

IFIP WG 8.6; International Conference on Transfer and Diffusion of IT, TDIT 2018, Portsmouth, UK, June 25, 2018 [IFIP AICT 533], paper 23. Pp. 261-276; (accepted 1st June, 2018, published 2019). Post print.

Balancing Stakeholder Interests: Socio-technical Perspectives on Smart Working Practice

Peter M. Bednar¹ and Christine Welch²

¹ School of Computing, University of Portsmouth, Buckingham Building, Lion Terrace, Portsmouth, PO1 3HE, UK

peter.bednar@port.ac.uk

² Portsmouth Business School, University of Portsmouth, UK

Abstract. The advantages put forward for so-called Smart working may sound very appealing. However, it is unlikely that all stakeholder groups involved will benefit to the same extent, if at all. Many initiatives that seem to be aimed at development of Smart work systems can be seen to be flawed, since they are suggested to support empowerment but are expressed in terms of pre-defined ‘best practice’. This inherent paradox leads to consideration of ways in which innovation could occur that would lead to genuinely Smart systems, harnessing Smart technologies and empowering engaged actors to co-create meaningful practice in pursuit of professional excellence. An open, socio-technical systems approach is suggested to be the way forward.

Keywords: open systems; socio-technical systems; Smart working; human-centred design.

1 Introduction

Suggestions have been made that a paradigm shift has taken place since the Millennium in the way in which work practices are organized [1]. This is said to have been characterized by willingness of managers to adopt new organizing principles; a decline in the importance of place in work activities; greater scope for collaboration; employee autonomy and talent management; and an emphasis on innovation [2]. Advantages put forward for this, new ‘Smart’ working include a better work-life balance, less time and money spent on travel, lower rents and running costs for organizations, attraction of new talent into the workforce and increased productivity [3][4][5]. At the same time, it is acknowledged that Smart working requires very careful planning and can involve a shift of costs from employer to employee. Use of collaborative and mobile technologies is suggested to support team working and innovation, even though increased isolation for employees is recognized as a drawback.

A number of questions arise in relation to this suggested shift in management thinking. First, is there concrete evidence for this apparent trend in management thinking? If so, it would be expected to be accompanied by changes in relations among stakeholders in organizations to reflect new thinking and to deliver the suggested benefits. There have been many ‘new’ perspectives on change in the past that promised much but were later abandoned, e.g. Business Process Reengineering. Secondly, if it was genuinely desired by decision-makers in an organization to promote ‘Smart’ working, by what means could this be accomplished? The discussion which follows is intended to address these questions.

In the next section, results of a search for evidence is set out. Some examples are examined of initiatives advertised as efforts to adopt Smart working in the interests of all stakeholders. The following section will examine how introduction of Smart working practices might be effected from a systemic, socio-technical perspective. Finally, some conclusions are drawn.

2 Smart Working initiatives

A search for literature on, and examples of ‘Smart Working Practice’ produced rather disappointing results, both from Google and Google Scholar. It is to be emphasized that this was not a rigorous or scholarly attempt to uncover material but only intended to be the type of search an interested manager or business owner might undertake, having learned of this supposed paradigm shift in management thinking. Several of the documents revealed in the search were from Governmental or quasi-governmental bodies and contained useful advice for other organizations wishing to pursue a Smart Working paradigm. Others were produced by consultants or commercial organizations wishing to encourage use of their services, e.g. Cisco who supply network technologies. Few examples of actual Smart working initiatives in organizations emerged.

2.1 The UK Government

The UK Government provides one example of an espoused wish for Smart working. It has launched an initiative for its services that it terms ‘The Way We Work (TW3)’

[4] and has set out a set of principles of ‘best practice for Smart working’, suggesting that in future the Civil Service will: focus on outcomes not process; be empowered by technology, work flexibly and cost-effectively; collaborate more effectively with other teams in their own department and other departments; maximize productivity and innovation, while reducing environmental impact. These aims and principles are discussed on the Civil Service Blog (2018) [6]. There seems little apparent awareness of any paradox between publication of ‘best practice’ for benchmarking on the one hand, and a statement of intent to promote flexibility, empowerment and autonomous innovation on the other. A case study of success is set out, relating to changes in practice at the Defence Science & Technology Laboratories (DSTL). However, we note that this is a section of the Civil Service whose whole purpose is to bring about innovation. How far such policies have met with success in, say, the Treasury, is a matter for conjecture.

2.2 The European Commission

A guide promoted by the EC on its Website was actually produced by Transport for London, in conjunction with a not-for-profit organization 'Work Wise UK' and dated 2007 [7]. The document offers advice to organizations wishing to embark on changes towards a Smart working paradigm. Examples are given, such as the Nationwide Building Society's move towards 'Flexible Working'.

The suggested policies on 'How to Implement Smarter Working' in this guide suggest, inter alia: *'It is important to assess business needs first, as production and service delivery dictate to a degree the choices that can be offered to staff' ... It is important to assess business needs first, as production and service delivery dictate to a degree the choices that can be offered to staff'* (2007, p.16).

2.3 Flexibility.co.uk

A Smart Working Handbook [8] is available on-line from flexibility.co.uk. The organization is stated to bring together expertise from research and opinion, drawing upon experience and working with large organizations, some of whom are listed as sponsors. This is more up-to-date and contains useful examples of real organizational initiatives, but these take the form of snapshots of particular aspects of practice from, e.g. Volkswagen Financial Services, Credit Suisse, Vodafone, Ofsted. It is stated to underpin and inform the UK Government TW3 document (see above). The advice and examples may be useful to those contemplating changing their practice, but not sufficient to enable a realistic evaluation for anyone less convinced.

