COLLABORATION IN CLOUD BUSINESSES – VALUE NETWORKS AND ECOSYSTEMS

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Abstract

Cloud computing businesses are coined by broad and intense company collaboration. There is a growing need for clarification of the types of collaborative structures. In this conceptual paper, we draw on existing scientific discussions from the fields of value networks and business ecosystems and provide a typology of organisational collaboration concepts for the cloud computing business. By suggesting a distinction between Cloud Value Networks and Cloud Ecosystems this paper lays the foundation for a more precise scholarly discussion on organisational collaboration.

Keywords: Business Ecosystems, Value Networks, Organizational Collaboration, Cloud Computing Business.

1 Introduction

Today’s cloud technologies and offerings – such as SaaS, PaaS, and IaaS [1], offered in a private, community, public or hybrid form [2] – have been claimed to provide opportunities for value creation and capture for both cloud service providers and users. In order to characterize the nature of value creation and capture processes in collaborative clouds, two partly overlapping but different concepts have been presented: the value network and the business ecosystem [3],[4],[5]. Both of these concepts were introduced in the early 1990s to analyse and describe collaborative business behaviour within a business context. In the cloud context ubiquitous access, on-demand availability, pay-per-use pricing, resource pooling, and dynamic scalability [2] have been identified as the key characteristics that define a cloud business – but with a dominating technological flavour. However, regardless of the technologies concerned, the question of what characterizes the cloud businesses remains largely under-researched and unanswered. Thus, this paper seeks to answer the question what is collaborative behaviour in the cloud business context. Consider the two following illustrative cloud business examples:

Content Cloud by F-Secure provides smart phone users a secure cloud service to manage, store, and retrieve securely their personal mobile content. Content Cloud is offered to consumers as Tier-1 mobile operators’ service, directly from the operator’s own servers and branded under operator’s own brand.

FinnCloud provides a general-purpose cloud resource for B2B, B2G or B2C companies to run a cloud-based service for their customers regardless of the content of the service. The set-up of FinnCloud consists of several companies that are not directly dependent on each other, but enjoy mutual collaboration-induced benefits.
The two illustrative examples given above can both be characterized as cloud service if we adopt a technology-dominant perspective on the cases. However, as cloud business these examples feature fundamental differences. Building on a literature review, we argue that it is possible to define businesses in the cloud as Cloud Value Networks (CVNs) exemplified by the Content Cloud case or as Cloud Ecosystems (CEs) exemplified by the FinnCloud case – and that these two exhibit differing features when it comes to conducting cloud business. Both business ecosystem and value network concepts have been used to examine and explain how firms operate in an interdependent manner but they are two different, though partly overlapping concepts as will be shown in this paper. Previously, Peltoniemi [4] has made a comparison of the concepts of cluster, value network, and business ecosystem, concentrating on the differences in innovation, knowledge creation, and knowledge transfer aspects. Our targeted contribution, however, is to provide a more comprehensive clarification of the fundamental characteristics of the business ecosystem and value network views. Also, we clarify and distinguish these two concepts by their content and application, exemplified and illustrated by the cloud business context.

The paper proceeds as follows. We start with a review of ecosystem and value network literature and continue with a discussion on and exemplification of the cloud business typology based on the juxtaposition of the two perspectives presented. We conclude with a discussion where we evaluate the typology and concepts presented and suggest avenues for further research within the cloud business context.

2 Literature Review

The existing scientific literature concerned with describing and analysing firms’ involvement with each other consists of mainly three concepts [cf.4]: cluster, value network or business ecosystem. In this paper we examine the ecologically derived organic business ecosystem thinking [e.g.6],[7],[8] on the one hand, and the field of strategic and value networks [e.g.9],[10] on the other hand (later referred to as value networks). Other approaches such as Porter’s [11] cluster concept or value chain thinking [12] are excluded from discussion as we concentrate on approaches that describe complex, boundary-spanning networks of organizations. While clusters can be regarded as geographic- and industry-bound, value networks and business ecosystems can span over national and industry borders and have a very intricate structure. An extent literature review was conducted by scanning research articles containing the key words ‘value network’ and/or ‘business ecosystem’. This was followed by demarcation of articles that did not provide genuinely new content. Only seminal papers and later contributions with fundamental influence to the chosen concepts were considered.

