

Towards Understanding IT Value Co-creation in Crowdsourcing: the Multiple Stakeholders' Perspective

Research-in-Progress Paper

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Abstract

Contemporary business environment involves IT being invested and shared by multiple stakeholders in collaborative, platform-based, and relational arrangements where the objective is to co-create value. Traditional IT enabled business value therefore has been extended towards IT value co-creation that involves multiple stakeholders. In this paper, we present a conceptual development of IT-based value co-creation in the context of online crowdsourcing. Based on the existing literature, we have distinguished multiple crowdsourcing types (models) by analyzing attributes of crowd, the roles of the client, the platform and the crowd that act as key stakeholders in the value co-creation process, and describe the major interactions between the main stakeholders. Our conceptual development is suggesting different combinations of value co-creation layers to be evident in different crowdsourcing models.

Key Words: Crowdsourcing, IT Value, IT Value Co-creation

Introduction

Over the past decades that witnessed rapid development of internet technologies, there has been a critical shift taking place in consideration of business value, and how this value is created. The business environment has become increasingly dynamic and traditional boundaries of firms are blurring (Kohli and Grover 2008). Firms are seeking to create value with open perspective by utilizing its network rather than closed perspective that solely relies on in-house value creation. For example, Grover and Kohli (2012) argue that “contemporary environments involve IT investments being made by multiple companies in cooperative, platform-based, and relational arrangements where the objective is to co-create value” (p.225). Han et al. (2012) highlight the open innovation paradigm, which moves beyond a closed mechanism to tapping into various stakeholders in the innovation ecosystem. Collaboration and strategic alignment have increasingly been considered on the strategic level (Zajac and Olsen 1993; Kale et al. 2002).

This business shift has been reflected in the academic literature. The emerging theme of IT-based value co-creation differs from traditional IT value creation in switching the focus from looking into a single firm to its network. IT value co-creation considers IT investments and the benefits directly and indirectly generated from those investments within inter-organizational networks (Kohli and Grover 2008). The key notion converges to the stakeholder theory (Freeman et al. 2004) which describes value beyond stockholders, involving all relevant stakeholders including shareholders, employees, customers, suppliers,

partners, political groups, trade associations and even competitors. IT-based value co-creation is the extension of the traditional view of IT business value which does not simultaneously consider value and contributions from multiple stakeholders.

In this paper, we aim to understand how IT-based value is co-created among multiple stakeholders involved in crowdsourcing context. Crowdsourcing, which is defined as outsourcing a task to the crowd in the form of an “open call” (Howe 2008), relies on a virtual network of individuals (user of the “crowd”) who are competing and collaborating online towards delivering products or services to clients, using an online crowdsourcing platform that acts as an intermediary. Given the growing popularity of crowdsourcing that we have witnessed in the last five years, we aim to contribute to the two streams of literature – on IT value co-creation and on crowdsourcing. Specifically, we expect to enrich crowdsourcing literature by linking crowdsourcing models with IT value co-creation. In the future research, we aim to use this classification to conduct empirical investigation, aiming to understand how IT value emanates in crowdsourcing environments.

Theoretical Background

From IT Value Creation to Co-creation

IT value refers to business value enabled by IT (Kohli and Grover 2008; Melville et al. 2004). Extensive research on IT value articulates different aspects of business value generated by the firms from IT investment (Kohli and Grover 2008). IT business value could be captured at different levels in an organization. At operational level, IT creates value through increasing work efficiency and productivity (e.g. Brynjolfsson and Yang 1999) – for example by substituting manual operations with computers. At managerial level, it involves information flow for decision making (e.g. Devaraj and Kohli 2000). For example, with the application of business intelligence systems, managers could get timely information to make quick reflections to market change. At strategic level, IT-based value focuses on how IT facilitates innovation to help firms sustain their core competitiveness (e.g. Han et al. 2012). At market level, it reflects how the external stakeholders see the value created by IT (e.g. Brynjolfsson et al. 2002). For each of the four levels, there is an extensive literature conceptualizing and investigating value with diversified measures.

