

Classification of Service Co-creation Systems: an Integrative Approach

Reihaneh Bidar*, Jason Watson*, Alistair Barros*

*Information Systems School, Queensland University of technology, Australia

r.bidar@qut.edu.au, ja.watson@qut.esu.au, alistair.barros@qut.edu.au

Abstract— Sophisticated service systems which utilise service delivery through social networks require organizations to understand co-creation systems. This paper classifies service co-creation systems based on user affordances in service production and delivery i.e. service integration mechanisms, and collaboration strategies. Through a systematic literature review, we identify three classifications for service co-creation systems, namely cooperative co-creation (CS1), coordinative co-creation (CS2) and collaborative co-creation (CS3) service systems. We find a set of seven dimensions that describe how instances of service co-creation systems vary across the three classifications: Network Focus, Service, Resources, Value, Roles, Interaction Mode, and Engagement Mode. A key finding is that service co-creation systems vary considerably in user engagement and in how value is distributed between stakeholders, ranging from CS1 where the business asks users to complete tasks through to CS3, where users provide services to each other and the business only facilitates.

Keywords— Co-creation, Crowdsourcing, Service system, Service platform, Collaboration.

I. INTRODUCTION

A service system is generally defined as the configuration of resources (e.g. people, technologies) that interact with other systems to create value [1]. Service systems have become increasingly more complex by incorporating sophisticated interactions between supplier and customer [2], where advance in IT technologies facilitate the flexible interactions and information exchange through digital platforms. This technical shift has been reflected in the practical strategies being used for business development and consequently the user/provider interaction behaviour. Traditional service production and delivery systems have influenced technical-business strategies such as crowdsourcing and co-creation with the aim of increasing efficiency and shared value through characterising roles and shared responsibilities with stakeholders (provider, customer, third parties) and strengthening networking relationships. Keast et al. [3] argued this as a kind of organizational change and formation of three types of network or “3Cs” (i.e. service system): cooperative, coordinative and collaborative. Current literature discussed crowdsourcing, value co-creation and 3Cs networks separately.

Since the development of service co-creation platforms with different types of relationships, roles, purposes and outcome is an ongoing inevitable process, there is a need to better understand the current models and how they function in

order to extract value and approach service integration [4]. It is argued that a clear understanding of the attributes of various co-creation models, and how the current mechanism matches with the practical purpose of organizations has contributed to the success of business and problem solving for future potential platforms.

The purpose of this study is to classify different types of service co-creation systems and investigate how they vary based on identified principle dimensions in the service ecosystem and co-creation contexts. The novelty of this research is that it considers different strategic perspectives of user collaboration (i.e. crowdsourcing and co-creation from different disciplines) rather than a single perspective and integrates these strategies with the formation of different types of network (i.e. 3Cs) introduced by Keast et al. [3]. An increased understanding of service co-creation systems and user collaboration will lead to more effective business models, an increase in efficiency in addressing business needs and an increase in value extraction. Practitioners need to understand the functionality of different service systems in order to employ more innovative approaches to their business. With this in mind, the main research question in this paper is: “How do we classify co-creation systems based on different dimensions in service co-creation context?”

The paper is structured as follows. In section II we discuss the characteristics of co-creation and crowdsourcing and explain our perspective on them following by reviewing the literature regarding 3Cs. In section III we discuss the method of the paper. Section IV discusses the findings of our systematic literature review and derived model of service co-creation systems depicting three classifications and seven dimensions. Finally, the paper closes with implications and limitations of the study.

II. BACKGROUND

Two schools of thought have emerged about customer collaboration in organizations’ business practices within the service system. Co-creation from the business and marketing perspective (e.g. [5], [6], [7]) and crowdsourcing from the Information Systems perspective (e.g. [8], [9], [10]) have been investigated thoroughly in this context. However, there is disagreement about these terminologies and their functionality. Some studies considered co-creation as a kind of crowdsourcing [11], [12] while others used co-creation as an umbrella term and classified crowdsourcing as sponsored co-creation [13], and as a method of collaborative innovation that

contributes to a better understanding of enterprise strategies [14]. However, following the idea of crowdsourcing by Lorenzo et al. [12], in co-creation firms use customer (i.e. crowd) to find a new solution or improve an existing service. These arguments focus on the necessity of clarification for co-creation and crowdsourcing terminologies and highlight different service systems that apply these strategies to enable collaboration with customers.

A. A Marketing and Business Perspective of Customer Collaboration

Customer engagement from the marketing and business perspective is focused on value co-creation. Co-creation theory, developed from service theory, has been investigated thoroughly in the service-dominant logic (S-D). This theory suggests that the value of a service is created by mutual engagement of firm and customer [15] for the development of the service [16], [7], personalization of experiences [17], [18], [19], mutual beneficial collaboration [20], collective creativity [11], [12] and fulfilling customers' need [5]. A co-creation process can be used as a learning strategy that enables organizations to improve the design of the relationship experience and enhance co-creation with customers [7]. Co-creation refers to the main function, and value as the main purpose of the relationships between members of the network. Therefore, the main output of the co-creation process is value creation and gained experiences [15].