2.4 Cisco IBSG

The report published by CISCO is persuasive about the suggested paradigm shift [1]. It refers to a global survey of more than 2,500 'end-users and key decision takers'. Smart Working is said to be the end of an evolutionary process in which technological developments have enabled organizations to reduce the importance of place in their activities. Their survey suggests that employees desire to work more flexibly but that IT-professional capability to deliver Smart systems lags behind. This is not a surprising conclusion from a company that sells networks. A number of successful initiatives are cited as examples (presumably from among Cisco customers) but it is interesting that these focus on enabling systems, e.g. Smart Work Centres in Amsterdam; a women's professional network 'GreenBizStartup'; community Smart work services in Belgium. The only large organization given as an example of Smart strategy is Cisco itself.

Discussion of Smart working in these technical and business publications refers to benefits as if these are both automatic and uncontroversial, while occasionally acknowledging a downside, e.g. isolation or higher running costs for employees. However, any strategy involves choices between the interests of particular stakeholder groups – customers, employees, investors and society more generally.

2.5 The Automobile Association

An example of conflicting interests among stakeholders can be seen in the history of the Automobile Association in the UK. [9] The AA was originally a members' organization formed in 1905, funded by motorists' subscriptions. Uniformed patrol staff provided roadside services such as breakdown cover. Over a period of some 90 years, membership grew from 100 to over 15 million, and the range and quality of services was expanded until there was a fleet of more than 3,500 breakdown vehicles providing national coverage. The AA became instantly recognizable as a safe and reliable brand. During the 1990s and early 2000s, further products and services were added, including publications, a transport information services 'AA Roadwatch' and insurance. In 1999, members voted to end mutuality and sell to a commercial venture. Almost immediately, the AA was sold on to private equity capital. It became clear that these new owners had different priorities [9] [10]. Return on investment was prioritized. The workforce was cut by over 3,000. The number of patrol vehicles was cut from 3,500 to 1,100. Instead of in-house, recognizable patrolmen, members were likely to receive assistance from any available local garage sub-contracted by the company. People, particularly women, no longer felt the same trust in the service. Wachman [11] reports anecdotal evidence of people being left waiting at the side of the road for hours on end following a request for assistance. Meanwhile, staff were subjected to greater and greater pressure with close monitoring of all aspects of work and rigid timing of meal or comfort breaks. Morale became very low and staff turnover high. However, investors received a high yield and were very satisfied. Shortly afterwards, the company was sold on again at a profit.

Thus, it can be seen that the AA appeared to be a successful business for many, of- ten institutional investors requiring a high return on capital. However, use of networking, electronic communication and remote working delivered benefits to neither customers nor employees [12].

2.6 Discussion

A number of the examples revealed in the rudimentary Web search described above relate to enabling initiatives. It is not difficult to see how small business centres offering Smart facilities would be attractive to self-employed entrepreneurs, who wish to operate in an agile way, e.g. keeping in close touch with actual and potential customers using mobile technologies. However, is this a genuine example of paradigm change?

Barber and Campbell [13] create a discussion on the drive from investors for companies to reduce their costs in order to generate a short-term surplus. Such strategies are not sustainable in the longer-term, but this is not the objective. Such imperatives might be cloaked under suggestions for Smart working. It is recognized, of course, that there are some industries in which it is possible to produce economies of scope by investing in new technologies to replace people (e.g. oil, banking, telecommunications), but in others human talent and engagement

is key to pursuing excellence and revenue generation - as can easily be seen in, e.g. software development, pharmaceuticals or fashion [13]. Policies that might, on the surface, appear to be 'Smart' may not survive beyond the short-term interests of a particular interests of a particular stakeholder group.

In any organization, there will be a strategic balance to be achieved. Clearly, an organization must be sustainable in many dimensions – financial, ecological and (socio)technical. Pursuit of effectiveness in delivering products and services requires professional education and commitment from staff, but is also dependent upon the financial viability of the processes involved, at least in the short-term. However, sustainability in the longer term requires attention to the so-called 'Triple Bottom-line' [14][15]. The AA, for instance, may be able to deliver a service that is more flexible by getting rid of dedicated patrolmen and instead buying in services from local garages. As we have seen, when they attempted to do so, efficiency gains pleased only investors – customers and employees became disaffected. Smart working requires an optimal balance of skills, engagement and supporting technologies. Thus, the AA may be able to provide a better service to members by utilizing a computer-aided dispatch system to direct the closest and best-equipped patrolman to a particular stranded motorist. At the same time, the patrolmen may have less stress by travelling shorter distances and the AA fuel costs may be reduced. As an academic, it is easy to recognize that these benefits may emerge in such a context. Whether they will emerge, however, depends crucially upon the perceptions and perspectives of the engaged actors within a system of professional service delivery, and the extent to which they have an opportunity to explore and express them. Social networks can be viewed as intertwined aspects of cultural behavior. Proposed change that is not culturally feasible within particular socio-technical environments is unlikely to succeed [16][17].

An important point that must be recognized when considering pursuit of benefits from Smart working is that every engaged stakeholder (customer, investor or employee) will have a personal, unique view of what is desired in context, and this also will be subject to redefinition and change over time. Desire by individuals to participate in, and facilitate change in pursuit of excellence must be a key to genuinely Smart work systems that deliver benefits to all [18][19].

The next section of the paper will consider how genuinely Smart work systems might be co-created

3 Systemic, socio-technical perspectives

Effectiveness in any purposeful activity is a socio-technical phenomenon. People use tools in order to be productive. Tools are designed for use. Systems for the effective use of tools by people, to bring about desired outcomes, requires social and technical elements to be considered together. Thus, a modern, socio-technical approach does not pursue two separate (social and technical) strands for examination, but one, integrated whole. Mohr and van Amelsvoort [20] have defined a modern, socio-technical approach to comprise: *'The participative, multidisciplinary study and improvement of how jobs, single organizations, networks, and ecosystems function internally and in relation to their environmental*

context, with a special focus on the mutual interactions of the entity's ... value-creation processes' (2016, p.2). This definition is not entirely satisfactory, however, since it tends to ignore the participation of real human beings, whose contextual understandings, skills and desires are crucial to the achievement of 'value-creation processes'.

