Towards Perception of Productivity: The Dilemma of Domesticating ICT in Office Life

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ABSTRACT

It has been almost half a century that information technology was introduced as a tool for a company to achieve organizational performance and productivity. The technology was expected to set human free and thus do more creative things. However, the outcomes were reportedly mixed. This study aimed to review contemporary literature on the impact of computer technology on office work by employing social technical system as theoretical lens to investigate the phenomenon. The consequences of domestication ICT technology to work place were analyzed, the insights were drawn from the findings, and in the end the discussion was offered.

Keywords: information communication and technology, job burnout, office automation, productivity, organization

1. Introduction

It was the hype about the term office automation (OA) which became one of the most popular terms in the history of mankind. Dating back to early the 1970s, OA referred to an employment of computer machinery and software to digitally carry out certain office routines. From the outset, OA was aimed to utilize technologies, as a driver, to satisfy organizational and individual needs [1] by domesticating a computerized system to eliminate mundane basic office routines, hence increased productivity and freeing people. However, the so-call "increased productivity" was questionable as domesticating the technologies posed eluding, mixed results: quality of work, quality of life, employment, and management [2, 3].

While adoption rate of information, computer, and telecommunication technology (ICT) had been skyrocketing, the perception of its merits raised public eyebrows. Many studies in organizational environments and medical research pointed out that job stress resulting from exposure to office automation environments over an intensive period of time could cause complicated psychosomatic diseases, poor mental health, and even physical health [4, 5]. In addition, there was reported that job stress regarding the use of ICT could lead to family and even sex life problems [5].

Also, job stress played an important role in low job satisfaction among employees [4, 6-10], and employee stress could contribute to organizational stress which finally led to organizational performance disruption and high turnover intention [11-20].

2. Theorytical LenS

This study was initially to employ two theoretical lens which were social construction of technology (SCOT) and social technical theory (STT). However, STT gave more application and description powers than the other. Therefore, STT was employed as theoretical lens; nevertheless, SCOT was also worth for.

1.1 Social Construction of Technology (SCOT)

According to [21], SCOT was first introduced by Pinch and Bijker [22] in "The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other." Mainly, SCOT responded to technological deterministic view that we, in order to understand the reasons of technology acceptance or rejection, needed to take into account the social world. Often times SCOT was utilized when one came to analyze the root cause of technology failure or success. Also, SCOT revealed that technology was not solely an inner technical logic but rather a social product, shaped by the "conditions of its creation and use" [23]. For instance, Bijker [24] employed SCOT to build a discourse in response to Clayton's [25] arguments on the case of bicycle, intentional politics in an invention.

However, Winner [26] pointed out weakness in SCOT with regard to social constructivism. While SCOT explained how technology arose, it ignored the effects of the technology. SCOT was a social construction of knowledge in itself, but it was subject to the same limitations as it postulated. SCOT disregarded dynamics which were not due to its preferred technological determinism concept. Later, Russell [27] critiqued Pinch and Bijker's [22] work on SCOT that it was inappropriate to transfer the approach and concepts of relativistic sociology of

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science. Instead, "they should to bring technological change as a distinctive dimension into an established, broadly Marxist, form of social analysis, or rather to continue the task beyond the limited area in that it has so far tackled technology."

Beside SCOT, social technical theory (STT) is one of the most pervasive theories in information technology and information sciences.

1.2 Social Technical Theory (STT)

STT, first existed in the context of labor studies by the Tavistock Institute in London in 1950s [28], was a theory about (i) social aspects of people and society and (ii) technical aspects of machines and technology, referring to interrelatedness of social and technical aspect of an organization [29]. Current research topics in STT were characterized and identified upon their focuses into nine groups: socio-technical system, socio-technical systems approach, job enrichment, job enlargement, job rotation, process improvement, motivation, task analysis, work design. The aim of STT was to pursue a number of different ways to achieve joint optimization which led to productivity and well-being as the uttermost outcome captured within the involving entities such as people, technology, tasks, and structure (Fig. 1).