Value creation occurs when the resources are used [2] and the customer performs a series of activities to achieve the desired goal [7]. The co-creation function involves customer participation; the techniques, existing values used for fulfilling the customer's need and interactions in each activity to co-create a new value [5]. The goal of these activities is to create value collaboratively [5]. Customers can contribute to problem-solving [5], [15], Idea sharing and evaluation [21], [10], content design [9], [22], [13], co-design [5], [11], product promotion [23], [13] and can construct and personalize experiences [5], [6], [7], [15], [18].

B. An Information Systems Perspective of Customer Collaboration

Collaboration with customers from IS perspective is considered as crowdsourcing. A crowdsourcing system "enlists a crowd of humans to help solve a problem defined by the system owners" [9]. Crowdsourcing is a process of open innovation harnessing the wisdom of crowds [24] in taking a function that is traditionally performed by employees [21]. The nature of crowdsourcing is mostly distinguished as ideas competitions [8], [25] and problem-solving [26]. Therefore, crowdsourcing is an aggregation of ideas or collective intelligence [27] without too much communication between users [8] and mainly seen as a business solution [28].

Both crowdsourcing and co-creation use the crowd to benefit from knowledge and effort from outside the organization. We consider crowdsourcing as a premier strategy for two reasons: Firstly, crowdsourcing is a broader term with more general functionalities that include crowd processing (Galaxy Zoo in which crowd helps in classification

of different galaxies), crowd rating (TripAdvisor provides reviews of travel-related content), crowd solving (Netflix Prize was an open competition for the best movie recommendation algorithm) and crowd creation (YouTube allows users to create content as videos for each other) [10]. However, co-creation not only includes these functionalities but also seeks to instantiate brand loyalty (e.g. MyStarbucksIdea.com that enables customers to engage in the organization's preference market) and develop future products/services. Secondly, crowdsourcing is based on a one-to-many model in which the organization mostly receives the benefits from the input of many participants, while co-creation is based on many-to-many model where the value is more equitably shared. Therefore, we determine co-creation is an evolution strategy within adaptive crowdsourcing method.

C. Different Networks: "3Cs"

Different mechanisms have been identified in the organizational literature as a necessary task to establish a better relationship between service provider and user, to achieve service integration and to form a comprehensive service delivery system [3]. Fine [29], Brown and Keast [30] and Mandell and Steelman [31] followed and integrated a continuum of organizational relationships in which the "3Cs" or "3Ns" are located along a loosely structured and fragmented system to a fully integrated system: cooperative (Micro level), coordinative (Meso level) and collaborative (Macro level) networks. A cooperative network represents a voluntary activity, short-term relations with a loose linkage among stockholders, usually involves lower-level actors and entails the use of relatively few resources [32], [3], [33]. In a coordinative network, the aim is to better coordinate existing services with a predetermined goal with medium-term relations; the level of linkage requires a higher degree of effort and commitment and results in shared benefits [32]. In a collaborative network participants are independent, with strong and longer-term relationships, shared goals and a holistic perspective [32], [3]. We develop these three types of service integration mechanisms on the online service systems.

III. METHODOLOGY

We have conducted a systematic literature review of 36 of the most significant scientific articles, and have identified existing publications on online co-creation and crowdsourcing domains. The scope of literature was limited to studies published between 2002 and 2015. Most of the co-creation studies were taken from marketing, business, management, and information systems-related publications, while all papers related to crowdsourcing were published in the Information Systems discipline. The selected articles were extracted from "Scopus" database as a comprehensive source of scientific publications [34] with indexed articles from "Elsevier", "Emerald" and "Springer". We also used Association of Information systems electronic Library (AISeL), a major database in the field of information systems (Table 1).

TABLE 1. DATABASE SEARCH DETAILS

Database	Initial Search	Final Pool
Scopus	351	21
AISeL	309	9
Others	-	6
Total	661	36

The data was obtained by searching the main terms of (“value co-creation” + system), “value co-creation process”, and (“crowdsourcing systems” + service). Initially, 661 papers were found. The papers were reviewed by title, abstract and then by full text respectively. In each phase of review, those papers that did not satisfy the inclusion criteria were rejected [35]. The following inclusion criteria were applied: we included papers published 1) in English; 2) between 2002 and 2015; 3) with a focus on online co-creation and crowdsourcing strategies in service platforms; 4) co-creation and crowdsourcing studies with the aim of understanding collaboration with customers. The review of title, abstract and keywords of 661 references led to the final list of 36 principal articles that met inclusion criteria for further analysis (see Figure 1). We then applied more in-depth analysis of the content of each final paper in the analysis phase.

