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Harnessing generativity of digital objects through process innovation

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Aim of the Paper

Contemporary entrepreneurial landscape is marked by opportunities emerging from the convergence of digitization and innovation. The generative and ubiquitous nature of digitization, defined as increasing saturation of business processes with information technology (Kallinikos 2009), manifest itself in digital start-ups, new business models, new product and service designs, and new forms of organizing (Amit and Zott 2001, Desyllas and Sako 2013). Reflecting these realities, entrepreneurship research offers insights into digital entrepreneurship. Focusing on entrepreneurial digital innovation, studies consider process innovation and the new organizational forms (Boland et al. 2007; Franke et al., 2008). There has been interest in strategies of digital start-ups (Rindova and Kotha, 2001), strategizing in nascent fields (Santos and Eisenhardt 2009); and entrepreneurial business models (Zott and Amit 2007).

Despite these advances, our understanding of digital entrepreneurship remains limited. Given the pervasive nature of digitization, the topic remains surprisingly under-represented in entrepreneurship literature and a review of the top entrepreneurship journals reveals relatively few contributions (Reuber and Fischer 2011). A common feature of extant research is treatment of digital technology as either an aspect of context (Santos and Eisenhard 2009), thus of no substantive research interest or as “black box”, “given”, beyond control of the focal entrepreneur (Fisher and Reuber 2011), thus no warranting problematizing. Furthermore, digital innovations seem insufficiently distinct from other types of technology to deserve special treatment. Lack of appreciation for the distinct nature of digital technology results in digital innovation being largely overlooked in empirical research. Consequently, entrepreneurship theory provides only limited explanation for the burgeoning activity in digital domain.

We argue that the development of digital entrepreneurship as a legitimate field of academic enquiry has been hampered by the lack of robust theory of digital objects. Richer theoretical treatment of these objects is needed to fully appreciate the distinct nature of digital innovation. The current study hopes to advance our understanding of digital entrepreneurship by exploring the nexus of opportunity and digital technology. Focusing on innovations in business process, our specific objective is to examine how digital technologies mesh with business process to generate digital process innovations. The study explores why and how opportunities for the value creation in business process innovation come into existence through digital objects. We build on theory of digital artifacts which stresses the unique generative nature of digital technology and focuses on affordances i.e. possibilities for action with technology (Faraj and Azad 2012; Leonardi 2011; Majchrzak and Markus 2012). The study adopts socio-materiality perspective on digital opportunity, which takes technology-centred focus but does not privilege either the objects or entrepreneurial actions (Leonardi 2012; Orlikowski 2007; Orlikowski and Scott 2008). According to this view, digital generativity depends on mutual entanglement between opportunity and digital object. By considering the ontology of digital opportunities, we hope to firmly position digital transformation within the realm of entrepreneurship, where it rightly belongs.

Background Literature

Theoretizing about digital entrepreneurship rests on the appreciation of distinct features of digital technology. The notion of digital artifacts provides a useful starting point (Faulkner and Runde 2013; Ekbia 2009; Kallinikos et al. 2013). Unlike their physical predecessors, digital artifacts have unique characteristics of editability, openness, distibutedeness, granularity and modularity (Kallinikos et al. 2013). Editability denotes that they can be easily changed by rearranging elements of which they are composed or updated by change of content. Distributedness means that digital artifacts are seldom propriary or contained within a single site but instead are open, fluid and transfigurable. Granularity derives from the numerical constitution of digital objects and the minute size of the stuff of which digital objects are made. Modularity concerns relationships between building blocks and denotes interoperatvity: digital objects can be easily interchanged. As a result of this features, digital objects are largely incomplete and ever evolving, offering unprecedented opportunities for reconfiguration but also substantial challenges in exploitation and management (Yoo et al. 2010; 2012).