Some researchers focus on tangible value, normally the relationship between IT investment and financial performance and productivity. Value is usually interpreted by quantitative variables, such as Tobin's q, return on assets and pretax profits (Brynjolfsson and Yang 1999; Stratopoulos and Dehning 2000; Weill 1992). Contemporary research pays more attention to intangible value, such as process improvement, better decision making, increased knowledge and innovation (Devaraj and Kohli 2000; Kohli and Grover 2008). Furthermore, previous research suggests that IT generates value under certain conditions (Kohli and Grover 2008). Based on Orlikowski's (1992) discussion about duality of technology, IT itself does not create value unless interacting with human agents. As a set of software and hardware, it must function as a part of business value creation processes, interworking with other IT and networking infrastructure and organizational factors in a synergistic fashion (Melville et al. 2004; Wade and Hulland 2004). There exist numerous factors that mediate IT and value, including IS strategic alignment, knowledge management, information sharing, organizational learning and so forth (Kohli and Grover 2008). Moreover, value creation from IT investment might not be immediate and often it takes place with a time lag (Kohli and Grover, 2008; Mahmood and Mann, 2005).

Traditionally, IT investment and its value were mainly studied from a single firm's perspective. Most literature could be positioned somewhere at operational level, managerial level or strategic level research. In terms of market level, researchers mainly talk about the market value of firms (typically the stock price and the informational impact of IT investment announcement) or value related to consumer relationship (e.g. customer relationship management system). However, seldom have they discussed shared IT value with other stakeholders. The concept of “strategic information system”, which emerged from the 1980s and was often framed by researchers through Porter's industry structure view (2008), placed great focus on how an individual firm could possess a monopolistic position via IT (Grover and Kohli 2012). As the business environment today has become much more dynamic and competitive, such a monopolistic position could hardly be achieved by a single firm. The increasing need for strategic collaboration implies the need for academic research to expand research themes beyond traditional IT-based value creation

towards what was termed as “IT-based value co-creation” (Grover and Kohli 2012; Ceccagnoli et al. 2012; Han et al. 2012)

IT value co-creation emphasizes the value of shared IT investment among stakeholders. It is crucial to identify who are the key stakeholders in the ecosystem where joint IT investment is made or shared. Ceccagnoli et al. (2012), for example, examine IT-based value co-creation in the context of platform technology ecosystem. Han et al. (2012) investigate how a firm’s IT investment would influence its competitors’ value. Grover and Kohli (2012) investigate inter-firm partnership. With respect to each of the key stakeholders, a traditional view of IT business value could be applied to investigate levels (operational, managerial, strategic, and market), types (tangible and intangible), and measures (financial, non-financial, or other measures). While sharing IT infrastructure, stakeholders interact as they work towards their own and/or joint goals and objectives. Another key consideration is the value of the network among stakeholders. The theme of IT value co-creation not only introduces the necessity to involve more stakeholders but also the relationship among them.

Based on the relational view (Dyer 2000; Dyer and Singh 1998), Grover and Kohli (2012) present a four layer framework to describe relational value, including relationship-specific assets, knowledge sharing routines, complementary resources and capabilities, and governance. Each determinant of value indicates a value creation layer and is enabled, expanded, or created by IT (Grover and Kohli 2012). The IT investment column in Table 1 highlights joint/shared contributions of different stakeholders that manifest the “co-creation” (i.e. joint creation) of the IT-based business value.