2.1 Business Ecosystems

What are they about? To comprehend the complexity of business entities’ interconnectedness to each other and their larger business environment, some researchers have found it valuable to examine the phenomenon from an ecological perspective. In a seminal work on organic business ecosystems, Moore [6] states that there are parallels with business and natural ecosystems in that both are partly intentionally formed and partly a result of accidental emergence [7]. The same way as biological ecosystems, business ecosystems are characterized by high complexity, interdependence, co-operation, competition and coevolution [6],[7],[8],[13]. The business ecosystem definitions emphasise companies’ joint
utilization of complementary capabilities in pursuit of new innovations [6],[7],[8],[14]. Ecosystem members evolve symbiotically, i.e. coevolve, through simultaneous collaboration and competition [8],[14].

How are they constructed? Iansiti and Levien [13] share Moore’s [8] view on the ecology analogy; they see it as a complex, multi-contributor business ecosystem infrastructure that can be fragmented and modular. Due to the constantly evolving relationships between ecosystem members, the boundaries between the members of an ecosystem are fluid. Furthermore, a business ecosystem can cross a variety of industries and encompass a variety of organizations [6],[13],[14] as a result of which defining its exact boundaries poses both theoretically and practically an arduous task.

How do they work? Business ecosystems are self-organized and the decision-making in them is decentralized due to their often modular structure. No single organization can control the entire system, but there can be several major players governing the ecosystem [13]. Each member must maintain bargaining power over other members [6] and focus on managing the complexity and interdependencies within its particular domain [8]. Short-term exchanges are governed by contracts but also community governance is practiced by leader companies, which Moore [8] calls ‘ecosystemic form organizations’ (E-form organizations). There can be shifts in leaderships and roles within an ecosystem, and one player can have different roles in different domains. [13] However, ecosystem leaders have a system-wide role as they enhance the coevolution process and promote the ecosystem’s health [6],[7],[13] which is why they cannot be easily removed [13]. A business ecosystem consists not only of collaborating businesses but of any other organizations, institutions and individuals that have an impact and interest on it. [6],[7],[8],[13]

How do they evolve? Not only individual ecosystem members but the entire business ecosystem develops over time [7]; in the beginning the member selection may be rather random but gradually the community becomes more structured [6]. The evolution of an ecosystem consists of stages: birth, expansion, leadership and self-renewal/death. Specific cooperative and competitive challenges of business strategy cause shifts in leadership in and between ecosystems [6]. Thus in practice, the ecosystem stages are not distinct but blurred.

2.2 Value Networks

What are they about? Value networks, also referred to as strategic networks [cf. 10], are based on intentional cooperation among firms. First mentioned by Normann and Ramírez [15], the value network is often described as a grid of customers and suppliers [9] and is a succeeding concept of the value chain. Thereby, products or services are not the result of linear chains of value adding instances, but rather the result of cooperation and competition as the companies seek to create and capture value within their network [9],[16]. Value creating cooperation among firms can take the forms of complementing competencies [17] and united core capabilities [18]. These can be achieved through the utilization of tangible and intangible resources [16] in the pursuit of efficiency and effectiveness by means of novel or existing knowledge [10]. The inherent, parallel competition within a value or strategic network leads firms to maintain and improve their core capabilities [18]. The focal point of a value network is defined by value co-creation and co-capture, centred on the customer or customers [17],[18].

