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Microtasking models and managerial challenges

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Abstract. This paper offers a brief overview of basic microtasking models and connects its developments with emerging management challenges that will need to be addressed in order to fully harness the capacities and skills of the crowd in different domain areas..

1 Introduction

In a number of domains, innovative and self-organising work units have developed that now utilise the 'cognitive surplus' of the crowd and 'aggregated intellectual skills' to gather and process critical information. The transition from hierarchies to distributed networks, from proprietary ownership to open-source standards and models that include contributory as well as market transactions (Rejeski, 2012; Benkler et al., 2013; Bauwens and Kostakis, 2014) is underwritten by a multiplicity of established rules and yet-to-be regulated practices.

Recent research tends to focus on the role of ICTs in microtasking. Yet, less attention is devoted to the social implications of digital labour. In this paper we briefly consider two different types of microtasking and its impact in terms of new managerial practices.

2 Microtasking models

Microtasking has been sometimes conflated with terms such as ‘crowdsourcing’, ‘microwork’, ‘crowdwork’. Likewise, the term crowdsourcing has been approached with the lens of human computation, collective intelligence, or social computing (e.g. Quinn, 2011; Michelucci, 2013). The intersections between these domains have been noted as they coincide in their focus on horizontal processes that engage large groups of individuals towards clearly defined goals.

Research on crowdsourcing has already provided comprehensive reviews of the many definitions of the term (e.g. Estellés-Arolas and González-Ladrón-de-Guevara, 2012; Hossain and Kauranen, 2015). Yet, microtasking as a specific modality of crowdsourcing procedures has received attention only recently. Microtasking entails the modularisation of problems into microtasks of varying granularity that are processed by a distributed digital labour force. These microtasks are then published through computational platforms (e.g. Mechanical Turk, CrowdFlower or ShortTask) which distribute them through a crowd of workers.

Two basic types of microtasking practice can be differentiated on the basis of task definition, process management, participant incentives, and the nature and purpose of the final product (Novak, 2013: 422-425). The first model invites participants to conduct ‘small-scale, granular tasks for a few cents apiece’ (Bollier, 2014: 33). This model is structured as a linear workflow system whereby distributed individuals execute basic tasks or ‘atomic units’ requiring minimal skills or ‘little cognitive effort’ for financial reward (Novak, 2013: 422, 431-33). The tasks are predetermined and conducted independently as ‘parallel work’ and in some cases are then aggregated afterwards towards a larger task (Novak, 2013: 423). ‘Atomic’ tasks occupy a problem area that is ‘well-structured’ with modes of execution that are ‘well mapped out’ and require little interactivity between individual workers (Franzoni and Sauermann, 2013: p. 10). The purpose of this form of microtask is to minimise costs but obtain ‘high quality results’ (Saito et al., 2014: 401). However, the emphasis on labour flexibility as a cost-saving strategy has drawn criticisms that this type of crowdwork is ‘exploitative labour’ (Kittur et al. 2013) and may be regarded as the reinvention of digital/virtual ‘sweatshops’ (Blumberg, 2013a: 3; Bollier 2014: 34), a new form of Tayloristic assembly line production (Novak, 2013: 422) or unsatisfying ‘assembly-line piecework’ (Kittur et al., 2013: 1). Nevertheless, basic microtasking platforms can offer marginalised populations employment opportunities (Bollier, 2014b: 35). Samasource acts as a broker between companies and ‘people in poverty’ who are employed on platforms to conduct less skilled tasks such as photo-tagging and image identification for remuneration (Bollier, 2014: 6).

Platforms such as UpDesk allow skilled individuals to access fee-for-service projects, and InnoCentive, invites participants to select research and technical tasks for payment as a form of ‘enterprise crowdsourcing’ (Bollier, 2014: 6, 34). The tasks offered on these platforms conform to the definition of ‘macro’ tasking as specified by Saito et al. (2014: 400). The atomic/primitive microtask requires individual participants with basic skills to perform simple tasks that are centrally managed as commercial projects (Novak, 2013: 422). While these projects solicit open mass participation both their processes and products are closed and subject to intellectual property agreements (Franzoni and Sauermann, 2013: 9).

Blumberg (2013b: 6-7) identifies a set of common characteristics for atomic microtasks: (i) tasks are simple and repetitive; (ii) task workers are single-user; (iii) task execution is non-interactive; (iv) tasks do not require expertise or high-level skills. He also contrasts these features with an evolved form of crowdsourcing that entails recruiting ‘many minds’ for sophisticated problem-solving projects (2013b: 5-7).

