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A Preliminary Taxonomy of Crowdsourcing

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Abstract

Many firms are now asking how they can benefit from the new form of outsourcing labelled “crowdsourcing”. Like many other forms of outsourcing, crowdsourcing is now being “talked up” by a somewhat credulous trade press. However, the term crowdsourcing has been used to describe several related, but different phenomena, and what might be successful with one form of crowdsourcing may not be with another. In this paper the notion of crowdsourcing is decomposed to create a taxonomy that expands our understanding of what is meant by the term. This taxonomy focuses on the different capability levels of crowdsourcing suppliers; different motivations; and different allocation of benefits. The management implications of these distinctions are then considered in light of what we know about other forms of outsourcing.

Keywords

outsourcing, “Web 2.0”, open innovation, “idea competition”, “broadcast search”, “web-enabled collective intelligence”

THE RISE OF CROWDSOURCING

Since its emergence as a phenomenon in the late 1980s, outsourcing in its various guises has continued to morph and adapt in the academic and trade literatures. So we have seen studies into outsourcing, insourcing (with two different meanings); rightsourcing; offshoring (again, with two different meanings); business process outsourcing (BPO); “the cloud” (as well as “software as a service” (SaaS) and “application service provision” (ASPs); “backourcing” (also known as re-insourcing) and, most recently, “crowdsourcing”. In each metamorphosis a range of claims has been made for that particular form of outsourcing as a business solution. These claims can largely be summarised into two promises: *greater quality* or *cheaper costs*. Usually there is an associated implication that the new form of outsourcing overcomes some of the limitations or problems of earlier forms.

This paper considers the latest of these, “crowdsourcing” a term coined only in 2006. As will be illustrated in the paper, like other forms of outsourcing “crowdsourcing” is characterised by woolly definitions, claims based largely on the basis of anecdote rather than systematic study, and a general tendency to “talk up” the notion in the trade literature without thinking deeply about the phenomenon. A flurry of business books have now been published, and articles written on the topic in journals such as Sloan Management Review. Firm CEOs and Directors are thus beginning to ask “What is it, and can we benefit from it?” Consultants are also asking “how can we appear up to date by including this idea in our advice for clients?”

As there is little systematic academic study of the phenomenon, the purpose of this paper is to decompose the trade literature’s use of the term “crowdsourcing”. The paper then teases apart various attributes that have been described under the term. Using an approach suggested by Bailey (1994) and adapted by Nickerson *et al.* (2009), the paper develops an initial taxonomy of crowdsourcing. It then explores the management implications of this decomposition. The focus of the paper is primarily on the use of crowdsourcing as a business solution, rather than as a social phenomenon.

RELATED LITERATURE

History and Definitions

The notion of crowdsourcing is at heart an Internet-derived, and, in part, “pop” concept, the product of the “blogosphere”. Its origins, as a term, if not a practice, are generally credited to a “Wired Magazine” editor, Jeff Howe. Howe (2006a) published a provocative discussion about the rise of the phenomenon in a June 2006 article in the magazine. With a new label for a phenomenon some were then noticing, the idea took off. Unsurprisingly, many blogs and commentators focused on the supposed benefits it would bring. Howe situated “crowdsourcing” as a form of outsourcing, from which he suggested firms could make even greater savings than with offshore outsourcing, where salary “arbitrage” (Rouse and Watson 2005) is largely responsible for any cost savings:

"For the last decade or so, companies have been looking overseas, to India or China, for cheap labour. But now it doesn't matter where the labourers are - they might be down the block, they might be in Indonesia - as long as they are connected to the network. ... Technological advances in everything from product design software to digital video cameras are breaking down the cost barriers that once separated amateurs from professionals. Hobbyists, part-timers, and dabblers suddenly have a market for their efforts, as smart companies in industries as disparate as pharmaceuticals and television discover ways to tap the latent talent of the crowd. The labour isn't always free, but it costs a lot less than paying traditional employees. It's not outsourcing; it's crowdsourcing." (Howe 2006a)

The term crowdsourcing is a neologism that combines *crowd* — based on the notion of “the wisdom of crowds” (Surowiecki 2004) — and *outsourcing*. It has been used to describe a number of things, but it usually refers to some form of outsourcing of activities by a firm or organization to members of the internet community. For example, in his defining article, Howe (2006b) characterised the term as “the act of a[n]...institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call”. The first part of this is a commonly encountered definition of outsourcing, though not all outsourcing involves a function previously performed in-house. The second part has similarities to other “crowd” based activities. Instead of allocating a task to a specific individual or firm, crowdsourcing involves outsourcing the task to an undefined crowd of anonymous individuals, made accessible via the World Wide Web, and in particular, Web 2.0 technologies.