Layer	IT Investments	Enablers	Value Cocreation
Asset	Idiosyncratic investments in interorganizational IT	Incentives, General IT & organizational infrastructure	Digital & IT-supported products & services (e.g., Apple, Inc.)
Complementary Capability	IT functionality or capability (e.g., realtime synergy complements partner resources)	Experience, Partner information, General IT and organizational infrastructure	IT-enabled capabilities (e.g., General Mills, Land O’Lakes, and Nistevo logistics)
Knowledge Sharing	Sharing of knowledge repositories and use of analytical software	Absorptive capacity, Incentives, General IT and organizational infrastructure	IT-enabled decisions and strategies (e.g., Motorola’s CPFR)
Governance	Interorganizational systems that facilitate brokerage and integration effects	Informal contracts (trust) Alignment with governance, IT & organizational infrastructure	IT-enabled cost reduction (e.g., Amazon.com, Global Health Exchange)

Table 1. Co-creation of IT Value (Grover and Kohli, 2012)

The *asset layer* has the lowest level of threshold. Any alliance that shares IT infrastructure to create value is deemed eligible. It is the foundation of the other three layers. When it comes to IT-based value co-creation, there must be some sort of hardware, software or network sharing. On this basis, the example of Apple App Store and individual App developers from the viewpoint of sharing the website is on the asset layer. However, it definitely does not mean that Apple’s case merely fits in the asset layer.

The *complementary capability layer* emphasizes complementary resources and capabilities among partners. Such resources and capabilities are beyond IT infrastructures. They could be HR-based, IT skills and organizational resources or IT expertise. The example of manufacturing and distribution system collaboration between automaker and tire manufacturer to achieve a sequencing advantage is a typical vertical strategic alignment. They not only share IT infrastructure but also take advantage of organizational expertise and resources to achieve a win-win situation.

The *knowledge sharing layer* involves the sharing of information and expertise between stakeholders that can inform decision-making and strategies for co-creating new or better products. This layer comprises knowledge management concepts such as knowledge learning, dissemination, sharing, re-creation and so forth. A typical example is offshore outsourcing. The vendor is required to learn from the client about how they handle the outsourced part, and then transfer this knowledge to the vendor to create knowledge.

The *governance layer* aims to set up an alignment with a control structure to reduce transaction costs and facilitate new value co-creation (Grover and Kohli 2012). Such alignment is safeguarded by formal contract. At the same time, informal controls may also take an important role. This is potentially less costly than formal contract in stimulating value co-creation. The governance layer could be viewed as an integration of the asset, complementary capabilities, and knowledge exchange layers (Grover and Kohli, 2012).

Grover and Kohli (2012) further indicate that there exist inter-dependencies among these layers. Value co-creation on one layer may facilitate value co-creation on other layers. This might be a laddered relationship: the governance layer integrates the other three layers; the knowledge sharing layer is built on the complementary capability layer, while the asset layer is the foundation layer. We apply Grover and Kohli (2012) layers to study IT value co-creating among multiple stakeholders involved in crowdsourcing.

Unpacking the Crowdsourcing Phenomenon

Crowdsourcing is generally defined as outsourcing a task to the crowd in the form of an “open call” (Howe 2008). Scholars have attempted to define types of crowdsourcing by distinguishing platform characteristics, such as whether the nature of collaboration is explicit or implicit (Doan et al. 2011) and whether user contribution is active or passive (Cook 2008). To generate a more insightful understanding, we extend this distinction through analyzing the attributes of the crowd. Firstly, a crowd could be either internal or external, in relation to the focal entity that is engaging in crowdsourcing. A majority literature assumes that crowdsourcing only engages external stakeholders (e.g. Howe 2008). However, a crowd could also be internal especially when the focal firm is multinational or with a large number of labor pool. Additionally, a crowd may have a vague boundary. For example, internal crowdsourcing could be at department, subsidiary or firm level while external crowdsourcing could be community, crowdsourcing broker (platforms), or public to everyone (Simula and Ahola, 2014). Secondly, the access to a crowd is not necessarily internet-based. Face to face engagement, traditional mass media, crowdsourcing platforms and other Web 2.0 applications are all potential channels. However internet-based channels are the most efficient way to engage a large and highly diversified crowd. Thirdly, the crowd boundary determines certain characteristics of the crowd, including crowd diversity, motivation (extrinsic and intrinsic), interaction style, expertise, and so forth. These features might be crucial factors which determine that a particular crowd is suitable for solving particular problems. For example, an internal crowd is likely to contribute to internal operation improvement on account of familiarity with daily operation and tacit knowledge; a public crowd is suitable for ideation because of crowd diversity and massive crowd interaction (e.g. commenting and rating).

