

Structured Crowdsourcing: A B2B Innovation Roadmap

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Abstract: Crowdsourcing is an increasingly popular source of both ideas and funding. Crowdsourcing in a B2B context is less well understood and, as such, much of our discussion will highlight business-to-business crowdsourcing. More generally discussion will address crowdsourcing relative to innovation and technology development and customer relationship management. Examples will be used to derive a general roadmap, and to identify specific areas worthy of increased attention. The roadmap is developed as a six-stage approach that begins with task specification and concludes with management of inputs generated from crowd-sourcing efforts. The roadmap emphasizes on early stages in the overall innovation management activity that is related to development and specification of the task to be crowdsourced, the identification of the crowd, the creation of the environment to connect the crowdsourcer, the task and the crowd, motivation of the crowd, and actual activities in reaching the crowd. Managing the input from the crowd is regarded as a later stage in the overall innovation management but also as a focal point in the arguments for improving B2B crowdsourcing. In crowd selection processes this paper aims at classifying the crowd related to the closeness to the company requesting deliberate choices between employees, partners, prequalifying participants or the general crowd. Magnitude of insight, capability, expertise and volume is defined as critical to the outcome.

Keywords: crowdsourcing, B2B, distributed innovation, innovation clusters, innovation contests, knowledge management, roadmap

1. Introduction

Since Schumpeter (1934), it has been widely accepted by economists, managers, strategists and policy makers that the best innovation ideas and designs originate with the producer. Opening innovation efforts up to larger and more diverse audiences or “crowds” can yield solutions inherently more robust than ones arising solely from within the enterprise (Seltzer and Mahmoudi, 2013). This latter development has given birth to innovation concepts such as co-creation, open innovation, distributed innovation, and crowdsourcing. In particular *crowdsourcing* may be regarded as an enabler of open innovation, where *open innovation* is a co-creative “paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” (Chesbrough and Di Minin, 2014; Ramaswamy and Guillard, 2010).

Though this may be done for disparate purposes, more often than not social media serves as an enabling force. Hence *crowdsourcing* is commonly perceived as a collection of web-enabled people-centric collaboration methodologies that aim to derive solutions to individual, enterprise, ecological, or societal challenges (Schenk and Guittard, 2011).

In business-to-customer (B2C) markets a distinction should be made between two important streams of customer engagement: *crowdsourcing* and *customer relationship management* (CRM). There is growing evidence that in B2C markets less CRM is often better in the sense that most customers do not want a “relationship” with the products and services they purchase and hence, by implication, neither do they want a relationship with the companies from whence those products and services originate (Dowling, 2002).

In CRM, the firm seeks a relationship with customers as a mechanism for increasing customer retention, satisfaction, and loyalty. Customers understand this and do not confuse these commercially driven exchanges for a real form of intimacy or interpersonal relationship (O’Malley and Tynan, 2001). In contrast, crowdsourcing is regarded by the firm and “crowd” alike as providing a win-win value proposition, albeit with the caveat that two potential negative consumer reactions may be generated from crowdsourcing efforts: feelings of exploitation and being cheated (Djelassi and Decoopman, 2013). Together these imply that crowdsourcing efforts must be carefully managed in order to minimize or mitigate these emotions and the possible backlashes

they can generate, while simultaneously maximizing the value to both the firm and the “crowd” by nurturing this form of open innovation (Mladenow et al., 2014).

As such we will examine crowdsourcing and some of its variations while determining how to make it more effective. Included in our examination are the use of incentives, innovation contests, and innovation clusters. Clusters will be important to our effort in that our greatest interest herein is on adaptation of crowdsourcing for B2B (business-to-business) markets (Simula et al., 2015).

2. Crowdsourcing

Juxtaposed to the relatively rare “lone genius” is the idea of collaboration in inventive teams, social networks, and the hybrid of these two that crowdsourcing represents. Formation of boundary spanning collaborations often comes with coordination costs, but these are offset by benefits arising from the leverage created by knowledge diversity – especially in the case of more novel combinations where social ties – even if only via social media – mitigate lack of geographic proximity (Bercovitz and Feldman, 2011).

