of Special ltd's expert knowledge of cloud-based applications and Cloud ltd's	• Absorptive Capacity: detailed documents, meetings and brainstorming	Cloud-based applications standards have been developed with specific decisions and

(*continued on next page*)

Table 9 (*continued*)

	IT Investments	Enablers	Value co-creation
	knowledge of the marketing, sales and promotion of cloud-based technologies, and data analytic tools, leading to information and knowledge of how the products will be endorsed and sold within the market.	between the 2 firms offers Cloud ltd the ability to recognise, absorb and exploit Special ltd's knowledge. Special ltd acquires knowledge of the large client network and of the data analytic tools that Cloud ltd has. Incentives: learning of the extensive abilities of data analytic tools that Cloud ltd has, endorsements and sales processes knowledge leads Special ltd to continue with the alliance. Cloud ltd's incentive was that it could cater to diverse client requirements in scaling terms. No need to form a new team, train and find facilities for it. General IT and organizational structure: advanced IT structure and the quality assurances that Cloud ltd abided to, meant knowledge was well documented and stored. Further, brainstorming sessions in both firms meant that there were dedicated individuals who understood and spoke the same language.	strategies to this alliance and the subsequent products and services (the X building program).
Governance Layer	Systems in both firms are synchronised and uniform, which prevents confusion, Former contacts of Special ltd in Cloud ltd and expert legal teams facilitate brokerage and integration effects.	• Informal contracts (trust and goodwill) that Special ltd will not disclose acquired knowledge to competitors. General IT and organizational structures: Legal teams and brokers in both firms speak the same language and have software and hardware allowing the formulation and understanding of contracts and terms and conditions. Alignment of transactions with stated terms and conditions: non-disclosure agreements and Intellectual Property rights are identified and abided to.	Cloud-based applications provide Cloud ltd's clients with a one-stop shop offering a diverse range of products and services. For Special ltd: learning of new tools and ways of endorsement, which can assist the firm in the future.

Table 9 (*continued*)

marketing and sales team that Special ltd did not have, and around which they drew and formed the alliance. Concurrently, there was a series of enablers that acted as incentives for the formation of the alliance. For example, one of them had to do with scalability matters that Special ltd could provide Cloud ltd with; particularly, in terms of innovative products and services. For Special ltd in turn, important incentives included the access to a large partner network, its identification as an official partner of Cloud ltd and finally, the first-hand knowledge regarding data analytic tools as used and deployed by Cloud ltd. By combining these incentives and enablers, the two firms managed to co-create value through and in the form of new cloud-based applications that were specific to the needs of the clients of Cloud ltd. For the customers of Special ltd, it meant that the quality being offered had improved due to the improved status of Special ltd.

The *complementary capability layer* deals with the capabilities and resources that are necessary to harvest the added value from cloud-enabled products and services. In this regard, Cloud ltd obtains knowledge obtained from Special ltd that allows the firm to develop its competitive advantage and endorse the relevant products and services. Similarly, Special ltd gains access to an extensive client network and essentially the two firms become synergistically aligned. However, *the co-created value along the complimentary capability layer* requires enablers in the form of e.g., trust. Therefore, further investigations of the relationship of the two firms, found that the intangible resource trust had already been formed due to Special ltd already working with other departments within Cloud ltd, which allowed the firm to build its good reputation and have key members vouch for them. A second enabler was the partner information, which was examined in two ways. The first was of Special ltd being endorsed as a partner and the second, being listed as one. Special ltd also had access to numerous partner organizations that Cloud ltd had alliances with. Along this layer, the co-created value relates with the IT-enabled capabilities such as, quality assurance, bespoke cloud-based applications developed by Special ltd but implemented within Cloud ltd's client space and endorsed by it.

For the *knowledge sharing layer*, IT investments involve the sharing of Special ltd's expert knowledge on cloud-based applications and Cloud ltd's knowledge of marketing, sales and promotion of cloud-based technologies, and data analytic tools; the latter leading to insights on how products get endorsed by Cloud ltd and sold within the market. The enablers of this layer are absorptive capacity from detailed documents, meetings and brainstorming between the two firms, which allows them to recognise, absorb and exploit each other's knowledge. Additionally, Special ltd acquires knowledge regarding Cloud ltd's large client

network and data analytic tools it employs. In terms of incentives, these pertain to Special ltd acquiring data analytic abilities and knowledge concerning endorsements and sales processes. The incentive for Cloud ltd was that the firm could now cater to clients' diverse requirements in scaling terms; ie., without having to form a new team, train it and find facilities for it. Therefore, for the clients, or customers of Cloud ltd, there was smooth transition to knowledge rather than being referred to some other external organization; thus, ensuring that there was little disruption to the service provided to clients. Further, Cloud ltd did not need to invest in any further premises for training.

Thanks to Cloud ltd's alliance with Special ltd, such costs were foregone. Finally, one enabler was related to the general IT and organizational structure. The advanced IT structure and the quality assurances that Cloud ltd abided to meant that knowledge was well documented and stored. Further, brainstorming sessions within both firms meant that there were dedicated individuals who understood and spoke the same language; thereby preventing any confusion and providing clarity and transparency across the teams. The co-created value surfaced in the form of novel cloud-based applications standards for the specific decisions and strategies to this alliance and the subsequent products and services (the X building program).