In our research we adopt the distinction between internal and external crowdsourcing types/models. While internal crowdsourcing leverages the focal firm’s internal expertise and heterogeneous knowledge, external crowdsourcing taps into external stakeholders. Similar with Simula and Ahola (2014), we further classify external crowdsourcing into community crowdsourcing, crowdsourcing via broker and public crowdsourcing.

Towards a Conceptual Framework of IT Value Co-creation in Crowdsourcing

To understand value co-creation in the context of crowdsourcing, it is important to distinguish who the key stakeholders are, how these stakeholders interact with each other to co-create IT value, and how IT supports such procedure. This is the key area of our research. We focus on a crowdsourcing project as the unit of analysis. Within the scope of an individual project, the key stakeholders are the *client* who posts the project, the *IT enabled platform* (including all staff that develop, maintain and use the platform as part of the mediation effort), and the *crowd* (the actual supplier(s) who undertake the project). We focus on “IT-based value co-creation” from the client’s perspective, as it is achieved through interactions between the main stakeholders throughout the process of completing a project advertised by the client. However we also recognize that as crowd members and the IT enabled platform (owners and support team of the online crowdsourcing platform) contribute towards creating value for the client, they also create value for themselves, which is the main motivator for them to engage in the crowdsourcing activity (e.g. financial motivation). While platform-perceived and crowd-perceived IT value are important to

consider, we believe that for studying the co-creation aspect of IT-based business value, the client perspective is the most appropriate focus for our empirical research, as it requires contributions from all the parties. Such contributions rely on interactions of a collaborative as well as a competitive nature of crowdsourcing environment.

While all contemporary crowdsourcing activities are designed to connect potential clients with people who constitute the “crowd”, the way this connection is established and mechanisms that support interactions between clients and crowd members are different across crowdsourcing models. In terms of *internal crowdsourcing*, the focal firm as the client engages its internal employees as the crowd. One common channel is intranet platform. Usually an internal management team sets up themes or problems to be solved. The internal crowd with the nature of collaboration interact with each other via platform applications (e.g. comment, blog, rating) to come up with solutions. Then, the management team collect, analyze, evaluate, and further develop valuable solutions. An internal crowd often possesses rich and tacit knowledge about the focal firm which can be hardly possessed by an external crowd. Employees have relatively high level of commitment with the focal firm. Therefore intrinsic value (e.g. commitment, self-fulfillment, sense of pride) is likely the key factor that motivates participation. In turn, the focal firm could get valuable solutions (e.g. process innovation, leveraging hidden ideas) and also potential side effects (e.g. increased satisfaction, involvement). Internal crowdsourcing is relatively flexible in terms of both contribution and management. The nature of contribution tends to be collaborative rather than competitive. Usually all valuable contributions are recognized. It can be seen that internal crowdsourcing is able to co-create complementary capability level and knowledge sharing level value. Meanwhile, IT platform mainly provides infrastructures for crowd interaction. Since IT is internal invested and governance function is retained in house, asset and governance layer value are not applicable. An example of internal crowdsourcing is Accenture’s “Just Do It” which aims to initiate internal brain storming to facilitate innovation and operation efficiency improvement with the support of a combination of channels (intranet, email, face to face presentation).