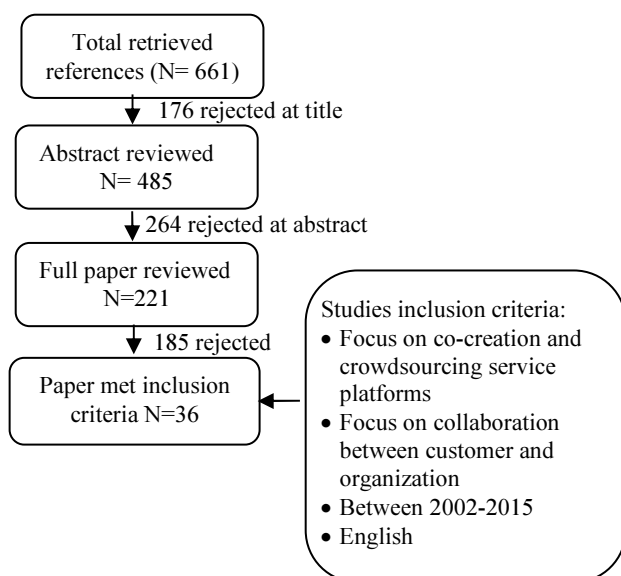


Figure 1. Stages of article selection

IV. RESULT

Thematic synthesis was used to analyse the data where each article was treated as a single case. The analysis followed an inductive approach, and all texts from findings, discussion, and conclusion were read and extracted from each paper. To better understand each case, a summary of aims, methods and goals were mapped from each study. We followed two phases in analysing the data. Firstly, we identified main dimensions in co-creation context and then we classified co-creation systems based on the identified dimensions.

A. Identifying Dimensions of Service Co-creation Systems

Using Nvivo, we coded the content of each article, and conducted a cross-case thematic analysis to find the main themes that are distinct in the service ecosystem, particularly based on definitions, pivotal concepts and components of their framework, the theoretical outcome of each article and the characteristics of co-creation platforms. After grouping the identified categories in coding, the seven final themes indicated are as follows: Network Focus, Service, Resource, Value, Roles, Interaction Mode and Engagement Mode.

- **Network Focus:** Network Focus was found as one of the main components of co-creation that represents the importance and centrality of the customer network to the collaborative service system. In general, customer networks have played an increasingly important and more central role as organisations transition from being organization-centric, to customer-organization centric, and ultimately to customer-network-centric.
- **Service:** In crowdsourcing service is defined as a completed task that is provided by users (as provider) to reach a business goal. Crowd services enable organizations to identify a specific category of tasks that are aggregated by the crowd [10]. In the S-D logic, service is defined as the application of competencies (knowledge and skills) for the benefit of another party [36], which demonstrates the exchange [37]. Service is the purpose of co-creation to fulfill customers' need [5].
- **Resources:** Resources was found as an essential component of co-creation systems. Resources are categorized into two types of operand (physical materials) and operant resources (human, organizational, informational and relational) [16], [38]. Any knowledge, shared information, technology, people and organizations within the network are defined as resources [1]. Pinho et al. [2] added that customer position, role and interaction in a social system can be considered as resources. The amount and type of resources that actors can access varies in the network [2]. Resources need to be combined with other resources to be useful [39]. The result of integration of resources through interactions (dyadic or many-to-many) between actors in the network is innovation and value [2], [39]. The created value from the exchange of resources [22] emerges from the physical, mental or possession use of resources [6].
- **Value:** Value was found as the strongest component of co-creation in the literature. Value is the “comparative appreciation of reciprocal skills or services that are exchanged to obtain utility” [37]. Value is the main outcome of the co-creation process [2] and centers on services [40]. Value derives from the use of a service to improve the process of identifying customers' needs beforehand [36], [37]. Value can be considered as financial benefits, customer satisfaction and utility value (intrinsic or extrinsic). Value in co-creation considers customer experience of value-in-use [16], [41], [6], [7], [15], [18], the emergence of integrated resources (physical or mental) [20], [6], [2], any perceived or actual benefits from the

service for the customer [5], [12], [19], and innovation benefits for the organization [11]. These benefits include financial or non-financial [22], utilitarian or hedonic benefits [22], [23]. However, Spiteri and Dion [42] define value as the proper combination of quality, service and cost.

- **Engagement Mode and Roles:** There are a number of perspectives used to view how people contribute in a co-creation system. From one perspective the customer is always a co-creator of value [7], [37], [40] and the firm facilitates value by providing resources and supporting the customer in co-creation [6], [37], [40]. However, value can also be the result of direct collaboration between both customer and provider [5], [41], [15], [43], [19]. A firm as a provider of service considers customer involvement in the production process and allows them to influence product and share experiences [17]. These studies highlight that customer play an active role in service creation and delivery rather than a passive role in simply receiving the value propositions offered by organizations [5].
- **Interaction Mode:** Interaction is a dialogical process [44], [45] in which “the interacting parties are involved in each other’s practices” [6]. Interaction among actors was found an important component in co-creation because the information is shared and knowledge is generated through interactions [46]. Interactions include relationships between customer and provider [5], [16], [6], [7], [19] or more than two actors in C2C relationships [7], [22]. Interactions can be directed through an active dialogical process with the firm [47], [12] or indirect through outcome and resource of firms’ process [6]. Interactions are platforms for co-creation and result in value formation [47].