Any effort to bring about change in an organization in order to develop Smart working practices must be considered from a socio-technical perspective. A relevant question to pose is how far traditional ideas of 'organization' can be useful in an age of Smart living and working. Much of the business literature suggests that an 'organization' was identifiable by its corporate status, brand, distinctive culture and carefully managed activities. Organizations were associated with formally-defined missions, such as profit-making or religious observance, and tended to be associated with place

– land and buildings. Any given organizations will have unique characteristics making it distinctive. As other organizations attempt benchmarking and copying 'best practice', they will probably acquire some of the first organization's market share or reputation assets; but those organizations that achieve sustained success are likely to do so through continuous innovation. As has famously been pointed out [21], the only sustainable source of competitive advantage for organizations in the long-run is the 'know-how' of those who work in them (p.15). Thus, organizations perceived to be successful are those within which employee enthusiasm, creativity and team working are continually engaged. A journey of co-creation is undertaken by engaged professionals seeking to achieve excellence in their practice, supported and facilitated by leaders. To what extent is the concept of 'Smart working' relevant to such a journey?

Nowadays it is common to consider business activities in terms of webs of value, often generated through a loose-knit collection of partner companies and individuals who come together to source, produce and/or deliver a collection of benefits perceived as a product/service. As Za, et al [22] suggest, gradual blurring of organizational, social and temporal boundaries has been supported by evolution of new 'digital ecosystems', allowing new products and services across multi-connected, transformative systems of collaboration, co-operation and learning. Joint ventures, collaborations and out-sourced activities are increasingly the norm.

It becomes increasingly difficult to express organizational boundaries with clarity – when someone logs into a social networking site such as Facebook or LinkedIn, for instance, are they engaging in business or social activity? Or a combination of both? Only an engaged individual can tell where such boundaries lie, for them and from moment-to-moment. What sort of 'organization' is Airbnb, for instance? Who are its members – renters, owners, facilitators? When people engage in purposeful activity, they often desire to become 'organized' so that activities are not missed or duplicated, methods and channels are chosen, etc. Does this mean that 'an organization' has come into being? Possibilities for Smart working and living have created an environment in which many things become possible at short notice, with little capital outlay and collaboration can be supported over wide distances. 'Organization' becomes an increasingly temporary and informal concept. Pop-up restaurants, festivals and galleries are common examples

of ephemeral ‘organization’. Community life may be enhanced within Smart cities, that enable factors such as government services, transport and leisure to be ‘organized’ as integrated socio-technical systems. Personal life can be enhanced through Smart homes that support advanced communication with devices via an Internet of Things [23]. Where is the boundary between personal and professional life to be drawn? It may be that the mental model of ‘an organization’ is less helpful than an alternative view of ‘work systems’ in which actors collaborate, communicate and use available technologies for particular purposes.

3.1 Dynamic, open systems approach

In contemplating design of work and/or organization, a systemic perspective is needed. Checkland [24] discusses emergence in systems. Originally a chemist, he uses the analogy with chemical elements. The distinctive smell of the household cleaner ammonia has little to do with the properties of nitrogen and hydrogen atoms, which are involved in ammonia’s chemical structure (NH₃) – the whole is more than just a combination of its parts. Thus, an organization might be seen as a purposeful whole, made up of smaller, interacting elements combined in an organized way to bring about a desired transformation of some kind (see Figure 1). Since definition depends essentially on an observer who describes a phenomenon, it follows that purposeful activity systems will be defined differently according to the perspectives (or what Checkland calls *Weltanschauungen*) of the individuals who view them. Thus, a system’s emergent properties exist only as a reflection of the mind of a person who contemplates them (p.671) and chooses to draw a particular boundary around a system of interest [25]. Attempts to define a system from a particular perspective at a given moment in time can only result in a ‘snapshot’ view, meaningful to a particular observer only.

When a systemic lens is turned upon the nature of organization, it is possible to perceive that a higher order of complexity is involved. As Mumford [26] points out, organizations can be perceived as dynamic and open systems – elements continually entering, interacting and/or leaving over time. Thus, an organizational system’s uniqueness derives from the qualities of the individual people who create and recreate it on an on-going basis by their participation and mutual interactions. Furthermore, as Bednar [27] [28] suggests, individual emergence is worthy of special consideration in relation to organizational systems, since it would be naïve to regard people simply as interchangeable ‘units’ of labour. Uniquely of all systemic elements, human beings may exhibit emergent properties greater than those of the whole system within which they interact, since human lives transcend any particular organizational context and human life is reflexive – we recreate ‘ourselves’ on an ongoing basis through experience and learning. Participants’ roles, relations and perspectives in organization overlay one another and subsist in a constant state of flux. An organization may be viewed, therefore, as a complex social-technical system, affected by aspirations, behaviour and values of individuals within it [29]. Indeed, it is the interactions among engaged actors on an on-going basis that co-creates and re-creates which is recognizable as ‘organization’ (Figure 1, System View B). Schein uses the term ‘organizational culture’ to reflect these recognizable characteristics.

All of this demonstrates the challenges involved in design of flexible, dispersed organizational systems to promote creativity and autonomous, continual innovation.