Crowdsourcing is an umbrella term with many identifiable variations among which are crowd-voting, crowd sourcing of creative work, crowd-searching, and crowd-funding; also applicable in B2B environments (Brabham, 2008). Regardless of the application, the principle idea is to “use the crowd as an innovation partner” (Boudreau and Lakhani, 2013).

The power of crowdsourcing, co-creation, distributed innovation, and open innovation is captured by the description “we are smarter than me”. Resources are gathered from otherwise disassociated sources; a co-creative “crowd” (Edgeman and Eskildsen, 2012). Relative to innovation, resilience and robustness comes better ideas (King and Lakhani, 2013). In the case of crowdsourcing, diversity is associated with the variety and size of audience able to contribute resources. The quality of portfolio contents must be considered and studies reveal that – under the right conditions – non-professional users add value on another level than professionals (Marjanovic and Roztock, 2013).

While B2C crowdsourcing research is abundant, B2B crowdsourcing research is relatively limited and less well understood (Simula and Ahola, 2013; Simula and Vuori, 2012). This fact supplies one motivation for the present work: *can inspiration from B2C and other forms of crowdsourcing be identified that can enhance innovation in B2B environments?* Natural sub-considerations include:

- What are the crowdsourcing differences between B2B and B2C companies?
- Why should the general crowd engage in crowdsourcing?
- In what ways can a B2B company utilize crowdsourcing?

We derive a conceptual model for B2B crowdsourcing as a means of resource generation.

2.1 Crowdsourcing with conscience: Citizen participation, sourcing, and science

Crowdsourcing with or without financial or other material incentives is an increasingly common and often successful practice. Crowdsourcing is also increasingly responsible for business model innovation (Marjanovic et al., 2012). Relative to challenges with less dire consequences, crowdsourcing is sometimes referred to as *open social innovation* (Chesbrough and Di Minin, 2014), *citizen participation*, or *citizen sourcing* (Seltzer and Mahmoudi, 2012).

Numerous cases can be cited where solutions to real world challenges with engaged citizens who see the solution itself as sufficient compensation for their involvement: *citizen science* (Wiggins and Crowston, 2011). For our purposes we will consider large-scale citizen participation, citizen sourcing, and citizen science to be particular forms of crowdsourcing. As a general practice, there is no participant remuneration associated with such efforts.

2.2 Incentivizing crowdsourcing: Innovation contests

A common form of B2B crowdsourcing is the *innovation contest* wherein a firm posts a challenge to a “crowd” of independent agents, providing a monetary or non-monetary award to the agent supplying the most promising

solution (Sawhney et al., 2006). Crowdfund platforms such as Kickstarter solicit ideas that compete to win funding (Stemler, 2013).

Whereas prior economic research suggests that having many solvers work on a given challenge produces a lower equilibrium effort for each agent (Fullerton and McAfee, 1999) –recent research indicates that in fact benefit can be derived from a larger agent crowd because of number and diversity (Terwiesh and Xu, 2008).

Collectively these results suggest that B2C and B2B enterprises should consider greater engagement of users/citizens as part of their innovation policies and practices. Studies of crowdsourcing incentives suggest that each prize should have twice the marginal utility value of the one that follows, and that no new prizes should be added (Adamczyk et al., 2012).

2.3 Structured open innovation: Science parks, free zones, cities, and innovation clusters

Science parks derive from unity or similarity of purpose and are identified with physical locations. In contrast to science parks, innovation clusters are – foremost – virtually, rather than physically anchored – though it is possible for an innovation cluster to be constrained within the physical limits of a science park (Salvador et al., 2013).

Innovation clusters can be interpreted – at least in some instances – as a crowdsourcing variation, albeit one with generally greater structure. A cluster may be described as a concentration of interconnected companies that both compete and collaborate (Elenkov et al., 2005). It is the focus of a given cluster that in many regards provides the structure within which innovation occurs and, also, the “crowd” that is appealed to as sources of innovative ideas (Bell, 2005).