B. Identifying Classification of Service Co-creation Systems

Considering the three networks of service integration for organizations introduced by Keast et al. [3], we compared the seven identified themes in different examples of platforms such as “Netflix prize”, “LEGO” and “Airbnb”. Our result shows three classifications for co-creation platforms, as presented in figure 2. The three identified platforms show three different models which differ mainly based on the role and responsibilities of the customer and provider, the level of customer engagement, service delivery and distribution of value. First, contributors conduct activities by the organization’s commands to complete a task, and finally, the organization will aggregate the contributions (CS1- Cooperative Service Co-creation System). Second, in a higher level of customer engagement, customers create value along with the provider (CS2- Coordinative Service Co-creation Systems). Third, in customer-to-customer service co-creation (CS3- Collaborative Service Co-creation systems), users engage in creation of collective value (Community orchestration).

1) Cooperative Service Co-creation Systems (CS1): CS1 is organization-centric in which organizations use collective

intelligence [48] with the aim of harnessing the potential input of a large number of people [10] for business motivation, saving costs, access to outsiders’ capabilities [28], idea competitions [25] and problem solving [26] to complete a task. The main aim of the organization (primary provider (PP)) is to gain benefits from others’ capabilities and insights [48]. Organizations as a seeker set a task with a specific characteristic for target workers (crowd). Allocating the task can be assigned to a specific individual/firm or an undefined crowd of anonymous individuals [28] to achieve an explicit goal [21]. Contributors play the role of workers to process the task in large quantities where the aggregation of contributions matters rather than individual contributions [10]. Aggregations can be done by integrative (homogeneous elements where contributions involve equal outcome) or selective (heterogeneous elements where contribution and value are distinct) approaches [10]. The goal is achieved by a process of sourcing and aggregating contributions from the crowd [21] in short-term relations.

TABLE 2. COOPERATIVE CO-CREATION (CS1)

Dimensions	Cooperative Co-creation (CS1)
Network Focus	Organization-centric (Main power with organization)
Service	Information and functional value (e.g. Idea, tasks)
Resources	Individual impact low Organization as resource integrator Shared resources
Value	Beneficiaries in relation to service under organization control and delivery Potential value for community.
Roles	- Two different areas for provider and customer. - Fixed provider role and diversified user role beyond customer crowdsourced value provider.
Interaction Mode	- C2B transaction contribution - B2C service delivery - Controlled orchestration - Trust is vested by provider side
Engagement Mode	- Organization recruits contributors for problem solving and innovative ideas. - Service system is providing platform, Platform advertises tasks and tasks visibility is to community - Risks vested by provider - Tasks have a contribution of financial or altruism
Examples	Netflix prize Huffington Post

CS1 includes one-to-many relationships where the task distributed to many contributors with few beneficiaries [28]. The highest value is for the organization and contributors may have a financial or altruism value from their participation. The focus of this type of service system is on tasks and projects

which are targeted by the organization and the value is provided by crowd to the business by aggregation of contributions. Netflix and Huffington Post are two examples of such a co-creation model. In 2009, Netflix set a prize competition to develop better algorithms for movie recommendations. They used crowd to improve the accuracy of predictions based on ones' movie preferences. Huffington Post aggregates news from individuals by asking them to pitch posts to their blog editors. However, there are some difficulties in the CS1 including selecting contributors, organizing outsourcing to be sure about the satisfactory outcome, providing incentives for active contributors and assessing the process and product [13]. These difficulties lead user collaboration to a higher level of engagement and deeper relationship with customer. Refer to Table 2 for the summary of CS1 characteristics.

2) Coordinative Service Co-creation Systems (CS2): The focus in CS2 is on the customer-organization interaction as the locus of value creation [15]. This type of co-creation, departing from harnessing users' ideas as downloadable information to benefit the organization [49], is a process of customers engaging with the organization to expand value together [6]. Therefore, the aim of companies is changing from the firm-centric perspective to a personalized customer experience [15], [37]. In CS2, organizations go beyond using collective intelligence by employing a higher involvement of the crowd that has the potential to eliminate some of the obstacles in CS1. This creates a more engaged process that goes beyond one-to-many relationships (Engagement Mode dimension).

The focus on this model is on services that are provided by the joint collaboration of organization as provider and customer (Focus dimension). Customers influence future products/services but not in a direct way. The interaction dimension shows a two-way relationship between customer and provider. Customer (secondary provider (SP)) can create their own unique, personalized consumption experience [15]. The organization (PP) needs to understand their customers' desire to improve their service and customers' satisfaction. Customers are actively creating value rather than passively using the value (Role dimension) [13]. So, value derived from gained experiences and use of service for both organization and customer at a higher level of engagement with customers (Value dimension).

LEGO the company evolved from listening to the adult LEGO communities of practice LUGNET (LEGO user group network) to creating forums to build the relationship with users. Today, LEGO offers participating in the virtual design and buying a manufactured version [49]. Nike provided software tools for local soccer teams and professional leagues to co-design and customize soccer shoes to tap the collective creativity and engaged community to build their unique brands [18]. MyStarbucksIdeas.com allows customer to engage with organization's internal preference market to improve their service and products. Refer to Table 3 for the summary of CS2 characteristics.

