Affordances of Control in a Paradigm of Spatial Computing Platforms

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Affordances of Control in a Paradigm of Spatial Computing Platforms

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Abstract

Adoption of digital platform innovations afford a changing nature of work, from mobile computing platforms (e.g. Apple) enabling 24/7 work connectivity, to labour marketplace platforms (e.g. Uber) enabling precarious work arrangements. Recently, organisations are adopting/investigating spatial computing platforms (e.g. Autodesk, Toyota, BNP Paribas), offering new affordances for organising (e.g. carrying out tasks, communicating and collaborating). Spatial computing concerns achieving spatial interplay between the real and digital world (Agulhon 2016), enabling perception of physically present content. An emerging paradigm of spatial computing is enabled by hardware and software innovations for; 1) digitally mapping, tracking, understanding and predicting analog audio and visual spatial fields, 2) creating digital audio and visual spatial fields, and the (3) mixing and fusing of those fields. Mixed, augmented and immersive reality is then experienced by volumetric graphic rendering onto a human's field of view (FOV) (Martín-Gutiérrez et al. 2017). Emerging market-place examples can be seen in 'Microsoft Hololens 2' and 'Magic Leap One' platforms, both creating/enabling an ecosystem of novel applications for both industrial, educational and leisure life contexts. With further convergence of IoT, haptics, 5G, cloud and AI etc., spatial applications will range from contextually aware and interactive; digital information layering of objects, guidance and decision support systems (DSS) within business operations (such as for industrial machine manufacture, monitoring, and maintenance), digital modelling & prototyping in R&D, through to applications for communications and collaborations (such as for spatial tele co-presence of people, objects and environments). More broadly, these advances have potential to catalyse disruptions within business, through to the labour and consumer marketplace via: (1) *Virtualisation* of hardware resources (e.g. fully digitising workplace equipment such as displays and interfaces, raw inputs for prototyping and even digital rendering of spaces). (2) *Protection and strengthening* of institutional knowledge and performance via knowledge capture, guidance and decision support of labour tasks and activity (e.g. reducing labour (re)training (e.g. parts assembly), knowledge capture of practice). (3) *Creation and distribution* of new value propositions in goods and services (e.g. digital item ownership in a mixed-reality cloud, spatial applications for IoT enabled devices). (4) *Displacement* of geographic space as cost, talent, time, access and convenience constraints on business (e.g. available talent pool, partner/customer reach and relations). (5) *Collaboration* through new/enhanced affordances for workers (e.g. shared digitised work tools/environments).

Therefore, a paradigm of spatial computing will challenge the IS community to research new ways of working, and consequences for worker experience, meaning, productivity and power. With emerging advances in AI, automation and spatial computing, one of the pertinent enquires concerns importance of workers (sense of) agency (Chandra et al. 2019). Control in the IT context has been conceptualised as control over work, control over self, and control over technology (Beaudry and Pinsonneault 2005), with prior IS work studying locus of control related to; work stress (Chandra et al. 2019), intrinsic and extrinsic motivations (Mujinga, M Eloff, MM Kroeze 2013), and performance (Vieira da Cunha et al. 2015) etc. With spatial computing platforms and their applications, *what affordances of control and for whom should be developed?* For example, the electronic representation of worker activity can be further enabled. Thus, tighter or looser coupling between worker activity and the reporting/outcome of work (Vieira da Cunha et al. 2015) becomes more of an organisational decision, with capability to monitor workers, and leverage AI for learning and optimisation. Furthermore, with development of spatial tele co-presence (STcP) (e.g. Mimesys), brings new affordances for communication with any worker(s), at any time, from anywhere. However, prior CMC research suggests people can choose different communication media specifically to manage social and emotional relationships (Madianou 2014) and their time (Mcloughlin et al. 2019). Hence, *will such affordances serve greater identity fusion (Swann et al. 2012) and collaboration in organisations?*

Thus, we propose a socio-technical research agenda exploring 'control' related affordances for emerging spatial computing platforms, such as for STcP technology. In this regard, Control Theory can offer a useful starting frame, as it deals with control mechanisms governing workers organisational actions both formal (outcome and behaviour based) and informal (group and self-control), to further the interests of organisations (Kirsch 1996). We suggest, data and communication related affordances of control (e.g. privacy, exploitation, authenticity, availability and spaces) as starting points. Social Capital (Lin 2001), Social Influence (Kelman 1958), Social Identity (Ellemers and Haslam 2012), Identity Fusion (Swann et al. 2012) and Polymedia (Madianou and Miller 2012) being just some of the many relevant social theories to this endeavour.

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