Wikipedia (2010a) also describes crowdsourcing as “a[n] Internet-based] distributed and problem-solving model”. In fact, Wikipedia, which predates Howe’s article by several years, is sometimes cited as an example of crowdsourcing (e.g. Crowdsourcing Wiki 2010), as are examples such as the development of the original Oxford Dictionary several centuries ago. So the term in some ways is a new, Internet-savvy way to describe a process people were using anyway.

Some authors (e.g. Leimester *et al.* 2009) consider crowdsourcing to be synonymous with “ideas competitions”, however it will be demonstrated in this paper that the term is used to describe phenomena beyond just these. Jeppeson and Lakhani (2010) too seem to view crowdsourcing as largely related to problem-solving competitions, relabelling it as “broadcast search.” In other words, with crowdsourcing a problem statement is broadcast over the Internet, along with incentives, allowing people with expertise to apply their skills to solving the problem. This description is almost identical to the model of crowdsourcing included on Wikipedia (2010a). “Focused search” appears a clearer and more restrictive term, as there are other aspects of crowdsourcing (such as its application in the creative/graphics industry) that are not fully captured by this description. Other writers describe crowdsourcing exercises as examples of “web-enabled collective intelligence” (e.g. Malone *et al.* 2010)

With a few exceptions (e.g. Malone *et al.* 2010; Jeppeson and Lakhani 2010; Leimester *et al.* 2009), there has been little academic literature that specifically focused on crowdsourcing. However, the phenomenon can be seen as both a new method for business innovation and an alternative form of outsourcing. Given this, literature in these two spheres (discussed below) is relevant. Crowdsourcing can also be seen as an enabler for a range of new business models (see Chanal *et al.* 2008 for a discussion) though whether these are sustainable is debatable.

Crowdsourcing is also a mechanism – a means by which distribution-enablers such as Web 2.0 tools and the World Wide Web can be used to support and coordinate worldwide volunteer efforts, or “collective intelligence” (Malone *et al.* 2010) in a similar way to “open source” software development. Hence the open source movement and crowdsourcing are often conflated. It is a moot point, however, whether the former is, or is not, a form of crowdsourcing. Although many blogs confound the two ideas, members of the open source community are often critical of this – as one open source practitioner put it (Grams 2010) *open source* is about a community sharing code for the common good (with many contributors, and many beneficiaries), whereas *crowdsourcing* involves many contributors, but few beneficiaries.

Crowdsourcing as Innovation

In the academic literature on innovation, crowdsourcing can be seen as a particular form of “open innovation”. The open innovation movement was pioneered by researchers such as Chesbrough (2003) and von Hippel (2005). The movement, in turn, draws its thinking from earlier models of innovation that depend heavily on customer involvement, such as von Hippel’s (1986) notion of a “lead user”. The idea underlying open innovation is that it may pay to open up the innovation funnel (a term often used for the project trajectory for new product development) to outsiders. Firms would then benefit from others’ capabilities and insights (Malone *et al.* 2010). The argument behind open innovation is that the advantages of openness may outweigh those associated with secrecy (necessary for some forms of intellectual property protection). In other words, the amount of creativity and knowledge “poured into” the innovation funnel can be increased by opening it up to suppliers, users, and

others in the community, cancelling out any negative effects of this opening up (Chesbrough 2003). The notions of “cloud intelligence” and crowd wisdom are important related concepts (Surowiecki 2004).

Like outsourcing, open innovation crucially depends on the availability of communication and coordination tools, and it is no surprise that both strategies have exploded in use in parallel with the development of the Internet, web tools (like wikis) and Web 2.0. Some well-established methods for open innovation include a method for gaining input from those users who are pushing the boundaries of a product’s use (von Hippel’s “lead user” method); Internet “toolkits”/development environments; and “idea competitions” (Bretschneider *et al.* 2008) which are inevitably Internet supported.