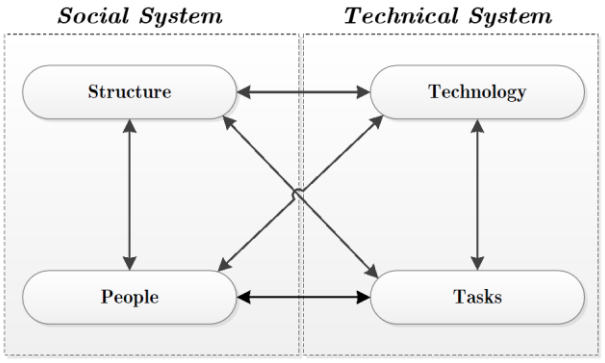

Figure 1. Social technical perspective [30]

STT was established to stress reciprocal interrelationship between human and machine, and to foster the program of shaping both the technical and the social conditions of work in a way that achieved efficiency and humanity, therefore they no longer contradicted each other [29]. In the middle of the 20th century, some of the optimistic predictions of the impact of technology on business efficiency and productivity were not fulfilled since there were many cases of technology implementation problems often linked to workforce resentment. In this regard, social scientists in the 1960s became very intrigued by the problems mentioned above, and they started to take into account STT in implementing and introducing computerized collaborative tools to a workplace. In addition, STT was later applied to facilitate a variety of research such as socio-technical system, sociotechnical systems approach, job enrichment, job enlargement, job rotation, motivation, process improvement, task analysis, work design.

Already, many disciplines took advantage of STT applications which were now found in engineering, mathematics, manufacturing, economics, psychology, business, human resources management, etc. Some of contemporary STT work were "Organizational Transformation through the Socio-Economic Approach in an Industrial Context" [31], "Teams between neo-Taylorism and anti-Taylorism" [32], "Two Cultures of Technical Courses and Discourses: The Case of Computer Aided Design" [33], "Work Organization, Work Characteristics, and Their Psychological Effects on Nurses in the Netherlands" [34], and "A Tool to Support the Shared Understanding of Manufacturing Systems Organization in Innovation Processes" [35], just to name a few .

1.3 STT and Perception of Productivity

This experimental research took on the *motivation* and *work design* facets which were two of nine topics of interest in STT. Geen [36] defined motivation in STT context that motivation in psychology refers to the initiation, direction, intensity and persistence of behavior. Motivation was also linked to perception towards world object which affected human life and norms. Work design or job design in organizational development was the application of STT principles and techniques to the humanization of work. The aimed at work design to improved job satisfaction, through-put, quality and to reduce employee problems, such as grievances, absenteeism, etc.

3. The hope, The hype, and The nightmare

The advent of ICT in work place has made radical change the way people that worked and the employment relationship in the post-industrial era. Beginning in the mid-1960s, certain labor-intensive tasks such as filling seats on airplanes or printing payroll checks was gradually replaced with computerized systems [37]. A decade later, a group of predominant companies (AT&T, Burroughs, Eastman Kodak, Exxon, IBM, 3M, and Xerox) and a group of business schools (MIT Sloan School of Management, the University of Pennsylvania's Wharton School, the University of Toronto, and the Harvard Business School) actively conducted research on using ICT in organizations [38]. It was not until the 1980s that "the decade of the automated office" was coined [39] and large Corporate America greatly invested in information technology. Approximately $120 billion was spent on ICT equipment, including software, hardware, and support units [40].