Interfirm cooperation across clusters more costly than within clusters, yet acceptably so due to the additional value created by clustering (Maskell, 2001). Possibly mitigating such costs are service intermediaries. Service intermediaries have a status as the “glue” in the network (Zhang and Li, 2010). Service intermediaries can facilitate inter-cluster engagement and broader B2B knowledge exchange – and that leverages a “cluster of clusters” (Ketels and Memecovic, 2008).

3. B2B market environments and the roadmap

There are barriers to B2B crowdsourcing that are largely non-existent in B2C environments (Kärkkäinen et al., 2012; Simula and Vuori, 2012). To determine where B2B companies should invest their energy, examination of successful B2C strategies is of value. Brabham (2008) analyses cases within B2C in garment print design and stock photographs; rewards and semi-professional appreciation attract a larger and contributing crowd. Motivations are less obvious in B2B environments – expectations might be expressed as *expected value proposition* (Helander et al., 2014). B2B companies face greater difficulty in generating sufficient crowd size, due to fewer participants in the market (Kärkkäinen et al., 2012). Mitigation of this could be constructed as B2(B+C) crowdsourcing that combines businesses and end users (Kärkkäinen et al. 2012).

Successful crowds should be sufficiently large, diverse, and knowledgeable. In all, a review of literature on crowdsourcing behavior both generally and with respect to the B2B market environments suggests the six-stage approach to B2B crowdsourcing cited in Table 1.

Table 1: Six stage approach

Stage/Crowdsourcing Task	Focus and Considerations	Literature
1. Specify the task.	Specify the task; select crowdsourcing business model.	Dawson and Bynghall, 2011; Grier, 2013; Howe, 2009.
2. Crowd selection and optimization.	Layers in the B2B environment; benefits and barriers; better leverage non-B crowd; crowdsourcing configuration.	Afuah and Tucci, 2012; Howe, 2009; Simula and Ahola, 2013; Simula and Vuori, 2012.
3. Create the environment.	Identify governance mechanism to manage distributed innovation; focus on communities of creation; establish suitable innovation environment.	Nonaka et al., 2000; Sawhney and Prandelli, 2000.

Stage/Crowdsourcing Task	Focus and Considerations	Literature
4. Crowd motivation and value proposition creation.	Elaborate motivations and rewards; performance-based incentives; match incentives to desired result.	Ariely et al., 2005; Boudreau et al., 2011; Ferguson, 2011; Marjanovic et al., 2012.
5. Reach the crowd.	Crowdsourcing configuration; crowdsourcing brokers; use of social media to reach non-B crowd.	Chui et al., 2013; Hossain, 2014;
6. Manage the input and communicate value.	Knowledge management motivation and value; technology intelligence.	Gassenheimer et al., 2013; Kerr et al., 2006.

Here, “knowledge is imperfectly shared over time and across people, organizations, and industries. Ideas from one group might solve the problems of another” (Hargadon and Sutton, 1997). This is exemplified by the four-step ‘*process model of how innovation occurs through technology brokering*’ from the design firm IDEO (Hargadon and Sutton, 1997) – modified in Figure 1. This inspires the model portrayed in Figure 2 ‘*Roadmap for B2B Crowdsourcing*’.