Furthermore, attempts to separate technologies underpinning Smart living and working from the activities of the individuals whose desires are supported seem increasingly unhelpful. Kappelman, et al [30] point to a study carried out by the Society for Information Management, in which it is established that business-IT alignment is still the first concern of senior managers of companies around the world. Such ‘alignment’ has been a focus of discussion in IS circles for a generation [31]. However, in the early years of the IS discipline, Langefors [32] had already pointed out that a need for reporting was a crucial feature of management roles, and that it was therefore impossible to draw a meaningful distinction between Information System and organization – the latter’s structure being crucially influenced by the former (p.53). Since Langefors time, technological developments have gone far beyond reporting of management data, to pervade production and delivery of desired outcomes. It is suggested, therefore, that a concept of alignment between separate organizational sub-systems is not a useful construct. The idea is now receiving recognition that dynamic co-evolution of socio-technical elements is more relevant [33] [34]. A contemporary socio-technical approach is therefore required to support an on-going journey towards excellence.

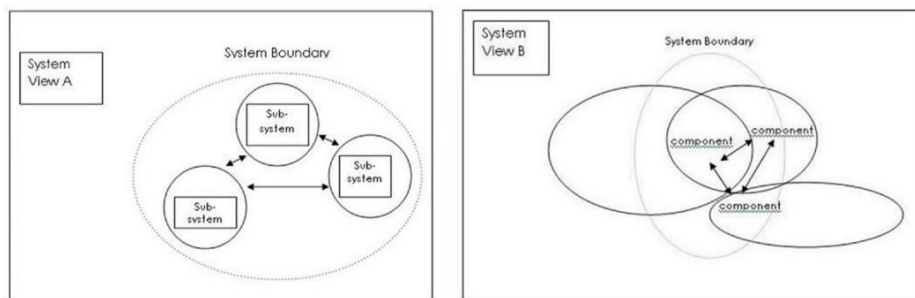


Fig. 1. System Views: A - organization as an emergent whole comprising hierarchical sub- systems (adapted from Checkland, 1999), contrasted with View B – organization as an emergent property of interactions among individual actors (adapted from Bednar, 2007; 2008).

3.2 Creating Smart Work Systems

A contemporary Socio-Technical perspective can be seen as a cornerstone of discussions about the human agency in the pursuit of Smart working. Phenomena such as human use and engagement with mobile technologies, the Internet of Things, or social networking as an intertwined aspect of mainstream cultural behaviour are factors all that have potential to promote or inhibit major changes in organizations and in society [35]. These changes, however, must be designed and created. Such design must focus on individuals and groups, according to a philosophy of human-centred design [36], and by taking into account systemic interactions among people and technologies [26] [37] [38]. Technical systems must be seen to be intrinsically incomplete, and therefore continually open to design and redesign in relation to human engagement [39]. It is possible to point to a double-helix relationship of use and reflection-upon-use in relation to IT artefacts,

driving this process onwards [40]. Thus, design and re-design of socio-technical systems must be conceived as a continuous process involving innovators and recipients dealing with complex and evolving artefacts [26]. This process cannot be decoupled from soft, social, cultural and even psychological components of individual and organizational experience [35] [41]. Conceptually, we can distinguish between design of a new artefact, and design of systems for use of that type of artefact in real-world contexts, by real people, pursuing their own desired activities. In practice, socio-technical systems are indivisible as they form dynamic, evolving 'wholes' through human agency.

It can therefore be demonstrated that human action, and interface with changes in personal and organizational life, are driven by desire. Too often, this crucial factor has been overlooked in efforts to develop and exploit new ideas for IT artefacts and systems [18]. Too often, consultation about 'requirements', followed by a phase of 'beta testing' have been considered all that was necessary as engagement with human motivation to use designed products. However, if organizations wish to achieve innovation through a process of autonomous evolution in working practices, human desire must become a central focus. There are motivating factors for use of mobile and Smart artefacts that might be described as 'fun', e.g. to be able to keep in touch with friends via social media, play games or to stream music and film. People may be motivated by factors equally compelling in the work environment, i.e. to engage with fellow professionals in carrying out tasks effectively to achieve professional excellence [17].

While designers may give adequate attention to the technical workings of artefacts and the ways in which they can be exploited for Smart working, this is often limited to a perspective we might term first order. Here, a socio-technical system, incorporating mobile devices, intelligent agents, and including human use of that system, form what is understood as a system of work. The boundary of this system is perceived as limited by the extent of artefacts, direct human use and interaction. It may be relevant here to reflect upon Alvesson's commentary on emptiness [42] in contemporary social systems. People seeking for growth in satisfaction sometimes focus not on real, economic improvements or improved utility in products, but rather on relative or positional satisfiers – e.g. 'my mobile phone has a better camera than yours'. Those who wish to support design of genuinely Smart working and living environments need to avoid a similarly empty response, as people engage with rhetoric and policy, rather than genuine professional commitment.

It is suggested that system design requires specific attention to the factor of desire-for-use. This can only be achieved within a second-order interpretation of relevant socio-technical systems. Here first order elements are considered together with other, further, inter-human communication within a work system (or other human activity systems in social contexts such as communities and groups) [19]. Viewed in this way, a work system (organization) can be seen to be both ephemeral and limited only by perceived boundaries of social networks out of which it is created. Desire to engage with such a system can only arise through opportunities for human agents to create and explore these boundaries for themselves. Designers then take the role of interested and supportive 'by-standers', taking a holistic approach in supporting actors to build systems that can contribute to empowerment for use [19] [43]. If human agents are to be supported to pursue excellence in their professional environments, then they need appropriate support to create purposeful

revisions of contextuality – to explore and shape the contextual dependencies inherent in their working lives [16], and to design innovation in working practices from a socio-technical perspective. Every aspect of socio-technical change requires a human-centred design perspective, whether work systems comprise people-to-people interactions, machine-to-machine interactions, or combinations of both [44]. Professionals are distinguished by their ability to reflect upon practice of a professed skill set in context, and to relate these reflections to a body of standards and values transcending their immediate job role, and to interact with other professionals in doing so. Often, this involves membership of wider ‘landscapes of practice’ – formal and informal [45]. It is these interactions, and those of professionals with other stakeholders within and outside of work environments, that continually co-(-re)create ‘organization’. Engaged professionals pursuing excellence will engage in extra role behaviour, e.g. experimenting, making suggestions for improvements, innovating methods or making efforts to help others in their professional roles. They are likely to bring experiences from other socio-cultural dimensions of life into their reflections upon practice [46]. It is through such attachment to a transcendent system of values, standards and experience that we recognize a professional at work.