Crowdsourcing as a Form of Outsourcing

Outsourcing typically involves assigning to an external provider responsibility for all or part of the activities involved in a business process – to achieve specified results. The provider is responsible for managing resources and activities, while an important role for the purchaser is quality evaluation. Much of the growth in outsourcing has been driven by changes in systems that support communication, information exchange and collaboration – these essentially are the enablers of outsourcing, particularly where the provider and purchaser are separated physically. There are three major classes of outsourcing: (i) simple outsourcing (such as cleaning) where no IT support is involved (ii) outsourcing of IT/IS services, or “ITO” and (iii) “BPO” or “business process” outsourcing, where relatively complex, IT-supported businesses services are involved (Rouse and Watson, 2005). Crowdsourcing can be seen as a particular form of business process outsourcing.

Outsourcing can involve processes delivered over time (such as the outsourcing of a help desk service) or project based delivery, where a singular product or service is supplied. The economics of these two forms of outsourcing are quite different (Williamson 1985), although both depend on a complex interplay of production costs, transaction and coordination costs, and risk exposure costs. Many of the risks associated with outsourcing are not well understood by those choosing the strategy. As a result, while individual case studies have demonstrated good outcomes and cost savings from outsourcing, sizeable random surveys have largely failed to establish that non-simple outsourcing leads to significant cost savings (Domberger 1998; Hodge 2000; Rouse and Corbitt 2003). This appears to be because firms fail to factor in the transaction and risk costs in their projections. It is also because many firms do not have internal capabilities anyway and have no choice but to outsource, whatever it costs.

One important risk identified for outsourcing is what is known as the “winners’ curse” (Kern *et al.* 2002). This appears to happen often, and describes the situation where the supplier deliberately, or unwittingly misrepresents its capabilities. This can have negative consequences for both supplier and purchaser. This situation is made more problematic if the services supplied involve substantial tacit knowledge, or if it is difficult to easily discern the quality of the output. Agency theory (Eisenhardt 1989) addresses some of these issues by suggesting outcomes-based contract (typically the basis of an outsourced arrangement), but where *both* these factors operate, agency theory offers few solutions.

Crowdsourcing shares many characteristics with other “project” or once-off business process outsourcing. When these are successful, they substantially leverage the skill and knowledge base of the purchaser, but when poorly managed they can significantly drain corporate resources (money, attention, reputation) and cause substantial delays. Given that there is evidence that other forms of outsourcing are frequently managed poorly (Lacity and Willcocks 2001; Rouse and Corbitt 2003) this is likely to be the case for crowdsourcing activities.

As a form of complex project, any outsourcing only achieves its potential when *every* aspect of a complex web of coordinated activities succeeds, and this requires high levels of sophistication to be able to plan and coordinate the myriad aspects that need to be attended to. However, achieving this does not seem easy, judging by the low levels of success reported in the literature. The evidence we have from hundreds of studies in outsourcing is that it can certainly be successful, but often is not, and that firms tend to *overestimate* the potential benefits as well as their capacity to manage outsourced projects (Rouse, 2002). On the other hand, firms also tend to *underestimate* the potential downsides. For these reasons the success rates for outsourcing are substantially lower than chance (Rouse and Corbitt 2003) for many of the potential benefits claimed for the strategy (cost savings, strategic benefits, access to new or better capabilities, etc).

The benefits of crowdsourcing described in the trade literature are similar to those attributed to outsourcing: cost savings; contracts and payments that are outcome based (rather than paid “per hour”); and access to capabilities not held in-house. A benefit of crowdsourcing not shared with outsourcing is the capacity to harness volunteers who might not otherwise be able to contribute; so expanding the involvement of customers/users in the design and improvement of products, and in scientific and community projects.

METHOD ADOPTED FOR TAXONOMY DEVELOPMENT

The research approach adopted in this paper was to decompose *crowdsourcing* into a series of subtypes, forming essentially a taxonomy. The approach for doing this was initially developed by Bailey (1994) and applied, in a slightly different way, by Nickerson *et al.* (2009) – It involves an “empirical to deductive” approach.

A taxonomy is a classification scheme, which helps researchers explore in finer detail facets of a phenomenon by classifying “like with like” and separating “unlike”. The term taxonomy comes from the Greek term “taxis” meaning arrangement or order, combined with the term “nomos” meaning law (Bailey 1994). A taxonomy is a systematic catalogue where elements are grouped according to similarities. It provides a conceptual framework for talking about, and researching a phenomenon. It can also, in business, assist in decision-making. Taxonomies play an important role in management research because classification of related concepts allows researchers, and practitioners to understand, and analyse, complex domains (Nickerson *et al.* 2009).