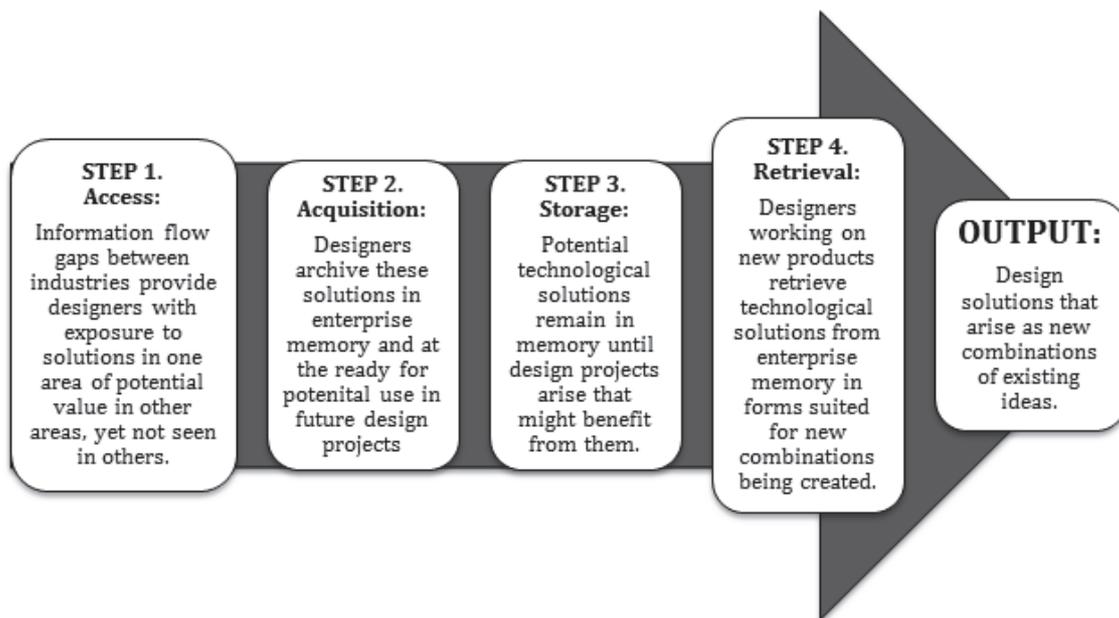


Figure 1: Technology brokering process model of how innovation occurs

Figure 1: Innovation occurs through novel assembly of existing idea fragments (Hansen and Birkinshaw, 2007; Hargadon and Sutton, 1997). Interacting with a number of people from different industries, experiences and background can boost innovation, product development, new product development etc. (Hargadon and Sutton, 1997). It can be argued that a crowd can contain these types of people, hence it can be argued that via crowdsourcing a given company can gain access to knowledge not previously available.

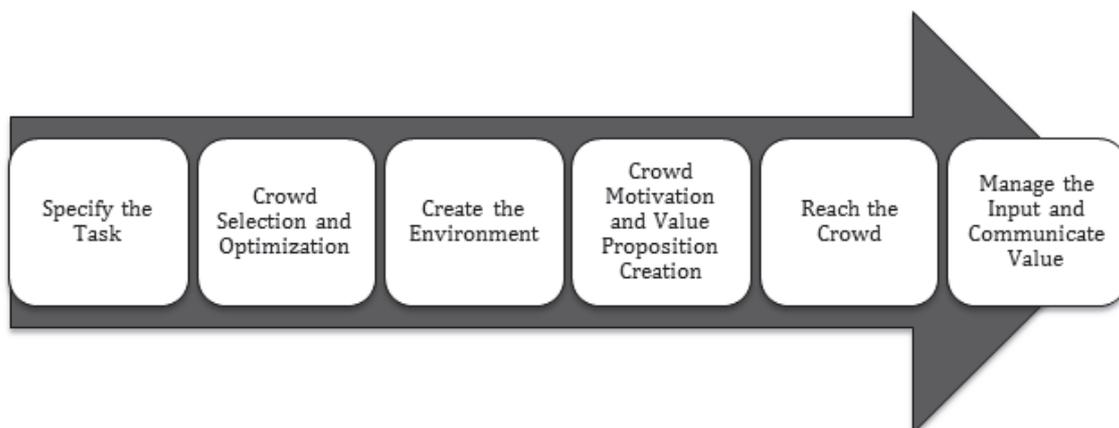


Figure 2: Roadmap for B2B crowdsourcing

The models of Figures 1 and 2 have notable similarities. In the steps *Access* and *Acquisition* of Figure 1, it can be argued that a crowd can obtain vital knowledge via interactions to obtain and leverage this knowledge. Interaction could occur as publishing via digital communication, that is, crowdsourcing. These two stages of Figure 1 fit stages one through five of Figure 2. The *Storage & Retrieval* stage of Figure 1 corresponds to the sixth and final stage of Figure 2, that is, to “manage the input and communicate value” stage, with the express understanding that some solutions may be suitable for other problems as yet unknown (Hargadon and Sutton, 1997).