The second modality of microtasking requires multiple participants driven by non-pecuniary motivations to work collaboratively on a particular online project through an ‘interactive problem solving process’ (Franzoni and Sauermann, 2013: 10). In interactive microtasking approaches task modularization tends to be limited. Tasks are interdependent, complex, and ill-structured, with no obvious parameters or solutions. Likewise, task workers, with specific skills/knowledge, interact and collaborate sequentially toward a resolution.

This second modality harness ‘large scale thinking systems’ with technology to address complex problems that are beyond the competence of computers alone or sole individuals (Blumberg, 2013a: 3). It also entails a collaborative approach that is more suited to solving ‘wicked’ or ‘ill-structured’ problems that cannot be solved by a ‘single computational formulation’ or through stakeholder consensus on the parameters of the actual problem and attendant solutions (Introne et al, 2013). Examining crowd-science projects, Franzoni and Sauermann (2013) argue that ‘ill-structured’ problems are complex, require a degree of interdependency and thus cooperation between participants who address these sub-tasks. It is not a clearly predetermined process either, since the ‘problem space becomes clearer as the work progresses’ and as knowledge contributions accumulate (Franzoni and Sauermann, 2013: 10).

The central challenge with task decomposition or modularization is to fragment problems into modules in a way that facilitates the reconsolidation of solutions (Franzoni and Sauermann, 2013; Introne et. al 2013: 46). A high degree of modularization facilitates the participation of a greater number of contributors who can undertake independent parallel work, however, the characteristics of specific problems set limits to the extent to which problems can be modularized (Franzoni and Sauermann, 2013: 14). As a result, complex ill-structured problems can only be partially fragmented and require greater levels of collaboration with no obvious hierarchy of labour and with components that cannot be easily reintegrated (2013: 14). In this regard task management as such involves modularising tasks structures and establishing groups of taskers to optimise the workflow toward solutions.

3 Managing digital labour

In the emergency management domain, digital volunteer organisations such as Standby Task Force (SBTF), Humanity Road (HR), Virtual Organisation Support Teams (VOST), or Humanitarian OpenStreetMap (HOT) have deployed either atomic or modular strategies when collecting, curating, or mapping crowdsourced information on disaster events (Buscher *et al.* 2014, Liu, 2014). Yet, the 'management' aspect of digital labour in the microtasking and virtual emergency management literature is under-emphasised and is often stylised as an oppositional format between hierarchical or lateral approaches.

The way microtasks are structured for information management, irrespective of complexity, requires collaborative interactions amongst volunteers and lateral structures so that reliable intelligence drawn from raw data can be rapidly produced in a fast-changing and uncertain environment. However, this process also requires a particular style of management or even *non-management*, that is, one that differs in style and execution from traditional authoritative models. Hierarchical or chain of command procedures requiring vertical lines of authorization are comparatively cumbersome.

At a theoretical level, Buscher *et al*. (2014) refer to the self-organising dynamic that emerges with processes of collective intelligence, and contrast modalities of self-organisation, orchestration and centralised control as management styles (2014: 248).

Using the example of online reality gaming practices whereby 'careful orchestration' encourages the attainment of goals, they suggest that with peer production and collective reasoning processes both self-organising and orchestration are complementary approaches.

Rahman *et al*. have suggested that 'the transformative effect of 'collaboration' remains largely unexplored in crowdsourcing complex tasks' (2015: 1). As they argue, the structure and maximization goals of basic microtasking for high-quality products with a rapid turnover are 'inadequate to optimize collaborative tasks' (2015: 1). At the same time there is little research on the human resource factors that influence the quality of group collaboration outcomes. For example, there are factors such as individual skills, group affinity and the 'upper critical mass' of group size for effective collaboration that require further investigation (Rahman et al., 2015).

4 Conclusion

We have briefly traced the development of microtasking as an information management process for digitally generated data. Microtasking is approached as a means to systematise the often overwhelming volume of digitally generated data and to construct a ‘cognitive architecture’ to produce actionable intelligence. The relevant literature indicates that micro-practices that enable the mass participation of digital workers has now embedded a role for the crowd in domains such as emergency management.

Yet, there is a need to further understand what is specific to organisational forms and managerial practices that support peer production and collective intelligence processes that are flexible to context and operate in urgent timeframes. How can collaborative processes be optimised with local and globally dispersed volunteers, how can newly evolved regulations and governance protocols be introduced using managerial approaches other than those based on individual performance goals?

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