Community crowdsourcing refers to engagement with crowd from a particular online community which consist of individuals and organizations with specific knowledge, expertise, and other pre-qualifications (Simula and Ahola, 2014). An online community usually has a specific theme (e.g. SAP, smart phone, product user of a particular brand). The platform encourages knowledge sharing and crowd interactions through gamification mechanism (e.g. rating system, badge system), communication mechanism and certain governance mechanism (such as acting as information gate keeper to eliminate trash and vicious information). In addition, distinguished users are also granted some privilege to help manage the community. Intrinsic value is the key motivation that motivates contributions. Contributions are highly voluntary since usually there is no guaranteed financial payment. A project is often accomplished through massive communication and collaboration of the community crowd (including the focal firm) without formal contracts. The focal firm usually has limited control over the project. Instead, completion greatly relies on the crowd’s automation and voluntary. As the client, a focal firm could create its own community (e.g. Starbucks). It could also register on a third party community to leverage the crowd wisdom. Additionally, in some cases the focal firm does not need to directly connect to the community, however still enjoy the benefits from the community crowd. For example, there are many communities focusing on iOS based application development. Usually these communities are not officially bonded with Apple, however Apple enjoys great benefits from their enriching the App store. Community crowdsourcing is expected to co-create asset, complementary capability, and knowledge sharing layer value. In addition, governance layer might be applicable. Efforts of community platforms and their crowds could be viewed as the extension of the focal firm’s R&D function.

Crowdsourcing via broker taps into third party outsourcing platforms. These online platforms act as intermediaries by connecting potential buyers (clients) with potential suppliers (the crowds). Instead of collaboration, crowd members that possess specific skills, knowledge and expertise compete with each other to get projects with guaranteed payment. In a specific project, very often there is no interaction among crowd members. In addition, extrinsic motivation is an obvious tag. Kaganer et al. (2013) summarized four major types of crowdsourcing via broker as facilitator, arbitrator, aggregator and governor models. In the *facilitator model* (e.g. Freelancer), the platform offers IT infrastructure, a bidding mechanism (to compete to be the only vendor to submit the deliverable), and limited governance (e.g. general rules and policies of the platform, patent protection policies). The client is responsible for managing the entire project including providing a detailed project requirement, pricing the project,

selecting the vendor from multiple participants, managing the relationship with the vendor, tracking the project, and evaluating the performance of the vendor. After the project is posted on the platform, for a certain pre-defined period of time any of the registered crowd members could bid for the project. Hence, in a facilitator model, there are multiple candidates available. Their proposals (bids) and working experience would be essential information for the client to make a vendor-selection decision. After this step, only one vendor is selected. That vendor is responsible to deliver the project. Therefore, in the facilitator model, the key stakeholders are the client, the (chosen) vendor, the platform and the bidders (potential vendors). The major interaction is between the client and the selected vendor. Consequently, we envision complementary capability layer and knowledge sharing layer value co-creation between the client and the selected vendor. The platform offers asset layer value to engage the client and the crowd. Since the client retains its governance, it is likely that there is no governance layer value co-creation.

In the *arbitrator model* (e.g. crowdSPING), the roles of the platform and the client are almost the same as in the facilitator model. However, the arbitrator platform offers a different mechanism for supporting interactions between these two parties. After the project is posted online, anyone of the crowd could participate. Interested participants are expected to compete with each other by submitting their deliverables that are accomplished voluntarily. The client is responsible for selecting the winning deliverable and only the winner gets payment. In an arbitrator project, the key stakeholders are the client, the platform, and multiple vendors (those who submitted their deliverables). Interactions take place between the client and multiple vendors. The only difference in value co-creation that we expect between the arbitrator and the facilitator is that the complementary capability layer value and the knowledge sharing layer would be between the client and multiple vendors rather than a single vendor. Other dimensions of value co-creation remain the same.

The *aggregator model* (e.g. CrowdFlower) mainly tackles large-scale projects that are segmented into a large number of small and relatively simple tasks. The client is responsible for clarifying the requirements, segmenting the project into small tasks and integrating deliverables submitted by multiple vendors. One vendor is assigned to accomplish each individual task. The key stakeholders are the client, the platform and multiple vendors who work simultaneously on different tasks. However, different from the arbitrator model where only one winning deliverable is selected, in the aggregator model contributions from all vendors are paid and they are integrated together by the client. As tasks advertised using this model are of low risk, there is no need for active interaction between the client and the vendors, and there is no need for interactions between the vendors. Hence, we perceive complementary capability layer value between the client and multiple vendors. The platform only offers asset layer value. Considering the nature of the task and retained governance, knowledge sharing layer value and governance layer value would not be applicable.