3.1 Roadmap stage 1 – specify the task

The first stage of the B2B crowdsourcing project shares the same characteristics as projects run by B2C companies. Managers are encouraged to draw inspiration from successful crowdsourcing projects of B2C companies (Boudreau and Lakhani, 2013).

During the initial phase of a crowdsourcing project, it is essential to define the overall framework of how the project will be managed, so all the risks are mitigated and benefits are maximized. The crowdsourcing project should ordinarily have defined outcomes such as specific or anticipated output, a timetable, major milestones, and key indicators of success (Dawson and Bynghall, 2011).

The task being crowdsourced will most usually be categorized as among: crowd contests, macro-task, micro-task, crowdfunding, or self-organized crowd. Each category has different traits and usages. Different types of crowdsourcing tasks are suited to solve different kind of problems (Grier, 2013).

3.2 Roadmap stage 2 – select the crowd

Crowd selection and optimization is key to improving the likelihood of generating an optimal solution for a given problem. A critical concern for the company is to verify whether problem solving should come from inside the company’s network, externally, or using a hybrid approach to solution seeking. Simula and Ahola (2013) have identified four crowdsourcing configurations applied by industrial companies as portrayed in Figure 3, while Simula and Vuori (2012) have developed a model dividing the B2B market environment into four layers as presented in Figure 4.

One potential crowd layer is that of the firm itself – its human capital, portrayed as the blackened circles of Figure 3 and as the innermost layer of Figure 4. A crowd composed solely of enterprise human capital we recognize as ‘internal crowdsourcing’ (Figure 3). IBM uses this internal configuration by setting up ‘innovation jams’ wherein the whole of IBM is encouraged to brainstorm new innovation possibilities (Simula and Ahola, 2013).

The external crowdsourcing layers are labeled as ‘trusted partners’ and ‘pre-qualified participants and communities’ in Figure 4.

Afuah and Tucci (2012) argue that in some situations it is better searching away from the problem field. In these situations the most distance layer of Figure 4, the ‘general crowd’ should be enlisted – a notion corresponding to either the ‘crowdsourcing via a broker’ or ‘open crowdsourcing’ configurations of Figure 3. There are risks associated with crowdsourcing such as revealing future plans and leakage of sensitive information, so that use of reputable brokers such as *InnoCentive* can mitigate such risks (Simula and Ahola, 2013).

Studies show that open crowdsourcing can be successfully used for B2B innovation (Kärkkäinen et al. 2012). This type of crowdsourcing has been successfully applied in many consumer industry settings, but its application by industrial enterprises has been heretofore limited (Afuah and Tucci, 2012).

If B2B companies want to control the crowdsourcing platform themselves instead of letting a broker handle it, they must create their own crowdsourcing environment.

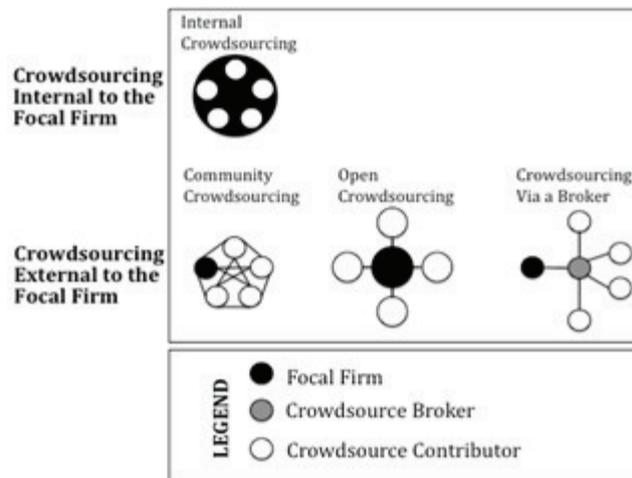


Figure 3: Crowdsourcing configurations (Simula and Ahola, 2013 – modified).