Unfortunately, the world of business is full of examples where a human focus is not apparent [47]. In banking, for instance, there are examples of whole processes becoming automated through use of intelligent agents that can read and assimilate text rapidly and can also observe human-customer interactions in order to learn by experience. This, managers and system designers claim, frees human staff members to deal with the more complex issues needing experience and discretion to solve [48] [49]. Bank directors may consider this to be contributing towards Smart Working. However, a question arises how in future human agents will acquire deep knowledge of task performance in order to be able to develop experience, use discretion and/or promote innovation. Such attempts appear to be grounded in first order thinking.

Even where there is a focus upon human agents as part of a socio-technical system, innovations are not always designed in such a way as to support collaborative pursuit of excellence. An example is explored by Solon [50], who relates how Amazon have patented a bracelet to be worn by staff working in its warehouses. This uses ultrasonic tracking to identify the precise location of each worker’s hands. A buzzing sensation against the hand alerts the wearer when moving away from the target warehouse bin. It is intended to speed up the picking process against certain performance measures. In public statements, the company asserts that this technology will be helpful to employees – saving them time and freeing their hands from scanners and their eyes from screens. Suggestions that performance monitoring is the real purpose of the wristband is dismissed by the company as ‘misguided speculation’. Interestingly, however, examination of the actual registered US patent describes the purpose of the device as ‘radio frequency based tracking of a worker's hands to monitor performance of inventory tasks’ [51]. Thus, it can be seen that Smart working does not always produce rewards for all involved stakeholders.

Leaders of organizations may seem to recognize that investment in enabling technologies must be combined with redesign of whole working systems [3]. However, it becomes ever more necessary to ask the question from whose point of view resultant systems may be regarded as Smart, genuinely socio-technical or

supportive of a journey towards professional or organizational excellence? Such initiatives often appear to be motivated by a wish to achieve cost savings, yielding greater returns for investors, rather than developing excellence through Smart working. It may be worthwhile to reflect, here, that efficiencies are often an expensive luxury in practice – achieved only by sacrifice of other, valuable assets. Too often, it appears that policies suggested to encourage innovation and Smart working are not translated into effective change [42]. Smart working practices are not always rewarded in practice, but rather incentives are applied in such a way as to create disorder and unintended, negative consequences. We see this in personal life as individuals become attached to Smart mobile devices and social media to an extent that may amount to addiction. The intended opportunities to stay connected, access leisure facilities and eCommerce can lead to fear of ‘missing out’ on desired contacts and an unreasonable focus on artefact use. In organizations, people may wish to be seen to carry out policies promoting innovation, rather than genuinely understanding or desiring beneficial outcomes from those policies. The resultant distortions in practice may lead to the opposite of excellence. Ciborra [52], drawing on Heidegger, distinguishes between two types of indication discernible in organizational life and discourse. The first, he terms illusory appearances: the set of ideas and models that are readily espoused in the domain of organizational theories or consulting models (p.176). These can lead to taken-for-granted assumptions that are not challenged, stifling responsiveness and innovation [53]. The second he labels apparitions, which belong to a space that cannot be filled by any model, surfacing in informal communication that host ‘the unexpected aspects of organizational life’ (p.177). Only the latter that can actually illuminate investigations into the desires of engaged actors for beneficial change. Again, it is clear that those who desire the benefits of Smart working within co-evolving socio-technical systems need support to engage in inquiry into contextual dependencies and thus unveil their desires and possibilities from use of innovative processes.

Efforts to assess the benefits of any particular innovation need to take into account both the positive and negative factors that may arise [54]. However, it is possible that those who seek for beneficial change will ask the question ‘What are the negatives of the current system / behavior?’ in conjunction with the question ‘What are the benefits to be expected from the posited future system / behaviour?’ and use this as the basis to initiate action. However, in doing so they have neglected to ask the questions ‘What are the negatives of the future system / behavior?’ and ‘What are the positives of the current system /behavior?’ Both of these questions are relevant to consider in taking an open systems perspective, and their neglect is likely to detract from achievement of desired outcomes [55] (p.44). Such a problem seems likely to occur when managers have published policies for ‘best’ practice in advance of any particular innovation in pursuit of Smart working.

In pursuit of professional effectiveness, the potential to go beyond the basic requirements of a role in order to create new boundaries involves a higher order of reflection. It becomes possible only through commitment to on-going reflection upon competence (Bateson)⁶⁴ in which the individual concerned is reflecting not only upon experience, but upon the process of reflecting on exercise of judgment. This development of a learning ‘spiral’ may be regarded as an exercise in practical philosophy. In a socio-technical context, such a spiral must be generated through collaborative inquiry. Figure 2 provides a summary of a contemporary, socio-

technical approach to design of Smart working systems. It shows how individuals interact within an organizing space, each with unique experiences of inherent contextual dependencies arising around their professional roles, and bringing their unique life experiences into the space. This figure therefore reflects multiple boundaries drawn from the perspectives of different human actors within the space. Recognition is given to individual emergence, showing how human lives transcend the space that forms current system(s) of interest. Individuals interact within an organized working system, continually creating and recreating it. This system of interest is open and dynamic as different people, in multiple roles and with unique perspectives join, interact in and leave the system. These interactions overlap with a co-created system of inquiry into meaningful action that supports continual (re)co-creation through interaction, reflection and learning [17][46].