A recent example of an IS-related taxonomy can be found in Nickerson *et al.* (2009) – where the authors decomposed mobile applications. In the realm of outsourcing, Ang and Slaughter (2002) developed an early taxonomy that alerted researchers to the need to differentiate outsourcing from related phenomena such as consulting and contract labour, which are still often erroneously described as “outsourcing” by some writers. According to Bailey (1994) a high quality taxonomy groups relates elements of a similarity-cluster into subgroups that are mutually exclusive, unambiguous, and taken together, include all possibilities. A good taxonomy also needs to be simple, and so easy to use.

Bailey (1994) argues that a taxonomy should be developed from empirical data, otherwise it is a “typology”. In this paper a conceptual taxonomy has been developed from information found largely in non-academic publications. This is not necessarily a systematic study as there was no attempt made to cover all the trade and blog literature. While Bailey might describe the outcome more as a typology, the term taxonomy has been used following previous similar usage in other IS publications (e.g. Nickerson *et al.* 2009).

Bailey’s (1994) approach starts by listing potential elements of the taxonomy. Since, at this stage, crowdsourcing is largely a trade phenomenon, the data used for this step was taken from 41 exemplars discussed in trade publications, books, and websites (including wikipedia, which was treated as a trade “journal”), together with academic literature on outsourcing. Included was a list of 22 crowdsourcing projects described on Wikipedia (Wikipedia 2010b). Where a term (such as “open source”) was discussed in several articles on crowdsourcing as a similar or related concept, it was included in the initial list.

Data was gathered using a “snowball” strategy in which leads on one website or article were followed to unearth other descriptions of crowdsourcing exemplars. These data sources represent, of course, a convenience sample. However, since much of the information held on crowdsourcing is on blogs or in the trade press, there are no databases yet available of articles or sources on the topic, so no way to create a systematic set of exemplars. The approach used can be seen as akin to analysis of a series of case studies – there is no suggestion that the exemplars found are fully representative of all possible types of activities labelled “crowdsourcing”. And as with case studies, the search for exemplars was terminated when no new categories seemed to emerge. It is acknowledged that the search strategy may have missed crowdsourcing exemplar types, and that new crowdsourcing types may have emerged since the analysis (mid 2010).

After gathering, the exemplars were then analysed to identify distinguishing characteristics and then to classify the elements – producing a set of dimensions. This process is similar to the use of thematic analysis in qualitative IS research. The examples of crowdsourcing were then subject to review according to the dimensions of a “good” taxonomy discussed above. Finally, the categories were transformed into a hierarchy and presented as a tree diagram.

A PROPOSED TAXONOMY OF CROWDSOURCING

Nature of the Crowdsourcing

The thematic analysis conducted for the study drew on the crowdsourcing, innovation and outsourcing literatures, as well as the researcher’s own prior qualitative research in outsourcing. Initially too many dimensions were identified to produce a relatively simple taxonomy, so some “collapsing” of dimensions was carried out. Through a series of abstractions a set of crowdsourcing subtypes was eventually identified. In essence, this analysis was similar to what is typically carried out in an interpretivist analysis of qualitative findings.

This method led to the observation that the most salient dimensions for classifying crowdsourcing types seemed to be nature of the task crowdsourced and the *supplier capabilities* this implies; *distribution of benefits*; and *nature of the motivation to participate*. The latter involves type of motivation, and whether this can be classified as *intrinsic or extrinsic* (these are really two dimensions, though they have been combined in this discussion).

Supplier Capabilities/Nature of the Task

The crowdsourcing types were initially decomposed according to the capabilities that suppliers needed to have – recognizing that these depend largely on the complexity and skills involved in the task, how much of this is tacit; the breadth of business and technical knowledge need to do a good job, and the extent to which the output's quality can be easily evaluated (c.f. Agency Theory). For simplicity these ideas were captured in a simple three-way classification:

Some outsourced tasks are of relatively low complexity, can easily be performed by someone with moderate education and training, and are easily evaluated – ideas for new or improved products fall into this category as would copy editing (as done with Gutenberg project), book reading (Librivox) and some community research projects. These were labelled “**simple**” tasks.