In the *governor model* (e.g. Trada), the client is responsible for specifying its project requirements to the project management team that is “employed” by the platform. The platform is responsible for collecting project requirements, deciding how to accomplish the project (including deciding which mechanism to use: the facilitator, the arbitrator, the aggregator, or any combination), dividing the project into small pieces, coordinating completion and sequencing of individual tasks, examining supplier certification and ensuring the quality of the project. Thus, the platform plays a significant intermediary role in interacting with the client and vendors. Key stakeholders include the client, the platform (including the management team), multiple vendors selected to accomplish various tasks, and also bidders (potential vendors that were not selected). Built on the shared asset layer value, on the one hand, the platform creates complementary capability layer value and knowledge sharing layer value through interacting with the client. On the other hand, it co-creates complementary capability layer value and knowledge sharing layer value with vendors through sourcing activities. Additionally, the client’s governance functionality is transferred to the platform that is believed to be more professional to tackle the project. Such new setting may lead to governance layer value

With respect to *public crowdsourcing*, it is open to everyone. Web 2.0 applications are the most convenient channels to connect the crowd. The focal firm usually initiates a crowdsourcing campaign and creates its own dedicated platform with specific business purposes. Apart from governing the project, the client offers IT infrastructure with crowdsourcing mechanism, policy and rules. A public crowd is highly diversified in terms of knowledge, expertise and biography. The crowd could voluntarily participate in the campaign through deliverable uploading, commenting, and rating. The nature of interaction is mixed with

competition and collaboration, being motivated by intrinsic and extrinsic motivations. Competitive nature exists in contributors who submit deliverables while collaborative nature exists in commentators and raters. Usually there are several winners who get the financial rewards. The winners are often chosen by the focal firm with the reference of crowd ratings. Public crowdsourcing is frequently used for marketing, R&D and customer research related business purposes (Whitla 2009). The key stakeholders in the campaign model are the client and the crowd (vendors who provide deliverables, and platform users involved in commenting and rating). The client directly co-creates asset layer value, complementary capability layer value and knowledge sharing layer value with the crowd. Since the client owns the platform, governance is actually retained in-house. The governance layer value might not be applicable. An example is LEGO's public crowdsourcing campaign. LEGO learns from consumers' creativity through maintaining its own platform CUUSOO to invite players to design their own toys. Table 2 provides a summary of the main features of the crowdsourcing models we discussed above, and layers where we envision IT value co-creation.

Conclusion and Future Research

In this paper, we presented a conceptual development of IT value co-creation in the online crowdsourcing context. We have distinguished multiple crowdsourcing types by analyzing attributes of crowd and interactions between multiple stakeholders. In the classification depicted in Table 2, we respectively identified the roles of the client, the platform and the crowd that act as key stakeholders in the value co-creation process, and described the major interactions between the main stakeholders. Our conceptual development is suggesting different combinations of value co-creation layers to be evident in different crowdsourcing models. We are currently engaged in designing our empirical research that would allow us to study in depth value co-creation in different crowdsourcing settings. In the future research we would conduct empirical research in each of the crowdsourcing types. The key areas of research include more comprehensive understandings about different crowds' attributes, and how these attributes constitute and affect different layers associated with IT value co-creation. In addition, we expect to generate thorough understanding about the IT value co-creation process, including interactions among the key stakeholders (e.g. interaction types, channels, efficiency, etc.), value perceived by each of the key stakeholders, and how individual value is linked to co-created value. We plan to start from a pilot case study(ies) of one to three crowdsourcing projects where we would map the process (interactions) and interviews with key stakeholders. Our work is building on the IT value co-creation framework developed by Grover and Kohli (2012) and intends to make a contribution to IT value co-creation and crowdsourcing literature.

