Crowdsourcing - The Next Wave in IT Outsourcing

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ABSTRACT

The Information Technology (IT) Outsourcing market has reached a saturation level in terms of the benefit realization through outsourcing. Clients are now looking for the next breakthrough in outsourcing which will help them reduce cost, improve time to market, provide break-through solutions and access to the right talent. Crowdsourcing seems to offer a perfect solution. Crowdsourcing is a technology driven transformation which concentrates on optimally utilizing the resources and enhance time to value and productivity. Many multinational IT companies have tried this with varying degrees of success, and IBM has been successful in breaking the project into smaller work products and assigning work to the crowd. The specific challenges in leveraging crowd talent for software services evolve around quality, security exposures related to compliance, intellectual capital and scalability. The authors through the controlled experiments done, with a captive crowd establishes that crowd can deliver IT software projects, and has the potential to create a paradigm shift in the IT outsourcing. Based on the experiment, author also suggests a framework for tapping the Gen Z currently in the universities, as crowd talent.

Keywords— Crowdsourcing, Software Services

I. INTRODUCTION

The term ‘Crowdsourcing’ was coined by Jeff Howe and Mark Robinson [11]. Jeff Howe describes crowdsourcing as a method by which an organization outsources to a large network of people by an open call [11] [12].

Fig 1: Crowdsourcing – Flow Diagram

Fig. 1, shows the Crowdsourcing flow, where requestor floats the work request, and anybody in the crowd can participate, finish the work and get paid. As can be seen in Table 1, many companies across the business functions have implemented crowdsourcing with very high degree of success [13].
Table 1: Crowdsourcing Examples by Function and Mode

<table>
<thead>
<tr>
<th>Crowd-sourcing Function</th>
<th>CrowdsourcingMode</th>
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<tbody>
<tr>
<td></td>
<td>Competition</td>
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<tr>
<td>Design and Innovation</td>
<td>Threadless</td>
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<td>Development and Testing</td>
<td>PeoplePerHour</td>
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<td></td>
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<tr>
<td>Marketing and Sales</td>
<td>Marketocracy</td>
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<td>Support</td>
<td>Askville</td>
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II. CROWDSOURCING IN IT

The economic uncertainty and challenging environment is driving IT companies to look for newer ways in delivering software services. In the 90’s the companies were more focused on labor arbitrage. In today’s scenario customers are looking for business value adds through innovations to grow their business, and moving towards outcome-based model. Traditional outsourcing companies are looking at IP reuse, as competition intensifies the race for higher levels of productivity at lower cost with higher quality output.

In simple terms three strong business drivers for crowdsourcing are: (i) Time-to-value (ii) Innovation and (iii) Need for cost effective solutions.

IDC report [19] credits IBM standing out among its peers, with its "Collaborative Sourcing — Smarter ADM" offering. In this model, instead of forming teams in traditional resource model, work assignments are delivered by multidisciplinary virtual teams, within a community against targets such as cycle time, speed, quality and level of asset reuse.

IBM model is centered on six key components

- **Community Network:** Virtual communities – supported by social technologies facilitate collaboration on work deliverables. Designated Community leaders provide the governance and manage the deliverables.
- **Digital Reputation:** Digital reputation helps the community members to differentiate their work. IBM has designed the ‘Blue cards’, which help the community member to catalog their accomplishments and scoring is based on – cycle time, speed, quality and reuse.
- **Performance and Maturity:** Analytics is deployed to track performance trend – on key parameters like cycle time, asset reuse, and cost saving.
- **Transparency:** Transparency is key and social technology tools (e.g., tagging, blogs) help to establish knowledge sharing, trust worthiness and co-operation among community members.
- **Best Practices:** The best practices repository is made available to the community, and reinforced through practices around asset management and reuse, talent management and recognition.
- **Adaptive Change Management:** Agile, Component Based Design methodologies help in ensuring an adaptive change management that helps in improving time to value.

IBM Model has met with success within the organization boundaries. The author’s studies are on expanding the crowdsourcing beyond organization boundaries. While boundary-less crowdsourcing has been successful in the case of Threadless.com or the Innocentive.com [3] [18], can the same be extended for IT Software Services.
The crowdsourcing concept seems to be more viable than before, because
- Strong business need (time to value, innovation, cost effective solutions)
- Proliferation of Internet, and applications supporting social collaboration networks
- Gen Y (born after 1978) and more importantly Gen Z (born after 1995) constituting 50% of the Indian population

III. PROBLEM OF STUDY

The economic uncertainty and challenging environment is driving IT companies to look for newer ways in delivering their services. Clients are demanding business value adds through innovations and are moving from labor arbitrage to outcome-based models. The challenge of readily deployable talent pool and the increasing Next Generation (Gen Y / Gen Z) in the labor pool are something IT companies are trying to cope up with. In this context we explored to see if Crowdsourcing can help companies effectively address these challenges.