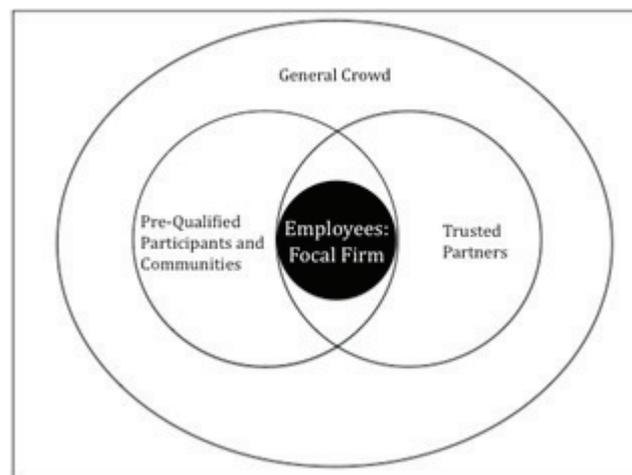


Figure 4: Layers of the B2B market environment (Simula and Vuori, 2012)

3.3 Roadmap stage 3 – create the environment

The SECI model of knowledge creation (*Socialization, Externalization, Combination, Internalization*) via conversion of tacit and explicit knowledge represents four conversion modes of knowledge process. Nonaka et al. (2000) assigned a corresponding *ba* (shared context for knowledge) to each conversion mode. Each *ba* supports a particular conversion mode and thereby each *ba* accelerates the knowledge generation process. The essential component of the crowdsourcing project is knowledge management (Nonaka et al., 2000). The proposed environment should be designed and developed based on the concept of *ba* (Sawhney and Prandeli, 2000).

If a company does not have the means to create this type of environment, it is possible to acquire already existing platforms or to use a crowdsourcing broker. Literature implies that development of a community of creation requires:

- Common interest;
- A sense of belonging;
- An explicit economic purpose;
- A sponsor;
- A shared language;
- Ground rules for participation;
- Mechanisms to manage intellectual property rights;

- Physical support of sponsor; and
- Cooperation as a key success factor. (Sawhney and Prandeli, 2000)

The originating *ba* represents the *Socialization* phase of the SECI model (Nonaka et al., 2000) and is the place where knowledge creation begins. As the definition says, *ba* can be virtual or physical. In a digitized world, we argue that today's virtual *ba* can be utilized successfully during the *Socialization* phase. The structure the environment should be community based rather than organizational.

3.4 Roadmap stage 4 – crowd motivation and value proposition creation

A contributor in the crowd can perform work based on a variety of motivations: according to “the motives behind crowd participation in crowdsourcing can be broadly categorized as points on a continuum as purely intrinsic, internalized extrinsic, and purely extrinsic” (Gassenheimer et al., 2013). According to self-determination theory, the basis for all motivation can be covered with three fundamental needs: autonomy, competence, and relatedness (Gassenheimer et al., 2013). This suggests that a B2B company might benefit either from categorizing and aiming their crowdsourcing efforts at a desired motivation type which they wish the crowd or participants to exhibit (Gassenheimer et al. 2013).

In Dan Pink's Ted talk, '*the puzzle of motivation*' filmed in 2009, he suggests that the 21st century motivations for creative problem solving are autonomy, mastery, or purpose, which falls under the categories mentioned earlier (Marjanovic et al., 2011). The motivation for a person or community to spend time contributing with assessments, ideas, knowledge, or other of their endowments can come from many places but the core of the motivation is the same (Ariely et al., 2006). Hence, if the level of monetary reward is too high it may lead to the decrease in performance, quantity or creativity.

We see then, the importance of matching incentives to tasks (Terwiesch and Xu, 2008). We also need to assess that motivation, value, expectation and feasibility of outcome is aligned to avoid disappointment among participants.

3.5 Roadmap stage 5 – reach the crowd

In this stage the focus will be on two crowdsourcing configurations portrayed in Figure 3: 'crowdsourcing via broker' and 'open crowdsourcing'. The first option applies a method where a professional broker or web-based service sources the crowd. This also means that when using the broker method a company can cover multiple methods of crowdsourcing, depending on how the company and broker chooses to post the assignment or project to the crowd. Well-known crowdsourcing brokers include *Innocentive*, *O-desk*, *Yet2*, *YourEncore*, and *NineSigma*. Most of these companies are web-based and require some form of membership to be able to participate or submit problems or tasks (Hossain, 2014). This implies that the size and quality of the crowd are more or less predetermined by the broker's network and skills: “When crowdsourcing via a broker, the level of commitment between actors varies; the relationship between a focal company and a broker is more formal as contracts are in place between them” (Simula and Ahola, 2013).