TABLE 3. COORDINATIVE CO-CREATION (CS2)

Dimensions	Coordinative Co-creation (CS2)
Network Focus	Organization-customer-centric (Main power with organization)
Service	Information and functional value (e.g. Idea, design)
Resources	Customer main resource Integration of resources Diverse set of resources Shared resources
Value	Value-in-use/ value-in-experience Value to customer Value to provider Potential value for community
Roles	- Two different areas for provider and customer which engage in the joint area and allow them to mutually co-create value. - Organization is primary provider (PP) and customer can be secondary provider (SP) and end-user.
Interaction Mode	- C2B transaction contribution and service/product co-creation - B2C service delivery - Two-way relationship between customer and provider (reciprocal) - Controlled orchestration - Trust is vested by provider side and expanded to customer
Engagement Mode	- Engagements are controlled by organization - Allow customer to co-construct the service experience and personalize the service to develop product/ service - Risks vested by PP - Engagements have a contribution of financial or altruism to fulfil customer's need
Examples	Nike LEGO

3) Collaborative Service Co-Creation Systems (CS3):

CS3 service co-creation systems (C2C co-creation systems) have been refined by communities of multiple connected users. Customers are part of the system of value co-creation [50] and expect a 360-degree view of the experience [15], where value emerges from their collaborative interaction [40]. In this type of service system, as a value network perspective, "all actors collaborate and integrate resources to create value for themselves and others" [2]. The outcome of the C2C Service Co-creation is a collective value that benefits whole networks (Value dimension).

In CS3, users are instrumental in producing and delivering the service to each other (role dimension). The types of exchanged services include knowledge sharing and delivering particular assets, and the customer network provides and delivers services. The idea underlying co-creation through service networks with multiple connectivities is that all actors who play a role will get value at all times. A high level of

interaction between members is required in this model (engagement dimension). Dyadic or many-to-many interactions between actors of the network occur to create jointly beneficial relationships [2] and are dialogical in nature [44]. Both community and individuals gain value from the interactions while the organization gains value financially and builds a brand loyalty (interaction dimension). Value in this type of service system is a combination of utilitarian and hedonic outcome (e.g. quality, service and price) that leads customers to engage in co-production and co-delivery of the service.

Using Frow et al. [20] definition of co-creation, this paper's perspective on co-creation within CS3 includes: active involvement of two or more actors with different roles, the integration of unlimited resources that bring beneficial value to the whole network, a willingness to interact and co-create the service, co-production and co-delivery of the service and co-construction of experiences within the user network independent of the firm. Therefore, co-creation is a function of interaction [6] in a shared value network with micro-level organization involvement. Refer to Table 4 for the summary of CS3 characteristics.

TABLE 4. COLLABORATIVE CO-CREATION (CS3)

Dimensions	Collaborative Co-creation (CS3)
Network Focus	Customer-centric (shared power)
Service	Information and functional value (e.g. Idea, design)/ transactional
Resources	Customer main resource Integration of resources Diverse set of resources Collective resources
Value	Value-in-use/ value-in-experience Value to customer Value to provider Potential value for community
Roles	- One integrated area for different roles (actors). - Organization is only facilitator of service between customers. - Users can be PP and customer
Interaction Mode	- C2C service co-creation, co-delivery - Two-way/multiple interactions between members - Community orchestration - Service process happens in the C2C network - Trust is vested throughout community
Engagement Mode	- High level of customer engagement - Users contributes in co-production and co-delivery of service and construct the service experience with each other - Risks vested through community - Engagements have a contribution of financial or altruism to fulfil stockholders' need
Examples	Airbnb /Uber Stack Exchange

Examples of platforms with transactional service delivery are Uber and Airbnb. Uber, a car ride-sharing company, connects riders and drivers together. Airbnb enables people to discover and book accommodation in other members' homes globally. Examples of informational service platforms are StackExchange and PatientsLikeMe. StackExchange, is a Q&A community to provide a better and smarter solution from experts to different context of programming, health and science for users. PatientsLikeMe, a healthcare social network, enables people to monitor their health, connect to patients similar to them and help others by sharing their experiences and insight into different symptoms/treatments and support them to improve their conditions. The generated data about the real world nature of disease helps researchers, health providers and health companies to develop more effective care services. The role of the organization as the provider is fading out and evolving into acting as a medium to match and connect different members of the community together. However, members use platforms provided by an organization that benefits economically from their work [13].