Challenge 1: Changing Client Demand
In the 90’s the Indian IT companies were more focused on labor arbitrage, but today customers are looking for business value adds through innovations to grow their business, and moving towards outcome-based models. Traditional outsourcing companies are looking at IP reuse, as competition intensifies the race for higher levels of productivity at lower cost with higher quality output.

Challenge 2: Changing Supply-Demand Landscape
NASSCOM’s (National Association of Software and Services Companies, India) ‘Perspective 2020’ [15] reveals how 2020 will present a dramatically altered landscape for the Indian IT companies. From Table 2, it is clear that access to global talent, innovation, learning and knowledge management and creation of readily deployable talent pools will become imperatives if an organization would like to succeed and bridge the supply-demand gap in this decade.

<table>
<thead>
<tr>
<th>Table 2: Supply-Demand Landscape for 2020</th>
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<tbody>
<tr>
<td><strong>Past Decade</strong></td>
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<tr>
<td>Demand</td>
</tr>
<tr>
<td>75% from Fortune 500</td>
</tr>
<tr>
<td>Cost and Quality Focus</td>
</tr>
<tr>
<td>Access to low cost labor</td>
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<tr>
<td>Onshore-Offshore model</td>
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<tr>
<td>Supply</td>
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<tr>
<td>&gt;50% of workforce from India</td>
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<tr>
<td>Management focused on delivery</td>
</tr>
<tr>
<td>Recruitment, Training</td>
</tr>
<tr>
<td>Talent pool that can be trained</td>
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Challenge 3: Changing Demographics in Workforce
From supply of talent perspective, about 50% of the population in India consists of people born after 1980, or in other words Gen Y (people born after 1978) and Gen Z (people born after 1995), who are more social and their outlook on employment, workplace is very different from the mindset of the current workforce. As per GRAIL Research [7], the beliefs that this Gen Y and Z carry are:
## Table 3: Generation – Experiences, Perspectives and Behavior

<table>
<thead>
<tr>
<th>Generation</th>
<th>Experiences</th>
<th>Perspectives</th>
<th>Behavior</th>
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<tbody>
<tr>
<td>Baby Boomers (1945-1965)</td>
<td>• Optimistic and financially stable environment</td>
<td>• Seen the phase of increased prosperity and growing consumerism</td>
<td>• Characterized as idealistic and competitive</td>
</tr>
<tr>
<td>Generation X (1960-1980)</td>
<td>• An economically uncertain environment</td>
<td>• Observed technologies like video games, cable television</td>
<td>• Characterized as individualists and skeptical of authority</td>
</tr>
<tr>
<td>Generation Y (1978-2000)</td>
<td>• An environment marked by increasing conflicts among regions, communities</td>
<td>• Seen digital technologies like email, SMS</td>
<td>• Characterized as optimistic, tech-savvy and style conscious</td>
</tr>
<tr>
<td>Generation Z (1995-2010)</td>
<td>• An environment where terrorism and degrading environment are concerns</td>
<td>• Seen Internet and social technologies</td>
<td>• Characterized as tech savvy, global citizens, inclusive mindset</td>
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The beliefs that this Gen Y and Z [7] carry are:
1. Internet is for anyone and everyone
2. Things can be done remotely using internet
3. Being socially connected through internet (be face book, twitter or second life)
4. Use freeware and open source as and when needed
5. Collaborating, sharing and distributing images and information is a way of life

Can Crowdsourcing be the next wave of outsourcing and help IT Companies address their current set of challenges?

### IV. LITERATURE REVIEW

Crowdsourcing is a business model where businesses use the Web to harness the efforts of a virtual "crowd" to achieve specific organizational tasks. While social media sites place emphasis on the "social" aspect of the community, crowdsourcing involves the "management" of a community via web-based collaborative technologies to elicit the community’s knowledge and/or skill sells thus fulfill a business goal [8]. It is also important to distinguish Crowdsourcing from the related concepts like Open Source, User Innovation and Open Innovation [6]. Open Innovation focuses exclusively on innovation processes whereas Crowdsourcing does not. Open Innovation describes interaction between firms, while in crowdsourcing the interaction is between a firm and crowd. User Innovation refers to user-driven projects, while crowdsourcing is firm driven. While Crowdsourcing can be seen as an extension of the Open Source principles, the distinction is in Crowdsourcing firms usually make traditional use of IPR e.g., by patenting their output.