How are they constructed? Being constructed around the customer(s), the required key activities for the creation of value are handled by certain key firms or managing leaders of the
value network [18]. Value creating activities, as Parolini [16] described it, are based on mutual flows of information, material, money, and influence relationships between the actors of value networks. Value networks can take vertical, horizontal or diagonal structures [10]. Nalebuff and Brandenburger [9] defined value networks as theoretically boundaryless, since no objective boundaries exist [16] due to network actors’ acting in and affecting several networks at the same time [10]. However, in practice, value networks can be delineated from one another by defining the influence range of the networks’ activities as a subjective border [16].

How do they work? The fact that, often, value networks do not compete within them but rather competition prevails between them [18] poses particular challenges to their governance. While customers’ buying and consuming behavior defines the value of a network’s offerings [16], suppliers need to be able to manage relationships with their value-adding partners, competitors, and customers in a way that allows all involved actors to benefit from their relationships [18]. Following Parolini’s [16] thinking, value networks can be governed in both hierarchical and self-organized ways. While ideal network actors are described as complementary, value adding, low risk partners [9], the actors of network often consist of competitors, too [18]. Thereby, important actors tend to lead and shape the network while minor actors are being shaped by the network [18]. The types of actors involved in value networks, following Helander and Kukko [17], range from suppliers to intermediaries and system integrators to end-customers. Actors may assume different roles, such as supporting, realizing or consuming actors as well as external transactions managing positions. Kothandaraman and Wilson [18] categorized the roles that suppliers in value networks can take on; these may assume strategic, facilitative, and transaction partners roles.

How do they evolve? Based on the underlying value creation logic, Möller and Rajala [10] argue for value networks types that differ in terms of their determination and stability. Perceiving these differences as evolutionary stages, value networks can be classified as emerging, renewing, or current value networks.

Table 1 below summarizes the differences between ecosystems and networks in terms of how they are defined, constructed as well as how they function and evolve.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Organic Business Ecosystems</th>
<th>Strategic/Value Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is it about?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Theoretical framework</strong></td>
<td>Ecology approach: resemblance to biological ecosystems</td>
<td>Strategic approach: value chain successor, value and strategy-oriented</td>
</tr>
<tr>
<td>Core</td>
<td>Coevolution, joint value creation for innovation, interplay of collaborative and competitive strategies</td>
<td>Intentionally built, customer-oriented co-creation of value with competition only between networks</td>
</tr>
<tr>
<td><strong>How is it constructed?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Evolving, complex Sometimes highly modular</td>
<td>Customer-centered and distinguishable from other networks in various configurations</td>
</tr>
<tr>
<td>Boundaries</td>
<td>Crosses industries Fluid boundaries</td>
<td>Subjective borders by means of defined influence range</td>
</tr>
<tr>
<td><strong>How does it work?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governance</td>
<td>Shifts in leadership in and between ecosystems over time Self-organizing, decentralized decision-making</td>
<td>One or few managing and leading actors Hierarchical and self-organizational governance possible</td>
</tr>
<tr>
<td>Roles</td>
<td>Different roles in different domains, may change Leaders, niche players, financing bodies</td>
<td>Supporting, realizing, consuming, and external transactions managing roles</td>
</tr>
<tr>
<td>Actors</td>
<td>Actor change possible E.g. producers, customers, partners, innovators, financiers, governmental institutions, competitors, a variety of other interested bodies</td>
<td>Suppliers, intermediaries, system integrators, and end-customers; All network actors can be both complementors and/or competitors</td>
</tr>
<tr>
<td><strong>How does it evolve?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change</td>
<td>Constant coevolution Evolutionary stages: birth, expansion, leadership, self-renewal/death</td>
<td>According to the degree of stability, value networks can move from emerging to renewing to current networks</td>
</tr>
</tbody>
</table>
3 Toward a cloud business typology