The properties of digital objects have significant consequences for innovation through convergence and generativity (Yoo et al. 2010). Convergence denotes bringing previously separate processes, actions or uses together. Digital start-up such as Spotify, Skype or Skyscanner exploit innovations of this type by bringing together previously separated actions. Generativity or “a technology’s overall capacity to produce unprompted change driven by large, varied, and uncoordinated audiences” (Zittrain 2006, p. 1980) captures digital technology dynamic and malleable character. Boland et al. (2007) for example, show how digital process innovations cause change across a range of related industries, a phenomenon they describe as “wakes of innovation”. Another good example concerns “big data” (Economist 2010) and new entrepreneurial activity

that centres around exploiting opportunities in the unprecedented volume of digital traces. Much innovation in social and mobile media relies on streaming, integrating, and analyzing data, that is, the generative use of data. The limitless possibilities in recombination of digital artifacts are a new source of innovation (Arthur, 2009).

The confluence of digital artifacts and enterpreneurship has been addressed from two perspectives. On the one hand, some attention has been devoted to new ventures that emerge through digital transformation of business process. For example, Zott and Amitt (2008) map out different types of value creation opportunities and the associated ventures. This stream of literature centers on value, actvities and facets of strategy (Rindova and Kotha 2001) or the business model (Desyllas and Sako 2013). By highlighting business aspects of new venuture, facets of technology and its unique affordances are not explicitly addressed and the digital artifacts receive little attention within this stream.

The other approach to digital entrepreneurship is technology centric. This research focuses on a particular set of technologies; their adoption and its consequences are explicitly examined (Boland et al. 2007). Good example of such a study is Fisher and Reuber's (2011) examination of Twitter and its implications for entrepreneurship. Although technology affordances are explicitly explored in this stream, the technology is taken as given and the deterministic relationship between digital artifact and entrepreneurial action ignores their mutual interaction (Leonardi 2011). Missing from these accounts is an appreciation that technological affordances are enacted and that opportunities results from the meshing of technology and practice. In result, the studies incompletely address the dynamic and generative aspect of digital objects (Boland et al. 2007).

The current study focuses on digital innovation, that is, innovation enabled by digital technologies. Digital innovation rests on digitization, defined as increasing saturation of business processes with information technology that is accompanied by the transformation of activities, practices and processes. The necessary condition of digital innovation is (1) that it goes beyond "a mere technical process of encoding diverse types of analog information in digital format" (Yoo et al. 2010) to involve new combinations to provide novel processes; (2) that this change reshapes the underlying value propositions; (2) that the novelty is significant offering advancement in "the state of the art" (Abrahamson 1996, Kimberly 1981).

Methodology

The study takes a socio-material approach to analysing digital opportunities (Leonardi 2011; Orlikowski 2007). That is, in line with other research concerning the nexus of digitization and innovation (Boland et al. 2007; Prasad 1993), the approach taken here assumes that digital opportunities are co-constructed at the nexus of organizing and technology adoption. The examination of such opportunities requires a careful examination of digitization in situ. The study adopts a qualitative method focusing on three entrepreneurial start-ups in marketing communications. Following other studies on situated practice (Prasad 1993), the project employs multi-method approach to data collection. Semi-structured interviews are complemented with the analysis of documents (meetings minutes, jobs descriptions, formal rules and procedures, online materials) and participant observation (shadowing). Data collection occurs at multiple levels of analysis: individual, team and organization. Data analysis follows established procedures (Glaser and Strauss 2011) with continual, iterative cycling between pre-existing theory, the data and emerging theory until the point of saturation.

Results and Implications

This study hopes to contribute to our understanding of digital entrepreneurship in several important ways. The study pays close attention to the ontology of digital objects and their affordances. Our detailed treatment of affordances against business processes allows to illuminate the generative properties of digital innovation. The attention to the entanglement in practice highlights opportunities as well as challenges of digital entrepreneurship. For example, the study offers insights into challenges digital innovation that result from the incomplete, unfinished and ever morphing nature of digital artifacts (Kallinikos et al. 2013). Incompleteness poses significant challenges to managing innovation and undermines conventional theories that assume that a product has a fixed boundary and follows a certain life-cycle (Yoo et al. 2010). The study shows that generatively of technology leads to highly specific, practice-situated applications. In essence, digitization seems to increase heterogeneitry of innovation heightening the complexity of the innovation process. This highly specific nature of digital opportunities offers significant advantages for value creation but also increases the risks.

References available on request