Recent study by European Commission [10] categorizes Crowdsourcing work as (a) Crowdsourcing for funding, (b) Crowdsourcing for paid work and (c) Crowdsourcing for unpaid work (volunteering). The study highlights the impact Crowdsourcing has created in the labour market, by enhancing employability by helping in building skills, creating supplementary employment and tapping on a new labour market – retired, part-time workers, students, stay-at-home mothers/parents and other individuals requiring or wanting to work from home.

Making a successful shift to crowdsourcing requires some behavioural and attitude changes and new technology adoption, but when done right the rewards can be enormous. The 8 principles of successful crowdsourcing [2] are:
Crowdsourcing models can also be classified along two dimensions which are "operator of crowdsourcing" and "relationship structure of participants" [20]. Based on case studies the study concludes that in today’s society characterized by the popularity of internet, the nature of diversity is a great power, and Crowdsourcing can take advantages of the publish diversity, collective cognition, collective intelligence, collective selection to innovate to gain companies favour and huge commercial success. Analysing the models of successful crowdsourcing companies, Brabham [4] concludes Crowdsourcing is not just another buzzword and definitely not just a repackaging of open source philosophy for capitalist ends. It is a model capable of aggregating talent, leveraging ingenuity while reducing the cost and time. Bacon [1] also suggests how crowd can be used for evaluating correctness of software based on a rich market ecosystem in which coalitions of users bid for features and fixes. There are eight strategies suggested for promoting community based crowdsourcing [3]. These are (i) Rewards, (ii) Competition (iii) Leaderboards or Ranking (iv) Goal or Badges completion (v) Reputation (vi) User-friendly Platform (vii) Good Infrastructure (viii) Community Awareness or Advertising. Nicolas et al developed a motivational model [16] for crowdsourcing markets based on classic motivation theory, work motivation theory and open source software development. Their survey of 431 workers on Mechanical Turk concluded that extrinsic motivational categories (immediate payoffs, delayed payoffs, social motivation) have a strong effect on the time spent on the crowdsourcing platform. For many workers, however, intrinsic motivation aspects like "task autonomy" and "skill variety" were important.

While crowdsourcing has a lot of advantages, there are risks associated as well. The Ideavibes Whitepaper [9] lists down seven key risks: (i) Crowdsourcing does not solve your organization’s problem (ii) The crowd doesn’t have an answer (iii) Failure to participate (iv) Crowdsourcing takes too much time (v) Idea theft (vi) Maintaining privacy (vii) Gaming the system.

As can be seen from the review of literature, Crowdsourcing is still an evolving model; there is limited literature on the model, risks, and best practices. The author’s interest is to develop a crowdsourcing model that can effectively address the three key challenges IT Companies are facing today.

V. CASE FOR UNIVERSITY DELIVERY MODEL

![University Delivery Model – A Framework](image-url)
The University Delivery Framework (UDM) (Fig 2) was developed based on (1) Expert interviews with IT Project Managers, University Deans, (2) Survey of the participating university students and (3) the Controlled experiments.

5.1. Expert Interviews with Project Managers, University Deans
The interviews with Project Managers helped us list down success factors for Crowdsourcing

- **Task Definition** – needs to be as granular as possible, with little or no dependency to other tasks
- **Technology** – can be adopted only for technology that is accessible in the university environment and not for any client proprietary code
- **Task Duration** – recommended that tasks are not more than 80 hours for better monitoring
- **Knowledge** – tasks which do not require significant domain, client specific knowledge
- **Risk Management** – the risks associated with Data Security and Privacy, Intellectual Property infringement, Crowd Commitment to schedules should be addressed effectively.