With business ecosystems built around the analogy of ecology and value networks stemming from a strategic and value-driven thinking, the underlying theoretical logic of both approaches differs significantly. However, the way business ecosystems and value networks are constructed, how they work, and what kind of evolution they undergo (see table 1) reveals several overlapping features. On one hand, both concepts describe certain system features in ways that do not contradict each other. In particular, the build-up of organizational collaboration systems’ features in both models shows only minor differences; even though Nalebuff and Brandenburger [9] state that it is possible to define the boundaries of value networks, in practice both concepts show no concrete delineations. Their boundaries are rather fluid and difficult to define. In that sense, depicting differences between the two approaches needs to be understood as a polarized attempt to grasp what distinguishes them from one another. On the other hand, we argue that major differences between the business ecosystems and value network thinking prevail mainly in the core (purpose and value transfer), functionality (structure, governance, and competition/collaboration) and evolution. The Table 2 below summarizes the following discussion.

Due to their underlying characteristics, business ecosystems are focused on renewal and innovation, or novelty. Through integration of resources, the utilization of complementary capabilities, and contributions, business ecosystems strive for constant innovation trajectories to gain “the only true sustainable [competitive] advantage” in today’s business world [7:p. 167],[8]. The objective of value networks, however, is for the most part centred at the increase of efficiency in the value creation process. While both approaches similarly concern with the transfer of value, i.e., as well the creation as the capture of value, business ecosystems focus on commonly created value. Moore [6] states that it is crucial for business ecosystems to create value by means of continuous performance, price improvements, new services or products, as well as by creating and serving customer needs. Value networks, however, tend to stress the capture of value; we argue that even though respective scientific literature emphasizes the common creation of value by its actors, value networks are intentionally set-up to increase their efficiency and consequently the profits for their members through meeting customers’ needs better.

Within Content Cloud concept the roles of F-Secure and the operator are defined by an agreement and tightly coupled. The content of the service is fixed and focus is on end-customers “owned” by the operator, as efficiently as possible, to enhance consumer attraction and lock-in (through operator’s brand) and thereby to guarantee value capture. FinnCloud actively looks for new participants, service concepts, and fosters collaboration-induced innovation among partners. Learning is a major motivation for companies to enter FinnCloud. There is no common target- or end-customers among the cloud participants and the services provided by the participants are only depending on common resource. The governance style remains open and structure of the FinnCloud is loosely coupled.

What comes to how business ecosystems and value networks function, they possess different governance styles. Value networks are led by one or few actors only, and the power of governing the whole system lies within these actors. Therefore, value networks are managed in a defined or rigid manner. Business ecosystems are coined by their inherently evolving governance directed by several leading organizations of the ecosystem in a co-evolutionary manner [7],[8]. According to Iansiti and Levien [13:p.10], an ecosystem member may be in a leading position in one ecosystem domain and in a niche player role in another ecosystem...
domain. The roles of each member can change in the course of time [6],[7],[13]. Furthermore, business ecosystems exhibit rivalry among alternative business ecosystems but also within the system, thus being co-opetition (simultaneous competition and cooperation) driven. Internal-to-ecosystem competition is based on all members’ need to constantly improve their contribution to the ecosystem [6],[8]. Value networks compete against other value networks – there is no real competition within the network [18].

In the Content Cloud competition is against other operators’ services, and the value captured by F-Secure is defined by agreement with the operator, the leading partner. After the service has been launched, profitability is naturally a key concern for both partners - the role of consumers’ is significant for the value network as the service needs to remain competitive. New additional partners are sought after by F-Secure for providing new content for the service within the value network.

Within FinnCloud competition and collaboration are intertwined but undefined as the participant companies may be directly or indirectly competing – and at the same time directly or indirectly collaborating or sharing customers. The role of the services offered may be independent, complementary (depending on the company involved), or dependent on other services. New ecosystem participants are welcome.