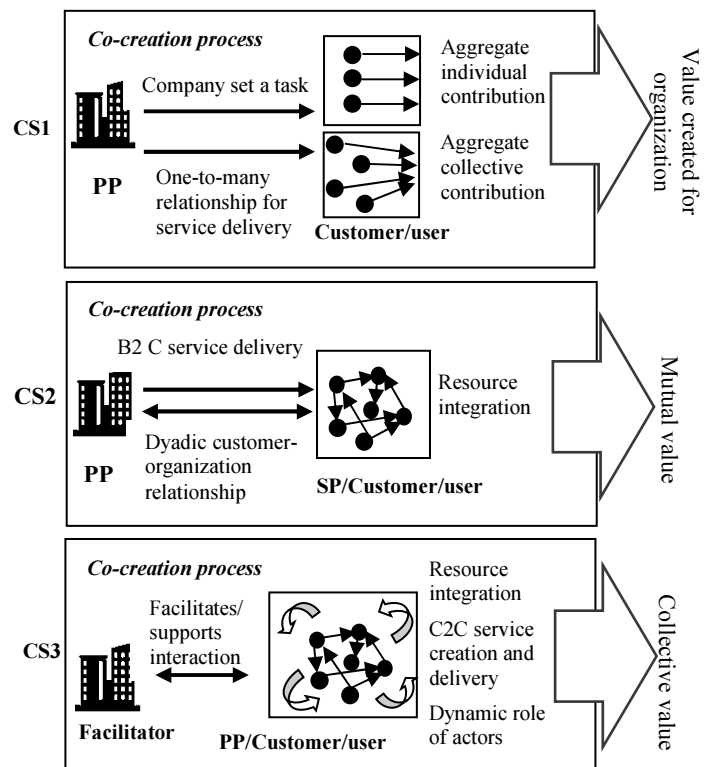


Figure 2. Comparison of different types of service co-creation systems.

Finally, there are other co-creation systems which we have not profiled such as DHL MyWays. In this type of co-creation systems, value is centered through the organization, with the trust is vested to the primary provider side. So, the orchestrator is organization while co-delivery of transactional services is with users and community. With the potential for these sorts of platforms to evolve and increasingly leverage the benefits of self-orchestration and open communities and C2C interactions, we face open research questions about

consideration of co-creation from risk-mitigated transactional delivery and flexible co-creation of StackExchange type of platforms.

V. CONCLUSIONS

In this paper, we offered a classification of service co-creation systems using co-creation from S-D logic, crowdsourcing from open innovation paradigm and 3Cs from service integration continuum. Three types of service co-creation systems were identified by emphasising seven dimensions that form characteristics for each kind of service system: Network Focus, Service, Resource, Value, Roles, and Interaction Mode and Engagement Mode.

These service systems demonstrate how customers became an integral part and the focal point in the success of service systems. The focus of service systems changed from organization-centric to customer-centric. Facilitating co-creation networks and experience environment became a priority for the organizations [15] by assigning more responsibility for the creation and delivery of the service to user. The respective services realized by the interactions between resources to influence others to create value [47]. The willingness, motivation and skills of participants leads to ways to contribute to value formation [47]. The consequence of this transformation is a higher chance of value extraction for customers. The outcome the co-creation process will be the drivers for future engagement of co-creation processes [22], [7].

Future research may select additional search terms such as “collaborative networks” and “value networks” to broaden the scope of analysis. Only 36 articles met the inclusion criteria for more investigation. However, we believe we have complied a strong analysis from the most influential articles in context of co-creation. Future work will investigate participation in co-creation of service emphasizing C2C service co-creation systems.

Future study should rely on both qualitative and quantitative data by performing an in-depth interview and survey to test the validity of proposed classification. Case studies of two different co-creation platforms could be conducted to enhance the generalizability of findings.

This paper contributes to better understanding of user service co-creation systems, and in particular to the clarification of three different models in practice. Practitioners can consider the different levels of user involvement in their businesses to assess risks, quality of service and performance. They will gain insight to choose appropriate strategies to collaborate with customers by better understanding of communication and service system environment.

ACKNOWLEDGMENT

This work is supported by ARC Linkage Grant LP140101062.