CS Type and Crowd	Client's Role	Role of IT Platform	Crowd's Role	Major Interaction	Envisioned IT Value Co-creation*
INTERNAL CROWDSOURCING:					
Internal crowd: High commitment, tacit knowledge, intrinsic motivations, collaborative nature					
	Project Governor: Flexible management IT infrastructure: Internal investment, interaction support		Mutual communication, collaboration, idea & solution development	Crowd interaction Management team & crowd	Complementary capability :Cl-Cr Knowledge Sharing: Cl-Cr
COMMUNITY CROWDSOURCING					
Community crowd: Specific knowledge, expertise, & other pre-qualifications, intrinsic motivations, collaborative nature					
	Project Participant/ Bystander: Limited control over the project,	General governance:** IT infrastructure: gamification, communication system	Mutual communication, idea & solution development. R&D governance & automation	Crowd interaction Client & the crowd	Asset: C-P-D Complementary Capability: Cl-Cr Knowledge Sharing: Cl-Cr Governance: Cl-P-Cr
CROWDSOURCING VIA BROKER					
Registered platform users with vendor perspective: Specific knowledge, expertise, and other pre-qualifications, extrinsic motivations, competitive nature					
Facilitator	Project Governor**	General governance:*** IT infrastructure: Bidding mechanism, payment, communication, vendor evaluation system	Multiple bidders competition, one vendor selected, one deliverable submitted	Client & bidders, Client & the vendor	Asset Layer: Cl-P-Cr (bidders) Complementary Capability Layer: Cl-Cr (vendor) Knowledge Sharing Layer: Cl-Cr (vendor)
Arbitrator	Project Governor**	General governance:*** IT infrastructure: Competition mechanism; payment, communication & deliverable evaluation systems	Multiple vendors compete by submitting their deliverables, one deliverable selected	Client & vendors	Asset Layer: Cl-P-Cr (vendors) Complementary Capability Layer: Cl-Cr (vendors) Knowledge Sharing Layer: Cl-Cr (vendors)
Aggregator	Project Governor** Project segmentations, Deliverables integration	General governance:*** IT infrastructure: Project split & reassemble mechanism, payment, communication, evaluation system	Multiple vendors selected and allocated different tasks. Each submit deliverable for allocated task.	Client & platform, platform & vendors	Asset Layer: Cl-P-Cr (vendors) Complementary Capability Layer: Cl-Cr (vendors)
Governor	Project Participant: Requirement specification to the platform, deliverable evaluation	Project Governor:** Gathering requirements; project analysis, decision about how to accomplish the project, project management & delivery to the client	Depend on the Platform-based project manager decision, could be any of the other crowdsourcing via broker models	Client & platform, platform & vendor(s)	Asset Layer: Cl-P-Cr Complementary Capability Layer: Cl-P-Cr (vendors) Knowledge Sharing Layer: Cl-P-Cr (vendors) Governance Layer: Cl-P-Cr (vendors)
PUBLIC CROWDSOURCING					
Public crowd: Open to everyone, highly diversified, collaborative and competitive nature, intrinsic & extrinsic motivations					
	Project Governor** IT infrastructure: Competition mechanism; payment, communication, evaluation and rating systems		Multiple vendors compete by submitting their deliverables, crowd comment and rate deliverables, collaboration	Client & crowd Crowd interaction	Asset Layer: Cl -Cr Complementary Capability Layer: Cl-Cr Knowledge Sharing Layer: C-Cr
*Note, in this column the following abbreviation is used: Client(Cl), Platform(P),Crowd (Cr)					
** Project governor refers to the stakeholder who takes the major responsibility to ensure the project quality, management activities including requirement specification; pricing; vendor selection; vendor relationship management; project quality tracking; acceptance of deliverable; payment; vendor performance evaluation etc.					
*** All platforms provide platform rules & policies, and patent & privacy protection					

Table 2. Envisioned IT-based Value Co-creation in Crowdsourcing

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