Table 2. Cloud Business Typology

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Value transfer</th>
<th>Structure</th>
<th>Governance</th>
<th>Competition, collaboration</th>
<th>Evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Ecosystem</td>
<td>innovation / novelty / renewal</td>
<td>rather value creation than capture</td>
<td>loosely coupled, emergent structure</td>
<td>inherent / evolving</td>
<td>competition/ collaboration within the ecosystem and against other ecosystems</td>
</tr>
<tr>
<td>Cloud Value Network</td>
<td>efficiency / service</td>
<td>rather value creation than creation</td>
<td>tightly coupled, purposefully structured</td>
<td>agreed / set / defined</td>
<td>competition against other networks, collaboration within</td>
</tr>
</tbody>
</table>

Value networks are set up by several companies to fulfil a certain purpose, which mostly is focused on improving the way to satisfy customers. This aspiration for increased efficiency, which is one of the main objectives of value networks, makes it possible to distinguish between certain maturity states. Möller and Rajala [10] mentioned in this regard three types of value networks which resemble maturity steps: value networks can pass through from emerging business networks to business renewal networks to so-called current business networks, thereby increasing their level of structural stability. In business ecosystems, again, the objective of constant innovation cannot be reached without constant evolution over time [7]; thus, capabilities coevolve [6:p.76] as a result of cooperation and competition within the ecosystem.

The development of Content Cloud is determined by the relationship between the two partners and is dependent on consumers’ behaviour. Both key partners want to maintain the
relationship and continue things as they are as long as revenues and profits remain satisfactory.

For FinnCloud the future plan emerges among the participants involved, services provided, or customers served. Provided that the platform remains available, the members of the ecosystem may vary over time as there are no predefined rules of engagement.

4 Discussion and Conclusions

We argue that if one adopts a technology dominant perspective on cloud businesses, i.e. a perspective where the platform or technology defines the boundaries of a business system, it becomes impossible to capture the true nature of collaborative behaviour within the cloud. This paper focuses on collaborative structures of firms in the cloud business context and reviews the value network and ecosystem concepts as starting points for understanding cloud businesses. We argue that these two approaches exhibit fundamental differences, and when applied to the cloud business context it is possible to conceptualize and identify two different types of organizational collaboration in the field of cloud business: Cloud Value Networks (CVN) and Cloud Ecosystems (CEs).

Parallel to the emergence of cloud businesses and services during the recent years, we have witnessed a rapid increase in the use of the term ecosystem. Unfortunately, the usage of the term has remained ambiguous and unclear as any type of collaborative cloud concept has been seen as an ecosystem, building on the idea that they have been based on a common technology or platform. We argue that in the cloud business context context choices regarding collaborative behaviour determine whether the cloud concept should be seen as a value network or as an ecosystem. The literature reveals that most significant differences between the business ecosystem and value network concepts lie in the emphasis of certain system objectives, their view on value-transfer, governance, system-internal competition and its evolution. We consider value networks to be more forced structures than business ecosystems. Exemplified by the Content Cloud’s cloud value network (CVN) and FinnClouds’ cloud ecosystem (CE), a CVN is constructed to serve one purpose; they are focused on one sole target such as producing a good or a service more efficiently/effectively in cooperation with others with the with the focus on value-capture. In contrast to a business ecosystem, the assembling and life-cycle of a value network does not follow natural evolution. For a CE that is concerned with innovation and creation of new added value for customers, evolution is a necessity as new actors may be needed, some may leave or be left out and their roles may change as the ecosystem members continuously target innovation and self-renewal together. Whereas competition within CVNs is related to value capture, CE members members also compete with each other in innovativeness. In both systems there is a complex complex interplay of collaborative and competitive action.

To conclude, we argue that in future studies researchers should pay more attention to the unit of analysis in the cloud business context. For instance, by the adoption of the business model as a unit of analysis [19] it might be possible to capture and define the collaborative dynamics within cloud business in a new way. If the Cloud Ecosystem is seen as a synergistically value creating and capturing constellation of independent yet interdependent businesses, the Cloud Value Network is to be seen more as the efficiency driven coupling of interdependent business.
References