REFERENCES

- [1] P. P. Maglio and J. Spohrer, "Fundamentals of service science," *Journal of the Academy of Marketing Science*, vol. 36, pp. 18-20, 2008.
- [2] N. Pinho, G. Beirão, L. Patrício, and R. P. Fisk, "Understanding value co-creation in complex services with many actors," *Journal of Service Management*, vol. 25, pp. 470-493, 2014.
- [3] R. Keast, K. Brown, and M. Mandell, "Getting the right mix: Unpacking integration meanings and strategies," *International Public Management Journal*, vol. 10, pp. 9-33, 2007.
- [4] A. Barros, K. Duddy, M. Lawley, Z. Milosevic, K. Raymond, and A. Wood, "Processes, roles, and events: UML concepts for enterprise architecture," in *«UML» 2000—The Unified Modeling Language*, ed: Springer, 2000, pp. 62-77.
- [5] C. Durugbo and K. Pawar, "A unified model of the co-creation process," *Expert Systems with Applications*, vol. 41, pp. 4373-4387, 2014.
- [6] C. Grönroos and P. Voima, "Critical service logic: making sense of value creation and co-creation," *Journal of the Academy of Marketing Science*, vol. 41, pp. 133-150, 2013.
- [7] A. F. Payne, K. Storbacka, and P. Frow, "Managing the co-creation of value," *Journal of the Academy of Marketing Science*, vol. 36, pp. 83-96, 2008.
- [8] D. C. Brabham, "Moving the crowd at Threadless: Motivations for participation in a crowdsourcing application," *Information, Communication & Society*, vol. 13, pp. 1122-1145, 2010.
- [9] A. Doan, R. Ramakrishnan, and A. Y. Halevy, "Crowdsourcing systems on the world-wide web," *Communications of the ACM*, vol. 54, pp. 86-96, 2011.
- [10] D. Geiger, M. Rosemann, and E. Fietl, "Crowdsourcing information systems: a systems theory perspective," in *Proceedings of the 22nd Australasian Conference on Information Systems (ACIS 2011)*, 2011.
- [11] J. Fuller, K. Hutter, and R. Faullant, "Why co-creation experience matters? Creative experience and its impact on the quantity and quality of creative contributions," *R&D Management*, vol. 41, pp. 259-273, 2011.
- [12] C. Lorenzo-Romero, E. Constantinides, and L. A. Brünink, "Co-creation: Customer Integration in social media based product and service development," *Procedia-Social and Behavioral Sciences*, vol. 148, pp. 383-396, 2014.
- [13] V. Zwass, "Co-creation: Toward a taxonomy and an integrated research perspective," *International Journal of Electronic Commerce*, vol. 15, pp. 11-48, 2010.
- [14] F. T. Piller, C. Ihl, and A. Vossen, "A typology of customer co-creation in the innovation process," *Available at SSRN 1732127*, 2010.
- [15] C. K. Prahalad and V. Ramaswamy, "Co-creation experiences: The next practice in value creation," *Journal of Interactive Marketing*, vol. 18, pp. 5-14, 2004.
- [16] B. Edvardsson, B. Tronvoll, and T. Gruber, "Expanding understanding of service exchange and value co-creation: a social construction approach," *Journal of the Academy of Marketing Science*, vol. 39, pp. 327-339, 2011.
- [17] T. Harwood and T. Garry, "'It's Mine!': Participation and ownership within virtual co-creation environments," *Journal of Marketing Management*, vol. 26, pp. 290-301, 2010.
- [18] V. Ramaswamy, "Co-creating value through customers' experiences: the Nike case," *Strategy & Leadership*, vol. 36, pp. 9-14, 2008.
- [19] A. Shamim and Z. Ghazali, "A Conceptual Model for Developing Customer Value Co-Creation Behaviour in Retailing," *Global Business and Management Research*, vol. 6, pp. 185-196, 2014.
- [20] P. Frow, A. Payne, and K. Storbacka, "Co-creation: A typology and conceptual framework," *Proceedings of ANZMAC 2011, Perth*, pp. 1-6, 2011.
- [21] D. Geiger, S. Seedorf, T. Schulze, R. C. Nickerson, and M. Schader, "Managing the Crowd: Towards a Taxonomy of Crowdsourcing Processes," in *AMCIS*, 2011.
- [22] S. Hassan and J. Toland, "A conceptual framework for value co-creation practices in C2C social commerce environment," in *24th Australasian Conference on Information Systems (ACIS)*, 2013, pp. 1-12.