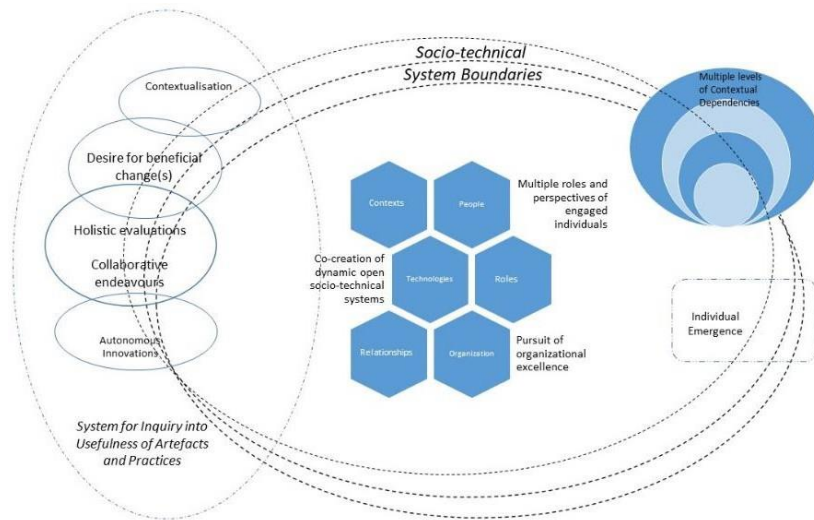


Fig. 2: A Contemporary Socio-technical Approach to Engagement with Smart Working

4 Conclusion

The evidence of a paradigm shift towards Smart working practice in organizations is not entirely convincing. It is important to recognize the potential benefits that such a shift might realize for different stakeholder groups, but at the same time to understand that Smart working strategy requires a balancing between differing interests. Benefit realization is not automatic. Desire for the benefits of Smart working may genuinely exist within an organization, but inertia may mean that such aspirations are not translated into action. Where desire for Smart working does exist, even the greatest advocates may inadvertently sabotage realization of these aims in practice [56]. Such phenomena have been well documented in the past, e.g. the (1928) comment of American Justice Louis Brandeis on the role of governments, inscribed in the Capitol Building ‘The greatest dangers to liberty lurk in the insidious encroachment by men of zeal, well-meaning but without understanding’ (Brandeis). People may desire to engage in Smart working, resulting in demand for greater access to supportive services. How is such demand to be articulated, assessed and acted upon? Organizational leaders may be

ambitious to support Smart innovation. However, consideration of support for meaningful practice, and learning for meaningful practice are required in order to bring about such a transformation [17] [57] [58] and this aspect is frequently overlooked. Argyris [56] suggests: '*It is not possible for human beings to engage de novo the full complexity of the environment in which they exist. Life would pass them by. Human beings deal with the challenge by constructing theories of action that they can use to act in concrete situations*' (p.8).

It can be seen that a rational planning model to expand organizational choices involves an inherent paradox. Since any observation must, by definition, be made by a particular observer, adoption of a 'neutral' stance cannot be achieved in practice. This means that those who espouse rational planning are unaware that any data they gather about a dynamic and constantly recreated problem space is inherently misleading. In particular, the concept of 'best practice' is a dangerous one. It is possible to observe the practice of others, consider it in relation to our own contextual experiences and desires, and learn from it. However, attempts to copy practice from one unique context to another are unlikely to yield unsatisfactory results. Only a human-centred stance, recognizing that organizations subsist from moment-to-moment as self-creating, dynamic and open systems, is likely to lead to success in Smart innovation (see Figure 2). Thus, if expressions of aspiration for Smart working are to lead to design of socio-technical systems that are experienced as Smart by professional human agents, support for professionals to explore their contextuality in pursuit of excellence must be more appropriate than policies setting out principles for supposed 'best' practice.

References

1. Boorsma, B. and Mitchell, S. (2011). *Work-Life Innovation Smart Work—A Paradigm Shift Transforming How, Where, and When Work Gets Done*. *Cisco IBSG Point of View*, accessed 21 April 2018 at https://www.cisco.com/c/dam/en_us/about/ac79/docs/ps/Work-Life_Innovation_Smart_Work.pdf.
2. Hamel G. (2007). *The Future of Management*, Cambridge, MA:Harvard Business School Press.
3. Gastaldi, L., Corso, M., Raguseo, E., Neirrotti, P., Paolucci, E. and Martini, A. (2014) *Smart Working: Rethinking Work Practices to Leverage Employees' Innovation Potential*, *Proceedings of 15th CINet Conference 'Operating Innovation – Innovating Operations'*, Budapest (Hungary), September 7–9, pp. 337–347.
4. HM Government (UK) (2015). PAS 3000:2015. ICS 03.100.01 Committee ZZ/3, *Smart Working. Code of Practice*, 30 November 2015, BSI.
5. Dominguez, A. (2017). *Do you know what Smart Working is?* *eHorus*, 22 August 2017, accessed 14 February 2018 at <https://ehorus.com/smart-working/>.
6. Civil Service Blog (2018). *Transforming the Way We Work*, accessed 14 February 2018. <https://civilservice.blog.gov.uk/2015/01/22/transforming-the-way-we-work/>.
7. Transport for London (2007). *Smarter Working Guide*, accessed 14 April 2018 at https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/astute_smarter_working_guide_en.pdf.
8. Lake, A. (2015). *Smart Working Handbook*, accessed 14 April 2018 from www.flexibility.co.uk.
9. Millward, D. (2006). 'For one day only, the saluting AA patrolman is back.' *The Telegraph on-line*, 11 April 2006, accessed 21 February 2018 at