Ironically, the return swere significantly disappointing [41]. William *et al.* [42] found mixed feedbacks upon satisfactions towards the use of the systems. While the blue-collar workers were very satisfied with the systems, the white-collar workers were different. Turner [43], for instance, examined the productivity gained from deployment of computerized system on secretary work in the case of word processing software. Simplified error and spelling correction features facilitated a secretary writing a

memo, however the secretary feltthat the productivity gained was marginal and even disappointing, recalling the overstating advertisement and the cost of the equipment. In addition, many contemporary studies showed that the projects highly supported by computerized systems failed to meet their deadlines mainly because the design of the systems severely lacked of human factor components (social aspect) [44].

Technology could increase productivity. However, the increase was from the fact that people were fed with more work. If the goal of introducing ICT to work was to set people free and increase productivity, then technology should free people, so the people could spend time and do more creative things [40]. In reality, the equation above simply failed since the technology merely moved office routines physically-oriented to mentally-oriented [45] as working on a computer-based job was much more intense than conventional one [41]. Technology added extra cognitive and intellectual loads by making mundane activities more abstract [46, 47], and these extras just overturned the benefit of having decreased physical loads. As a result, working in ICT-enabled environment led to emotionally and mentally stressful than traditional office work [45], hence workers' emotional, mental, and physical health problems [48].

4. Living and Working at Home

Computerization of even a smallest component of work could have profound effects on job effectiveness and employment quality [47]. Empowered with communication technology, today's employees were easily exposed to overwork more than ever. [49, 50] Gave an example that support engineers were expected to be on-call in order to respond to any request of service 24 hours a day, 7 days a week. Even though they were on vacation, their managers explicitly enjoined them to turn on their beepers or cellular phones, and be ready to immediately withdraw from their vacation if there was a support issue.

The concept of virtual office, home PC with network access, and the advents of faxes, beepers, and cellular phones have blurred the frontier between work and life, hence invading professionals' lives [49, 50]; thus merits of working at home were equivocal [51]. Essentially, socialization provided the individual opportunities for social relationship which is one of the major sources of job satisfaction [52-54]. And, in aspect of organizational socialization, workers needed to transfer and being transferred organizational culture and norms [51, 55]. Due to general characteristics of remote collaboration, workers were vulnerable to encounter social dysfunction, the lack of interpersonal network or social support [56, 57]. Moreover, this negatively affected quality of working life [58, 59], led to an organizational detachment [60], and collectively reduced team performance [61]. Ironically, working at home method was naïvely invented to promote employees' well-being by eliminating the stress involved in a journey back and forth between their homes and workplace. In reality, a journey in fact provides an opportunity for "cooling-off," mechanically a buffer preventing the stress transferred from the workplace to the living places [62]

Finally, working life and home life boundaries became blurred and, somewhat, intertwined. So this situation drove the workers confused regarding time and space since they were actually living in between the borders of the two worlds. Therefore, they were susceptible to high occupation stress because the workers did not exactly know when they should stop working [51].

5. CPM: The Big Brother

Certain office automation systems were well-crafted with specific features that enabled the management to closely monitor performance and productivity of the employees. By this means, technology itself did not directly provide quantified working statistics; but it made available the data for managers to take a close control over their employees with or without the consent [2, 63].

Computerized performance monitoring (CPM) was initially designed to respond to high level management's goal, to drain the effort from low level managements and operational staff. CPM system of course delivered increases in office productivity, more accurate and complete performance evaluation, and greater organizational control. Nonetheless, the employees whose work acknowledged that they were monitored by a computer system increasingly experienced incidences of headaches, nausea, chest pains, anxiety and other health problems resulting from stress [64]. In some serious cases, when the stress increased up to certain level, job satisfaction dramatically dropped, and the positive relationship with managers and colleagues was ruined due to resentment again the system [65].