Finally, *the governance layer* provided protection to both partners where the IT investment took the form of management and knowledge systems in both firms that were synchronised and uniform. This also prevented confusion regarding the terms and conditions and any other legal documents required for assurance. Trust was essential and was provided through the former contacts of Special ltd within Cloud. Finally, expert legal teams facilitated brokerage and integration effects that protected and assured both partners. An essential enabler appeared in the form of aligned transactions that abided to the stated terms and conditions. Therefore, non-disclosure agreements and IPR were identified and abided to. The co-created value initially related to the cloud-based applications that provided Cloud ltd's clients with a one-stop shop for a range of products and services. Special ltd, on the other hand, educated itself on new tools, marketing, selling and endorsement tactics, as well as networking. Having discussed the outcomes of this research, this section identified the novelties, the similarities as well as the differences to previous. The next section elaborates on the implications of this research study.

5.1. Implications for research and practice

For academia, the implication of this study is that academics can form an understanding of the cocreated value that CCT can provide using an RBV and co-creation of value using four layers. We have shown how RBV can lead to complimentary resources using a combinatorial innovation in a platform ecosystem. Further, we used only a SaaS provider's perspective along with the alliance to an SME to explain and understand how co-created value can be obtained. Previous RBV and CCT ecosystem organizations did not emphasise in-depth the benefits of having an alliance between a large, global organization and an SME. By considering such aspects, academics can understand that although there are benefits of forming alliances between two organizations, there are also benefits for the clients that can be considered. For cloud computing, to the authors' knowledge, this is the first study examining such a process. This study is therefore an empirical examination of the intrinsic mechanisms of value co-creation through and based on CCT within the context of a strategic alliance. Further, by building on a single case and examining the perspectives of both partners within this alliance, we clearly described the co-created value for both firms. Finally, for academia we advanced the understanding of alliances and the use of cloud computing that allowed the larger organization to enter a diverse market without incurring additional costs such as, ensuring alignment to the international market regulations and taxes.

On a more practical level, for the industry, our study provides an explanation for value co-creation following a strategic perspective and shows how knowledge spill overs and leaks occur, which we consider is a novel aspect for the CCT and value co-creation ecosystem research. For policymakers, we have shown how the strategic decisions made in organizations can lead to value beyond the boundaries of an organization and not only for a sole organization.

6. Conclusions

For this study, we used the lens of RBV and strategic alliances theory to explore how CCT in a cloud ecosystem can lead to value co-creation between strategic alliances. In line with previous research of RBV and strategic alliances (Das & Teng, 2000; Sarker et al., 2012), our findings illustrate that there is knowledge shared in some of the value co-creation categories; namely layering and synergistic integration. Further, although firms may have the necessary resources necessary for co-creation, it is the process and the affiliated layers that led to the co-created value. In addition, governance mechanisms (e.g., self-reinforcing mechanisms of trust, goodwill and contracts) and technology-related collective strength (e.g., simplicity and adaptability) enable value co-creation. However, contrary to previous findings (Sarker et al., 2012), we did not identify inhibitors, which we consider to be attributable to the alliance being still in its early stages. To date, previous studies have not examined in depth the impact of time upon the co-created value of cloud-enabled products and services. In the case of Cloud ltd and Special ltd this was possible because in our study we emphasised one specific and clearly defined alliance, rather than into one large organization and its several different partners, which is the typical approach for alliance-focused studies. Co-creation and cloud studies also undertake a case study approach as.

Further, we identified the necessary resources including those that are mobile and can be substituted and knowledge resources that can, eventually over time be imitated. However, in the case of property resources, due to the legal protection offered by, for instance, contracts and copyright, imitations, substitutions and mobility is not easily possible. In terms of shared knowledge, layering and synergistic integration value co-creation promotes bi-lateral knowledge sharing and absorptive capacity that can lead to value in the form of a competitive advantage for the alliance. In the case of layering (additive) co-creation, there was no learning or knowledge exchange; thus, there was no absorptive capacity and no value in terms of learning and knowledge acquisition. Finally, we recognised that there are forms of rents, such as, the Ricardian rent and the Collaboration Specific Quasi rent that can co-create value. However, this can be a short to medium term return. Once, the imitation, substitution or mobilisation occurred, the rent ceased to exist.

7. Limitations

Turning to the limitations of our study, we have concentrated on one alliance, which is still developing. Therefore, the enablers and inhibitors of co-created value have not yet been established. However, we believe that we captured the true essence of the co-created value by examining several perspectives of how and why co-created value was formed. Had we followed a less holistic examination, it would not have been possible to gain insights into the main provider (Cloud ltd) and the decision-making process of the smaller partner (Special ltd). Second, as the alliance is still in an emerging stage, it would be useful to ascertain the alliance's progression, and examine whether inhibitors such as, power and politics do emerge and their impact on the value co-creation process; therefore, a future direction is to conduct a longitudinal study regarding the co-created value enabled by cloud computing. Finally, although the findings of this study cannot be generalised, a general view of the processes and benefits of a CCT co-created value can be formed. This can assist with the formation of issues that should be addressed in a future study utilising more organizations and alliances.

CRediT authorship contribution statement

Choudrie Jyoti: Conceptualisation, Part analysis and Methodology, Literature review, Write up, Formal analysis, Management, Review and editing. **Zamani Efpraxia:** Writing-original draft, Investigation, Part literature review, Methdology, Project administration, Formal analysis.

Declaration of Competing Interest

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

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