Other tasks are complex, highly skilled, and difficult to evaluate. Often they depend on substantial domain understanding, much of it tacit, as well as highly developed business acumen. They can only be performed effectively by suppliers with deep knowledge and experience. Examples include many design tasks, the development of a business plan or a software module. These were labelled “**sophisticated**” tasks.

Some tasks are neither simple, nor sophisticated – they involve a moderate level of complexity and difficulty and are moderately difficult to evaluate. For simplicity these are labelled “**moderate**”. Examples might include design of a T-shirt, logo or colour-scheme, or performance of more complex tasks in a shared scientific effort.

Comments in the trade literature suggest that many firms considering crowdsourcing fail to appreciate the capabilities involved and might not be able to classifying these without expert help. For example, the business and legal impacts of a product name are considerable. Although often treated as a moderately simple task, this design task has substantial marketing and legal dimension that are not necessarily obvious to laymen. A specialist firm will include these as part of the name “design” whereas a layman (and possibly some purchasers) may not appreciate the implications of choices.

Distribution of Benefits

Possibly the most important dimension for partitioning the concept of crowdsourcing is to explore “who benefits?” and what this means in terms of motivation. Building on Grams' (2010) observation, crowdsourcing can be classified into (i) activities that clearly provide personal or firm benefits, and (ii) those that are designed to benefit a community of some kind. The first group were labelled “individualistic” because in these types of crowdsourcing the benefits accrue to the individual who wins a prize or is paid, or to an individual business that uses the crowdsourcing strategy to meet its commercial goals. The second type of benefit distribution has been labelled “community”.

Generally with “individualistic” crowdsourcing, only a handful of participants (such as the firm initiating the crowdsourcing, and the winning bidder) benefit. Whereas in “community” situations, a community of some type benefits, including, usually the supplier – so this descriptor implies that benefits are allocated to the “many”, rather than to the few (c.f. Grams, 2010). Using this distinction, open source development, or community research projects (which are “community” forms) would be classified differently from contributions to a contest. Community activities (often motivated by self-image and personal values, and leading to voluntary behaviours like donation of labour to a charity) are also motivated in a qualitatively different way to the motivations associated with commercial business, or financial gain.

Analysis of the pool of examples revealed that there are some situations where crowdsourcing can be *both* individualistic and community, and that these should be classified as “mixed”. Examples would include customers offering suggestions for product improvement – while in that case the firm seeking ideas benefits most, the contributor and others in the user community can benefit too if the idea/need is valuable to many customers. For the sake of simplicity, the *mixed* category has not been shown in the visual taxonomy (Figure 1), however some examples are included in Table 1. Examples are described and sourced at Wikipedia (2010b).

Forms of Motivation

Both Viitamäki (2007) and Leimester *et al.* (2009) noted that when designing the incentives underlying crowdsourcing, providers' motivations for involvement are crucial. In their study of participation in IT-based ideas competition, Leimester *et al.* suggested (p. 206) four classes of motivations; *learning*, *direct compensation*, *self-marketing* and *social*. On examination, their “social” motivation appears to be associated with *social status*, or a wish to be respected by peers.

To these motivations the author added *instrumental* motivations (the motivation to solve a personal or firm problem, or to address a personal/firm need) and *altruism* (the motivation to help the community without personal benefit). The author made a further distinction between *token compensation* (a small monetary prize,

iPod, or other small piece of equipment, etc) and *market compensation* which is of a similar order of magnitude to that earned by specialists in the field. Finally an additional source of motivation can be *personal achievement*, associated with the need for self-actualization and mastery – this has much in common with “learning” so these motivations have been combined below.

Self-marketing - Leimester *et al.* (2009 p. 205) described this motivation as an opportunity for demonstrating capabilities and skills; a form of self-advertising for those seeking new job opportunities.

Social status – as “social” motivation, this was described by Leimester *et al.* (2009 p. 205) as “the expected reactions of significant others, friends, or the audiences”. Since this description is less associated with a need for social company (a traditional meaning for the term ‘social’) and more to do with social status, the label has been changed.

Instrumental motivation – this involves motivation to obtain some practical benefit, either personally, or for the firm worked for. For example, the involvement of “lead users” in new product development (von Hippel 1986) is largely motivated by the needs of users, or purchaser firms to improve a product so as to incorporate the improvement into their own business processes, or to meet personal needs.