To demonstrate, Kraut et al. [66] underwent a study on the service representatives' satisfaction towards working under electronic monitoring system, and he found that the overall job satisfaction declined after the introduction of the automated phone conversation recording system. In this case, it could potentially lead to increasing in job stress and therefore turnover intention [8]. In "An Assembly in the Head" of Taylor and Bain [67], call center employees working under computerized monitoring was studied. The findings were disturbing. Whereas the quality of the service improved, but the call center operators themselves reported that they were experiencing extremely mental and emotional pressure. Being monitored all the time, they strictly conformed to the predefined sent of dialogue and interaction scripts while engaging the customers and typing as fast as they were told to do so. Every single accidental situation (i.e. temporary voice loss, customers' peculiar accents) was reported as a slow response which was recorded in the backlogs to the manager. At the end of the day, the reported operators had to explain why they had records of slow

responses in their backlogs. Some operators confessed that the combination of pressures undermine their emotion, mental, and physical well-being, and some even mentioned that they were surprised that they were able to continue working and finish their shifts. This situation elicited an outcry and critics of CPM technology from the users affected, and the use of CPM was a serious ethical employment issue [68]. Furthermore, individual privacy was also impacted from a monitoring system [69]. To illustrate, an on-line electronic calendar—workflow and collaboration support software [70]—enabled users to implicit who was available or unavailable at a specific time [40, 58, 71]. In this regard, making privacy data available was primarily ethical issues [70, 72]. However, Wagner [70] remarked that privacy was a multifaceted problem with no obviously morally right solution.

6. Discussion

As Schmidt and Bannon [73] noted that a proper CSCW application should provide supports in articulation work, the design of an application should be carefully crafted since technology had implications towards work and life. In practice, technology is socially constructed by means of "negotiation" as many social informatics work also articulates the paradoxical quality of work and life introduced by modern day technology [74]. Likewise, studying the effects ICT domestication in office life is actually one of the agendas in constructivist science and technology (STS) studies, and social theory is expected to help design technological artifacts for optimal work practice. Therefore, the priority should be in seeking of understanding ontological difference in the domain studies of "technology" (the system) and "human work" (user and the situated context) [75].

It has been half a century that ICT was domesticated and incorporated into our society and offices all over the world. Still, the question of the productivity and the quality of life remains. Socio-technical impact organizations results from of a complex set of interconnected choices which are driven not only by the technology, but managerial also the assumption regarding work design [58]. Therefore the notion of improved productivity done by adding machines to an office was hopelessly inadequate and haplessly simplistic [76]. The ICT implementers and managers have to ensure that the technology will be applied in a way that improves quality of life as well as organizational effectiveness.

One of the problems usually found in the domesticating ICT is that, regarding Zuboff's [47] study, technology makes jobs more reutilized, workers interact and coordinate their activities through database rather than through direct communication. Certain social satisfaction in work place decreases as workers are less connected to their colleagues. This degrades the job itself and therefore leads to less job satisfaction and mental distress [43, 77]. Therefore, the work designers may need to sustain certain degree of social interactions in their work designs [78]. The privacy also a common concern [70, 72]. Electronic calendar system, for instance, is frequently brought into the discussion, for it makes privacy data available. The recommendation to this concern is that the system should provide an anonymously transparent scheduling. That is, the individual calendar is made available, but the calendar cannot be tracked back to the owner. Instant Messaging (IM) is a sample of incautious and immature technology which turns out to be a counterproductive communication tools, for it creates a situation where incoming messages often become a distraction to users while the individuals are performing important tasks [79-86].

Remote office and working from home seem to be an economic choice for employees. These concepts however are a double-edge sword since they cause social isolation and blur *the borders of the two worlds*. Although companies can make this option available, they should encourage the employees to have face-to-face communication formally and informally since direct communication proves effective in promoting job satisfaction and organization citizenship, otherwise eliciting resentment toward the system. Therefore, non-functional social and emotional requirements are the vital factors to work design success [87].

In sum, productivity is course of the main objective of employing ICT, yet the consequences are suggested to closely observe. The big steps ahead are not to merely fix the current problems but to articulate how the future will emerge, what the future will look like, how future systems should be, how the future will address current problems, and how we can make a better system.

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