- <http://www.telegraph.co.uk/news/uknews/1515359/For-one-day-only-the-saluting-AA-patrolman-is-back.html>.
10. Teather, D. and Treanor, J. (2007). 'Private equity: the human cost.' *The Guardian on-line*, 23 Feb 2007, accessed 21 February 2018 at <https://www.theguardian.com/business/2007/feb/23/privateequity1>.
 11. Wachman, R. (2007). A sorry Saga at the AA? Private equity is back in the headlight. *The Guardian on-line*, 1 July 2007, accessed 21 February 2018 at <https://www.theguardian.com/business/2007/jul/01/privateequity.observerbusiness>.
 12. Williams, C. (2017). 'How the wheels came off at the AA', *The Telegraph on-line*, 5 August 2017, accessed 21 February 2018 at <http://www.telegraph.co.uk/business/2017/08/05/wheels-came-aa/>.
 13. Barber, F. and Campbell, D. (2001). Layoffs: creating or destroying shareholder value? *Ivy Business Journal*, September/October 2001, accessed on-line 21 February 2018 at <https://iveybusinessjournal.com/publication/layoffs-creating-or-destroying-shareholder-value/>
 14. Elkington, J. (1997). *Cannibals with Forks: the Triple Bottom Line of 21st Century Business*, Capstone, 1997.
 15. Willard, B. (2012). *The new sustainability advantage: seven business case benefits of a triple bottom line*. New Society Publishers.
 16. Bednar, P.M. (2000). A Contextual Integration of Individual and Organizational Learning Perspectives as Part of IS Analysis. *Informing Science: Journal of an Emerging Transdiscipline*, 3(3) 145-156.
 17. Bednar, P.M. and Welch, C. (2016). Learning for professional competence in an IS context, in U. Lundh Snis, (Editor), *Nordic Contributions in IS Research: 7th Scandinavian Conference on Information Systems (SCIS 2016 and IFIP8.6 2016) Proceedings, Ljungskile, Sweden, August 7-10: Diffusion of IS for Learning New Practices*, Ljungskile, Sweden, 5-7 August 2016. Cham (ZG): Singer International, 163-175.
 18. Bednar, P.M. and Welch, C. (2006). 'Incentive and desire: covering a missing category.' MCIS 2006. *Proceedings of the Mediterranean Conference on Information Systems*, Università degli Studi di Trento, San Servolo, Venice, Italy. 5-9 October, 2006.
 19. Bednar, P.M. and Welch, C. (2009). 'Inquiry into Informing Systems: critical systemic thinking in practice'. Chapter 14 in G. Gill (Editor), *Foundations of Informing Science: 1999-2008*. Santa Rosa, California: Informing Science Press. pp 459-501.
 20. Mohr B J and van Amelsvoort P (2016). *Co-Creating Humane and Innovative Organizations: Evolutions in the Practice of Socio-technical System Design*. Portland ME: Global STS-D Network Press.
 21. Davenport, L. and Prusak, L. (2000). *Working Knowledge: How Organisations Manage What They Know*. Cambridge, Mass: Harvard Business Press.
 22. Za, S., Spagnoletti, P. & North-Samardzic, A., 2014. Organisational learning as an emerging process: The generative role of digital tools in informal learning practices. *British Journal of Educational Technology*, 45(6), pp.1023–1035.
 23. Carillo, K., Scornavacca, E. & Za, S., 2017. The role of media dependency in predicting continuance intention to use ubiquitous media systems. *Information & Management*, 54(3), pp. 317-335.
 24. Checkland, P. (1999). *Systems Thinking, Systems Practice: a 30-year Retrospective*. Chichester: J. Wiley & Sons.
 25. Checkland, P.B. (1983) O.R. and the systems movement: mappings and conflicts. *Journal of Operational Research*, 34(8), 661–75.
 26. Mumford, E. (2006). The study of socio-technical design: reflections on its successes, failures and potential. *Information Systems Journal*, 16, 317–342.
 27. Bednar, P.M. (2007). Individual Emergence in Contextual Analysis. Problems of