3.6 Roadmap stage 6 – manage the input and communicate value

Content management translates knowledge into usable and workable information. Nonaka et al. (2000) describe content management it as knowledge being embedded in *ba* that, if separated from *ba* turns into information, which then can be communicated independently: “Information resides in media, it is tangible. In contrast, knowledge resides in *ba*. It is intangible”(Nonaka et al., 2000).

To extract this knowledge, Cyber *ba* has to be established as it represents the *Combination* phase of the Nonaka et al. (2000) knowledge transfer process. Such Cyber *ba* can be established by utilizing a content management system (CMS). The ability to utilize external knowledge represents enterprise 'absorptive capacity', a central feature of interorganizational learning and critical to knowledge management (Lane and Lubatkin, 1998): The external crowd must be motivated to deliver knowledge, while the crowdsourcer must also have the ability to assess, value and implement the knowledge (Gassenheimer et al., 2013).

If the knowledge received from a crowdsourcing effort is technology-focused or concentrated e.g product development, new product development, future products or services etc. then the framework described in (Kerr,

et al., 2006) can be useful to evaluate and utilize the knowledge. The effort for converting the crowdsourcing contributions in to actual production must in this stage not be underestimated.

4. Discussion and further suggestions

Our efforts herein reveal under- or unused and unrecognized potential for B2B companies within knowledge retrieval and crowdsourcing of macro- or micro-tasks.

Differences exist between B2B crowdsourcing and B2C crowdsourcing. Acknowledging these differences and examining the key role of incentives informed structuring of a *Roadmap for B2B Crowdsourcing* comprised of six stages (Figure 2). Derivation of this roadmap is principally based on review of relevant literature. The model addresses the process beginning with task specification, concluding with making use of crowd-generated input and all stages between these. Adaptation will almost certainly mean that the relative emphasis dedicated to a given stage will vary from environment-to-environment and application-to-application. This may be especially true relative to identifying and locating the crowd and motivating them afterwards, which requires more attention in B2B crowdsourcing since the necessary crowd often differs from the enterprise's normal customers, suppliers and partners. In this regard much can be learned from other sorts of "crowds" and how they are formed, including science parks, innovation clusters, and free zones.

Critical views on B2B crowdsourcing must entail an elaborate view upon the requester as well as the bidders. Ethical issues are dominant and unethical conduct can affect the whole industry of crowdsourcing. Crowdsourcing initiatives must be clearly distinguished and transparently defined from adjacent activities such as procurement, RFI-RFQ tendering, professional communities of practice, otherwise paid-for innovation, technology intelligence. IPR is formally well-defined, but cases of disproportionate benefits remain ethically unresolved. Particular and critical attention is needed on the stage "Reach the crowd", as numerous resources might both be activated and wasted, if bidder's expectations are not met or the results are discarded on questionable grounds. Poorly organized or flawed crowdsourcing can thus harm trust and reputation.

Studies suggest that if a participant is contributing to a crowdsourcing project it is important that participation incentives align with participant and enterprise motivations. If innovation is the desired outcome, lead users and hobbyists tend to prove more beneficial than participants who are engaged purely for a monetary reward. The opposite goes for repetitive tasks as micro-tasks can be, here it is seen that a reward will increase the volume and quality of work performed. Hence, controlling or affecting the participant motivation is an important issue and in need of further examination.

Different types of crowdsourcing tasks were found to elaborate how a B2B company can utilize crowdsourcing. These types of tasks can be a factor for which kind of crowdsourcing configuration an enterprise should use. For example, if the enterprise wants to deal with macro- or micro-tasks it should consider using a broker.

Lastly, further research is needed for a more suitable way of knowledge management in context of B2B crowdsourcing. To fully support knowledge creation it is essential for B2B companies to understand how to engage the crowd and to prepare the requisite infrastructure for doing so. These aspects of the crowdsourcing project require more attention.

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