Altruism – this motivation describes values and behaviour that emphasize primarily the interests and welfare of others, without personal reward (Simon *et al.* 1998).

Token compensation – motivation to obtain something that is desirable, but of relatively minor value, such as an MP3 player, a free product, or a small cash prize (Kazdin and Bootzden 1972).

Market compensation – payment for services that go beyond a small monetary prize, where the compensation is likely to be used by the provider to make a living.

Personal achievement and learning – motivation associated with feelings of personal mastery, competence, fulfilment. This would also include the motivation to gain additional knowledge or skills that Leimester *et al.* (2009 p. 206) identified. They argued that contributing to ideas contests provides learning experiences through presentation of one’s own ideas, and through gaining feedback from competitors’ contributions and organizers’ feedback.

Table 1. Crowdsourcing Examples Categorized by Capabilities and Distribution of Benefits

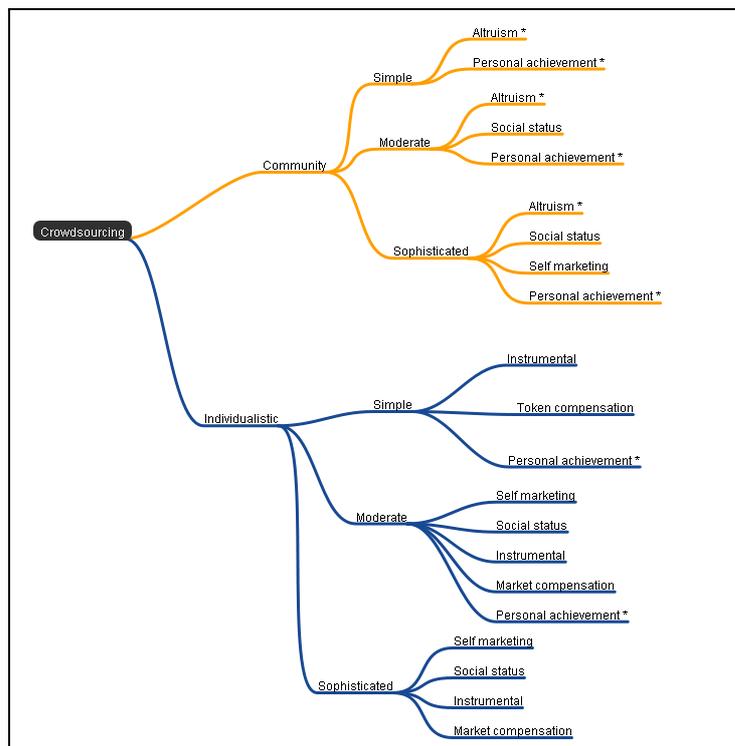
Distribution of Benefits	Supplier Capabilities	Examples
Community	Simple	Copy editing (e.g. Project Gutenberg); Transcribing text (Librivox)
	Moderate	Participation in volunteer group scientific endeavours (e.g. the Open Dinosaur project)
	Sophisticated	Collaborative design or scientific activity (e.g. Galaxy Zoo, Stardust@Home); participating in Open Source software development
Mixed	Simple	Submission of suggestions for product design improvements
	Moderate	Participating as a “lead user” in developing and testing product improvements; submitting data to an industry database (e.g. Emporis)
	Sophisticated	Entering into a high-status design contest for a charity or non profit group with strong visibility (e.g. One Billion Minds, the Open Dinosaur Project)
Individualistic	Simple	Submission of ideas for a contest with a token prize
	Moderate	Medium-skill design activities like T-shirt, colour scheme, logo (e.g. Brandsupply); business plan submitted by student team (e.g. Brainrack)
	Sophisticated	Complex design activities (e.g. Cisco Systems I-Prize; the Goldcorp competition) s

These motivations were further classified based on whether they were largely intrinsic or extrinsic. This distinction is fundamental to several psychological theories of motivation. Altruism and personal achievement were considered largely intrinsic motivators, while compensation (either token or market compensation), self-marketing and instrumental motivation were classified as extrinsic motivators. It was decided that, on balance, social status motivation was an intrinsic rather than extrinsic motivator, as the need for social status appears to be endemic to human beings. The reason for considering this aspect is that using incentives that are essentially extrinsic in an attempt to motivate in situations where motivations are largely intrinsic may have surprisingly negative consequences (Deci *et al.* 1999).