- Individual Emergence, Proceedings of Dutch Systems Society 12th bi-annual 'Problems of...' Systems Conference, *Systemica*, 14 (1-7)
28. Bednar, P.M. (2008). 'Contextual Analysis – a Multiperspective Inquiry into Emergence of Complex Socio-cultural Systems', in G. Minati, M. Abram and E. Pessa (editors), *Processes of Emergence of Systems and Systemic Properties: Towards a General Theory of Emergence*. World Scientific.
 29. Schein, E. and Schein, P. (2016). *Organizational Culture and Leadership*, 5th Edition. Thousand Oaks: Jossey Bass.
 30. Kappelman, L., McLean, E., Johnson, V., Torres, R., Nguyen, Q., Maurer, C. and Snyder, M. (2017). The 2016 SIM IT Issues and Trends Study, *MIS Quarterly Executive*, 16 (1), 47-80.
 31. Henderson, J.C. and Venkatraman, N. (1993). Strategic Alignment: Leveraging Information Technology for transforming organisations. *IBM Systems Journal*, 32(1), 472-484.
 32. Langefors, B and Dahlbom, B (editor) (1995). *Essays on Infology*. Studentlitteratur, Lund.
 33. Kahle, C., Hoffmann, D. and Ahlemann, F. (2017). Beyond Business-IT Alignment - Digital Business Strategies as a Paradigmatic Shift: A Review and Research Agenda. *Proceedings of the 50th Hawaii International Conference on System Sciences*, Hilton Waikoloa Village, Hawaii, 4-7 January 2017, 4706-4715, accessed 21 February 2018 at https://aisel.aisnet.org/hicss-50/os/digital_innovation/2/.
 34. Amarilli, F., van Vliet, M. and Van Den Hooff, B. (2017). An Explanatory Study on the Co-evolutionary Mechanisms of Business IT Alignment. *Proceedings of International Conference on Information Systems*, Seoul, S. Korea, 10-13 December 2017.
 35. Bednar, P.M. and Welch, C. (2017). The Innovation-Diffusion Cycle: Time for a Socio-technical Agenda. *Proceedings of IFIP WG8.6 Working Conference: Re-Imagining Diffusion of Information Technology and Systems: Opportunities and Risks*, University of Minho, School of Engineering, Gilmaraes, Portugal, 5 June 2017.
 36. Shin, D. (2014). A socio-technical framework for Internet-of-Things design: A human-centered design for the Internet of Things. *Telematics and Informatics*, 31(4), 519-531.
 37. Kling, R., & Lamb, R. (1999). IT and organizational change in digital economies: a socio-technical approach. *ACM SIGCAS, Computers and Society*, 29(3), 17-25.
 38. Lyytinen, K., Yoo, Y. and Boland Jr, R. J. (2016). Digital product innovation within four classes of innovation networks. *Information Systems Journal*, 26(1), 47-75.
 39. Kallinikos, J., Aaltonen, A. and Marton, A. (2013). The Ambivalent Ontology of Digital Artifacts. *MIS Quarterly*, 37(2), 357-370.
 40. Nissen, H-E., Bednar, P. and Welch, C. (2007). 'Double Helix Relationships in Use and Design of IS: Lessons to Learn from Phenomenology and Hermeneutics', H-E Nissen, P. Bednar and C. Welch, (Editors), Editorial: Use and Redesign in IS: Double Helix Relationships? *Informing Science: Journal of an Emerging Transdiscipline*, 10 (Monograph), 1-19.
 41. Silver, M. S., and Markus, M. L. (2013). Conceptualizing the Socio-technical (ST) Artifact. *Systems, Signs & Actions*, 7(1), 82-89.
 42. Alvesson, M. (2014). *The Triumph of Emptiness: Consumption, Higher Education, and Work Organization*. Oxford University Press.
 43. Friis, S. (1991). *User Controlled Information Systems Development – problems and possibilities towards Local Design Shops*. Dept of Information and Computer Science, Lund University Publications, Sweden.
 44. Bednar, P.M. and Welch, C. (2016). Enid Mumford: The ETHICS Methodology and its Legacy. Chapter 15 in B. J. Mohr and P. van Amelsvoort (editors), *Co-Creating Humane and Innovative Organizations Evolutions in the Practice of Socio-technical System Design*. Portland, ME: Global STS-D Network Press, 274-288.

45. Wenger-Trayner, E. (2015). *Learning in Landscapes of Practice*. Abingdon: Routledge.
46. Bednar, P.M. and Welch, C. (2009). 'Paradoxical Relationships in Collaboration, Competition and Innovation: a Critical Systemic Perspective'. *Proceedings of WOA 2009. The 10th Workshop of Italian scholars on Organization Studies*, Università degli Studi di Cagliari, Cagliari, Sardinia, Italy 29-30 April 2009.
47. Bednar, P.M. and Welch, C. (2017). Stepping on the cracks – transcending the certainties of Big Data analytics. *Proceedings of the 14th conference of the Italian Chapter of AIS (itAIS2017)*, University of Milano Bicocca, October 6th–7th, 2017, Milan, Italy.
48. Flinders, K. (2016). Interview: How Swedish bank prepared robot for customer services. *Computer Weekly*, 28 October 2016, accessed 31 May 2017 at www.computerweekly.com/news/450401647.
49. Haaramo, E. (2017). Robotic automation takes off in the Nordics. *Computer Weekly*, 19 April 2017, accessed 31 May 2017 at www.computerweekly.com/news/450417014.
50. Solon, O. (2018). Amazon patents wristband that tracks warehouse workers' movements, 1 February 2018, *The Guardian on-line*, accessed 20 February 2018 at <https://www.theguardian.com/technology/2018/jan/31/amazon-warehouse-wristband-tracking>.
51. United States Patent Office (2018). *Patent No. 9,881,277 - Wrist band haptic feedback system*.
52. Ciborra, C.U. (2002). *The Labyrinths of Information: challenging the wisdom of systems*. Oxford: Oxford University Press.
53. Alvesson, M. and Spicer, A. (2012). A Stupidity-Based Theory of Organizations. *Journal of Management Studies*, 49(7), 1194–1220.
54. Bednar, P.M. and Welch, C. (2013). A Case for Multi Criteria Benefit Analysis, Chapter in P. Spagnoletti (editor), *Organizational Change and Information Systems: Working and Living Together in New Ways, Lecture Notes in Information Systems and Organisation*, Volume 2, 2013, pp 337-344.
55. Bednar, P.M. (2018). *The Socio-Technical Toolbox*, v.12.3. Portsmouth: Craneswater Press.
56. Argyris C. (2004). *Reasons and Rationalisations*. Oxford University Press.
57. Bednar, P. and Welch, C. (2007). 'A double helix metaphor for use and usefulness in Informing Systems', H-E Nissen, P. Bednar and C. Welch, (editors) *Use and Redesign in IS: Double Helix Relationships? Informing Science: Journal of an Emerging Transdiscipline*, 10 (Monograph), 272-295.
58. Bednar, P.M., Welch, C. and Milner, C. (2016). Excellence in Practice through a Socio-Technical, Open Systems Approach to Process Analysis and Design. *International Journal of Systems & Society*, 3(1), 110-118.