The University Deans see this as a great opportunity to bridge the industry-academia gap, and enhance their ability to create readily deploy talent pool. On the skill levels, crowd commitment and risks, some of the key suggestions offered were

- **Curriculum Upgrades** – institutions are willing to offer specific courses on software engineering, coding standards, programming languages as part of the university curriculum which are today offered by companies, after the students join their workforce
- **Credit System for Crowdsourcing projects** – To ensure commitment from students, the Crowdsourcing projects maybe included in the academic credit system
- **Data Security / Privacy** – Being a captive crowd in a restricted area, risk mitigation like firewalls, signing of NDA (Non-Disclosure Agreements) by students can be better enforced.
- **Positioning of a University Resident Project Manager** – to liaison between students and the organization

5.2. Survey of Student Motivation towards Crowd Participation
We also did a survey on the intrinsic and extrinsic motivational factors (Fig 3) among students, to see what factors would drive a higher Crowd participation.

![Motivational Factors that impact Crowd Participation](image)

From the Survey three key motivational factors emerged:

- **Signaling** - making themselves visible to prospective employers
- **Human Capital Advancement** – opportunity to develop new skills, which improve their chances of employability
- **Direct Feedback** – the feedback they receive on tasks delivered which help them improve their programming skills

5.3 Controlled Experiments using Captive Crowd

5.3.1 Experiment Design
We conducted the following experiment involving 50 participants
• 25 participants from captive crowd talent who were pursuing their final year engineering course in universities
• 25 participants from the organization’s workforce, engineering graduates who had recently joined the organization.

The participants were selected based on their interest and familiarity with software programming. A briefing session was organized to explain the expectations of the program, refresh the Java coding practices / standards, and the project requirements.

Five programming tasks (Table 4), which were 80 hour tasks from a larger project was assigned individually to 10 participants (5 from captive crowd and 5 from organization’s workforce).

The organization’s Crowdsourcing Portal was used and the above projects were floated as contests and students and organization’s workforce participated. The Portal also provides access to education, guidance, and assets to help players who compete in software development contests. This also acts as a platform for players to meet with one another, discuss topics of interest, provide feedback, and ask questions.

5.3.2 Experiment Results
The effort spent by each participant was logged in a timesheet (Fig 4). Experienced programmers reviewed the deliverables and identified the defects in deliverables and variations in Delivered Defect Density (DDD) studied (Fig 5). The variance on Effort and DDD from both streams was studied.
**Ho: There is no difference in the deliverables (in terms of effort expended and delivered defect density) between captive crowd and organization’s workforce**

There was no difference in deliverables between captive crowd and organization’s workforce ($F_{1,48} = 1.05, p > 0.10$)

A SWOT Analysis of UDM (Fig 6), shows that there exists a distinct opportunity to deliver software services under University Delivery Model.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weakness</th>
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| - Crowdsourcing has evolved and gaining acceptance  
- Software renders itself to distributed work (component based development)  
- Socially savvy young workforce in India  
- Access to wider talent pool improving time-to-value | - Commitment to Work  
- Quality of Deliverable  
- Intellectual Property related infringement risks  
- Data Security & Privacy Issues |

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
</table>
| - Tap into untapped talent pool  
- Open innovation  
- Cost Reduction  
- Create Deployable Talent Pool | - Crowd Motivation and Retention  
- Legal, Labor Regulation related issues |

*Fig 6: SWOT Analysis of University Delivery Model*

The above field studies highlight a distinct opportunity to implement a University Delivery Model (Fig 2). The university talent could bring in innovative ideas and fresh thoughts that can be further enhanced through training. The closed community in a university setup can ensure a secure platform to address security related concerns in software work. The quality concerns and commitment of crowd can be addressed by positioning a senior manager from the organization in the university as a resident project manager and tie up the experience to university credit system. Thus, the university / engineering colleges offer a perfect campus to create a captive center for providing software services. The UDM can be seen as taking outsourcing models to the next level.

The benefits from UDM can be (i) significant cost reduction, (ii) create deployable talent for corporate, (iii) help organizations respond to demand fluctuations and (iv) access to diverse, fresh minds leading to innovations.

**VI. CONCLUSION**

Crowdsourcing business models are extremely disruptive and at the same time effective. The advantages of crowdsourcing are huge in terms of access to global talent, delivering in fraction of time and cost compared to traditional models and is amenable to both repetitive and high end research work. When it comes to expanding software work into crowdsourcing beyond the organization boundaries, two major challenges that need to be overcome are (i) Quality of work and (ii) Data Security & Privacy. The UDM model seems to have a greater potential to mitigate the quality and data security risks than an open crowd.

Large scale commercialization of software services using crowd seems promising and the University Delivery Model proposed in this paper can be taken up for a wider implementation and given the technology and talent available in India, may well become the next wave of outsourcing.
REFERENCES