The three dimensions discussed above have been combined to create a hierarchical tree diagram, illustrated in Figure 1. In Figure 1 those motivations that are essentially intrinsic are starred – these have the potential to be destroyed if the crowdsourcing design and incentives are not carefully thought through. This diagram can be used to classify types of crowdsourcing. For example, contribution to wikipedia might be classified as “community-sophisticated”, and so likely to be motivated by altruism, as well as by a desire for social status (amongst peers) and for personal achievement. Introducing extrinsic motivations would be self-defeating in such a situation, as it would destroy the largely intrinsic motivators that make wikipedia work so well. It is noteworthy that in his FLIRT model of the factors that lead to crowdsourcing success, Viitimäki (2007), too, highlights the importance of distinguishing between extrinsic and extrinsic incentives.

Combining each of these three dimensions allows decision-makers to form subtypes. These might reveal subtle differences between a sophisticated commercial crowdsourcing activity offered by a firm that appeals to social status (“individualistic/sophisticated/social status”) when compared to a similar commercial crowdsourcing activity that depends largely on providing commercial recompense (“individualistic/sophisticated/market compensation”).

Figure 1: Crowdsourcing Taxonomy



DISCUSSION

In a business setting, a valuable role of a taxonomy (or typology) is to allow more accurate evaluation of potential benefits and problems. For example, a highly “individualistic” crowdsourcing situation is common in the US design community. There firms commonly seek to use crowdsourcing to significantly reduce costs by forcing providers to compete aggressively and so supply at essentially “token” rates. Yet Figure 1 suggests this is not likely to be successful using crowdsourcing strategies that have worked well largely in community settings if this involves other than simple services. Many trade articles and blogs do not make these distinctions, instead reasoning that because one form of crowdsourcing has been successful in one arena (open source software, as an example) the same strategy will succeed in others too. The unpacking that the taxonomy reveals should encourage decision-makers to question claimed similarities, as well as assumptions that underlie assertions about the potential benefits of crowdsourcing.

Another important consideration arising from classifying motivations is the issue of potential exploitation. For example, if a firm expects to obtain a completed, complex product which demands high levels of skills and tacit knowledge for a “token” compensation, this is unlikely to happen, as that is likely to be perceived as exploitative. Those with this level of skill would typically expect to receive market compensation for their sophisticated capabilities. While using a “token compensation” would certainly save money in the short term, it is a relatively unrealistic expectation with potential downsides. Even if the firm were to receive an apparently high-value bid in this way, it is likely to be “too good to be true”, and will probably have downsides that are not necessarily

obvious, such as corner-cutting, incomplete or rushed solutions/designs, or designs/ideas that may have been submitted elsewhere and so cannot be protected against competition. It is revealing that crowdsourcing examples that demand highly sophisticated training typically offer substantial prizes of several hundred thousand dollars, meaning that their incentives approach market compensation. They are also highly prestigious. Examples include Cisco's I-Prize, where teams create innovative business plans, and Goldcorp's competition to analyse geological survey data for likely gold sites (won by an Australian firm, Fractal Graphics).

On a large scale, a trend to rely on inappropriately-designed and exploitative crowdsourcing and incentives might even drive the more skilled and value-providing suppliers out of the marketplace, with long-term negative consequence. This is a concern in the US design market at present where the economic crisis, combined with a glut of new design graduates is encouraging many designers to give their services for token compensation or "self marketing" purposes. The crowdsourcing that exploits this provides a disincentive for firms to invest heavily in creating businesses that provide well-thought-through designs built on a rich basis of deep knowledge (like that of Ideo).

Some trade articles suggest that many potential problems can be addressed by the supplier assigning IP rights to the crowdsourcer. The evidence from a number of studies into outsourcing suggests that legal contracts, of themselves, are a hollow protection – costly and difficult to enforce. Ensuring adherence to an IP contract would be expensive and probably ineffective if the person sued is a penniless individual.

As with other forms of outsourcing, it is tempting for some firms to see crowdsourcing as a way to push risk onto the provider – "if they are willing to supply products or ideas below market rates then great!". However, in the end it is unlikely that in a non-community situation ("individualistic" in Figure 1) firms or individuals who could earn a living from providing ideas or designs will do so if there is nothing "in it for them". Except for those few cases where the idea/suggestion *is the product itself* (such as suggestions, ideas competitions, T-shirt or simple product designs) there are usually substantial differences between high quality products developed by specialists and those produced by amateurs, yet this is rarely obvious to the untrained purchaser.