- [23] T. Tuunanen, M. Myers, and H. Cassab, "A conceptual framework for consumer information systems development," *Pacific Asia Journal of the Association for Information Systems*, vol. 2, p. 5, 2010.
- [24] T. Walter and A. Back, "Towards measuring crowdsourcing success: An empirical study on effects of external factors in online idea contest," in *Proceedings from the 6th Mediterranean Conference on Information Systems (MCIS)*, 2011, pp. 1-12.
- [25] J. M. Leimeister, M. Huber, U. Bretschneider, and H. Krcmar, "Leveraging crowdsourcing: activation-supporting components for IT-based ideas competition," *Journal of management information systems*, vol. 26, pp. 197-224, 2009.
- [26] L. B. Jeppesen and K. R. Lakhani, "Marginality and problem-solving effectiveness in broadcast search," *Organization science*, vol. 21, pp. 1016-1033, 2010.
- [27] L. Pierre, "Collective Intelligence: Mankind's Emerging World in Cyberspace," *Cambridge, Mass.: Perseus Books*, 1997.
- [28] A. C. Rouse, "A preliminary taxonomy of crowdsourcing," *ACIS 2010 Proceedings*, vol. 76, pp. 1-10, 2010.
- [29] M. Fine, "The New South Wales demonstration projects in integrated community care," *Getting results through collaboration: Networks and network structures for public policy and management*, pp. 207-219, 2001.
- [30] K. Brown and R. Keast, "Citizen-government engagement: community connection through networked arrangements," *Asian Journal of Public Administration*, vol. 25, pp. 107-131, 2003.
- [31] M. Mandell and T. Steelman, "Understanding what can be accomplished through interorganizational innovations The importance of typologies, context and management strategies," *Public Management Review*, vol. 5, pp. 197-224, 2003.
- [32] B. Cigler, "Multiorganizational, multisector, and multicomunity organizations: setting the research agenda," *Getting results through collaboration: Networks and network structures for public policy and management*, pp. 71-85, 2001.
- [33] H. Lawson, "Improving conceptual clarity, accuracy, and precision and facilitating more coherent institutional designs," *The Contribution of Interprofessional Collaboration and Comprehensive Services to Teaching and Learning, The National Society for the Study of Education Yearbook*, pp. 30-45, 2002.
- [34] M. E. Falagas, E. I. Pitsouni, G. A. Malietzis, and G. Pappas, "Comparison of PubMed, Scopus, Web of Science, and Google Scholar: Strengths and weaknesses," *FASEB Journal*, vol. 22, pp. 338-342, 2008.
- [35] M. O. Meade and W. S. Richardson, "Selecting and appraising studies for a systematic review," *Annals of internal medicine*, vol. 127, pp. 531-537, 1997.
- [36] R. F. Lusch and S. L. Vargo, "Service-dominant logic: reactions, reflections and refinements," *Marketing theory*, vol. 6, pp. 281-288, 2006.
- [37] S. L. Vargo and R. F. Lusch, "Evolving to a new dominant logic for marketing," *Journal of Marketing*, vol. 68, pp. 1-17, Jan 2004.
- [38] S. D. Hunt and C. Derozier, "The normative imperatives of business and marketing strategy: grounding strategy in resource-advantage theory," *Journal of Business & Industrial Marketing*, vol. 19, pp. 5-22, 2004.
- [39] D. S. L. V. Robert F. Lusch, D. Dr Ron Fisher, and T. Hammervoll, "Service provision for co-creation of value: Insights from exchange- and production economy perspectives," *International Journal of Physical Distribution & Logistics Management*, vol. 44, pp. 155-168, 2014.
- [40] S. L. Vargo and R. F. Lusch, "Service-dominant logic: continuing the evolution," *Journal of the Academy of Marketing Science*, vol. 36, pp. 1-10, 2008.
- [41] C. Grönroos and A. Ravald, "Service as business logic: Implications for value creation and marketing," *Journal of Service Management*, vol. 22, pp. 5-22, 2011.
- [42] J. M. Spiteri and P. A. Dion, "Customer value, overall satisfaction, end-user loyalty, and market performance in detail intensive industries," *Industrial Marketing Management*, vol. 33, pp. 675-687, 2004.
- [43] E. W. See-To and K. K. Ho, "Value co-creation and purchase intention in social network sites: The role of electronic Word-of-Mouth and trust-A theoretical analysis," *Computers in Human Behavior*, vol. 31, pp. 182-189, 2014.
- [44] D. Ballantyne, "Dialogue and its role in the development of relationship specific knowledge," *Journal of Business & Industrial Marketing*, vol. 19, pp. 114-123, 2004.
- [45] G. Decker, A. Barros, F. M. Kraft, and N. Lohmann, "Non-desynchronizable service choreographies," 2008, pp. 331-346.
- [46] P. Berthon and J. John, "From entities to interfaces," *The service-dominant logic of marketing: Dialog, debate and directions*, pp. 196-207, 2006.
- [47] C. Grönroos, "Value co-creation: Towards a conceptual model," in *Otago Forum*, 2011.
- [48] T. W. Malone, R. Laubacher, and C. Dellarocas, "The collective intelligence genome," *IEEE Engineering Management Review*, vol. 38, p. 38, 2010.
- [49] T. Roser, A. Samson, P. Humphreys, and E. Cruz-Valdivieso, "Co-creation: new pathways to value: an overview," *Promise & LSE Enterprise*, 2009.
- [50] C. K. Prahalad and V. Ramaswamy, "The co-creation connection," *Strategy and Business*, pp. 50-61, 2002.



Reihaneh Bidar received her BS in software engineering from Iran Azad University of Lahijan, in 2008 and she earned her MS degree in information technology at Istanbul Bahcesehir University, in 2013. She is currently a PhD candidate in Information Systems school, Queensland university of technology, Australia. Her major research interests are social networks, service networks, co-creation networks, user behaviour and user collaboration.



Jason A. Watson is a senior lecturer at the School of Information Systems at Queensland University of Technology, Australia. Jason conducts theoretical and systems research into Social Technology. In particular, his research interests include understanding, deriving, and modeling the characteristics of social technology platforms (and their users) in a way that informs understanding of social technology design, adoption and impact. His degrees are in Electronic and Information Engineering (BEng Hon) and Monitoring of Computer-Based Training over Computer Networks (PhD). He has worked as a researcher and lecturer in both the UK and Australia. Jason is well published in the field of technology and education and successfully instigated and completed research projects as principle investigator in these areas. He has achieved more than \$1M dollars (Australian) in research funding to date.



Alistair Barros is a professor and Head of Services Science Discipline, at QUT's Information Systems School. He has a PhD from the University of Queensland and 29 years ICT experience in industry, technology vendor and research roles, including Global Research Leader and Chief Development Architect at SAP. His major area of work relates to next-generation digital platforms capable of service accessing in wide spanning ecosystems, leveraging wide heterogeneous data sources for intelligent decision-making, and connecting people through digital communities. In addition to his research and teaching roles at QUT, Alistair is currently serving as a consultant chief architect in an Ernst & Young led team, in one of the federal government largest service delivery transformation projects, the \$1.6 billion Welfare Payments Infrastructure Transformation project.