PRACTICAL IMPLICATIONS

The taxonomy developed in this paper prompts a series of questions that a firm can, and should, ask before choosing crowdsourcing as a sourcing strategy. Some of these are not easily answered, and may require a significant investment of time and attention on the part of the firm putting out the bid. These are listed in Table 2 below:

Table 2. Management Questions Derived from the Crowdsourcing Taxonomy

1. Who reaps the benefits (is this a community or individualistic situation)?
2. What are all quality attributes for the deliverable and their broader implications (e.g. what might happen if the design were submitted elsewhere, or others challenged the intellectual property involved)?
3. How much technical skill and business acumen is needed by suppliers to deliver a quality product (and does this match with typical suppliers)?
4. How easy is it to discern these attributes and the level of skill invested in the supply (and does the firm have the capacity to discern these)?
5. What coordination, quality control and vetting is needed to bring the project to a conclusion (who will do this, what risks are involved, and how much will it cost)?
6. What are the likely motivations of suppliers, and what does this imply in terms of incentives?
7. Is there inherent exploitation in the choice of incentives, and what implications might this have in the longer term?

Having answered these questions, the potential crowdsourcer should be in a much better position to judge the extent to which the attributes of other forms of crowdsourcing match the proposed use.

CONCLUSION

As with all outsourcing, the decision to crowdsource should only be made after considering all the production, coordination and transaction costs, and the potential risks. Many of the highly publicized crowdsourcing successes have been managed by organizations with substantial project management and new product development expertise. In those cases it is likely that a large amount of "beneath the surface" effort was spent on planning, coordination and vetting of the crowdsourced contributions. The costs and difficulties of this activity is likely to be significant, but would be apparent only to firms with already sophisticated management systems and substantial project management and new product design (NPD) experience. Less experienced firms may be lulled into thinking that crowdsourcing is a generally easy, and low cost strategy, because the total effort is not

comprehended, and the risks and downsides are not well-understood. This is particularly the case when crowdsourcing involves substantially more than just supply of an un-evaluated idea.

A critical problem when firms make strategic sourcing decisions (including decisions about crowdsourcing) is that it is almost impossible to obtain accurate information about the success or failure of sourcing strategies. This statement is as true for some of the oldest forms of outsourcing (such as IT outsourcing, which has been studied in the academic literature since the early 90s) as it is of novel forms, such as crowdsourcing. Firms tend to announce their *potentially* successful outsourcing arrangement widely and publicly, but there have been few systematic studies into the actual outcomes of these strategies (Rouse and Corbitt, 2003) — even twenty years after the phenomenon began, our evidence base still consists largely of individual cases. Furthermore, when sourcing arrangements fail to reap expected positive benefits, such failures are, wherever possible, kept from public view. Given this, it is particularly important that decision-makers approach sourcing decisions warily, in recognition that the benefits are frequently talked up, and that the exciting promises often do not eventuate.

One way to improve decisions is to be more precise when seeking evidence and claims for a particular type of sourcing strategy, such as crowdsourcing. It is here that a taxonomy can be useful — by alerting decision makers to the fact that their own proposed form may not share the characteristics of widely-promoted successes. As Paul Boutin (2006, p 1) has observed in relation to commercial crowdsourcing: “Most companies’ products are a lot more complicated than T-shirts and lamps, and require deeper domain expertise to design them.” Boutin goes on to note that while he might have some great ideas for improving the Corvette, that is a long way from being able to produce the CAD designs that a manufacturer needs to turn these idea into a practical innovation.

This is the crucial aspect of crowdsourcing – ideas are valuable, and at the earliest phases of product design and improvement it is critical to get many ideas from as many sources as possible. This is the thinking behind vonHippel’s “lead user” method and other “open innovation” strategies. However, initial ideas need to be developed further, culled, turned into organizational routines and eventually protected in some way so that only those ideas likely to produce viable, marketable and sustainable innovations are invested in. As with other forms of outsourcing, the promoted benefits of crowdsourcing are many, whereas few writers to date have focused on the more mundane, but essential groundwork and effort that needs to be undertaken to make crowdsourcing activities work. Finally, as with other forms of outsourcing, where crowdsourcing is based on exploitation of economically-powerless or naïve providers, it is unlikely to be sustainable.

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