

## To Connect or Disconnect – That is the Question: ICT Self-Discipline in the 21<sup>st</sup> Century Workplace

Balsam Al-Dabbagh  
Allan Sylvester  
School of Information Management  
Victoria University of Wellington  
Wellington, New Zealand

Email: [balsam.aldabbagh@vuw.ac.nz](mailto:balsam.aldabbagh@vuw.ac.nz), [allan.sylvester@vuw.ac.nz](mailto:allan.sylvester@vuw.ac.nz)

Eusebio Scornavacca  
Merrick School of Business  
University of Baltimore  
Baltimore, Maryland  
Email: [escornavacca@ubalt.edu](mailto:escornavacca@ubalt.edu)

### Abstract

*Information and Communication Technologies (ICTs) in the workplace are increasingly connecting employees to people and sources of information. As a result, this ICT connectivity has had both a positive and a negative impact on employee productivity. Existing literature suggests that further investigation on 'self-control' in the context of employee connectivity is necessary. To address this we introduce the idea of **ICT self-discipline** – an individual's ability to control their behaviours towards use of ICTs. We investigated ICT self-discipline through interviews and focus groups. That research led to the development of an empirically grounded instrument for measuring employee ICT self-discipline. Preliminary statistical results are promising and are returning reliable scores. This paper reports on part of a larger project that investigates the influence ICT self-discipline has on the effect of ICT connectivity on employee productivity. Findings from this research contribute to IS research and inform practice.*

### Keywords

Connectivity, ICT, Productivity, Self-Discipline, Work-Practice

### INTRODUCTION

A recent report on disruptive technologies states “one clear message: the nature of work is changing...The challenge for policy makers—and for citizens—is enormous” (McKinsey Global Institute 2013). Overly connected employees are constantly exposed to disruptions in their workflow resulting in an inevitable decline in personal efficiency and effectiveness (Karr-Wisniewski and Lu 2010). Information and Communication Technology (ICT) connectivity in the 21<sup>st</sup> century workplace is evolving rapidly and the way employees react and respond to this challenge continues to emerge (Mazmanian 2013; Rose 2013). It is no surprise that both scholarly literature and the popular media routinely raise concerns about employees being overly connected (McKinsey Global Institute 2013; Perlow 2012; The Guardian 2013). For the purposes of our research we call this the state of *ICT connectivity*. ICTs are a non-negotiable reality for most 21<sup>st</sup> century workplaces and contemporary work practices (Karr-Wisniewski and Lu 2010; Richardson and Benbunan-Fich 2011). These devices, practices and applications form a work environment where individuals are under pressure to be almost constantly connected to both people and information sources (Baron 2010; Renaud et al. 2006). This embeddedness of ICT also contributes towards employee productivity that is suggested by many as a critical component of organisational success (Campbell and Campbell 1988; Karr-Wisniewski and Lu 2010; Tarafdar et al. 2007).

However, such ICT connectivity has evolved the work environment with both positive and negative consequences (Mazmanian et al. 2006; Perlow and Porter 2009). The positive impacts of ICT connectivity include the availability of information at the touch (or tap) of a button, often leading to efficiency and effectiveness gains. On the other hand, an overload of incoming exchanges can lead to interrupted workflow and create a negative impact by eroding employee productivity (Karr-Wisniewski and Lu 2010).

For individuals to manage ICT connectivity, extant literature suggests that managing self-control should be sufficient but little work exists to explain what form that self-control should take. To better understand the effect of ICT connectivity on employees we need to further investigate how self-control manifests itself in this context

(Leung 2011; Mazmanian et al. 2006; Wajcman et al. 2010). Derks and Bakker (2010) suggest that because of the way employees govern the use of ICTs and call for more empirical investigations of “personal control” in this context.

This paper reports one component of a larger corpus that investigates the effect that ICT connectivity has on employee productivity. The research investigates the notion of self-control and presents the concept of ICT self-discipline in the workplace. We developed a working definition of ICT self-discipline through interviews and focus groups and developed a set of empirically grounded items for measuring ICT self-discipline in the context of ICT connectivity. The following section begins with a review of associated literature, followed by the research design, findings, discussion and conclusion.

## LITERATURE REVIEW

ICTs are “the devices, applications, media, associated hardware and software that receive and distribute, process and store, retrieve and analyse, digital information, between people and machines or among people” (Rice and Leonardi 2013). Such devices and applications increase an individual’s choice of communication streams and therefore their ability to reach and be reached by people and access to sources of information. The use of these streams leads individuals to become connected, and accordingly can shape their level of ICT connectivity. Information systems (IS) literature encourages the investigation of ‘self-control’ in the context of an ICT-connected workplace to explain the impact that ICT connectivity has on employees (Leung 2011; Derks and Bakker 2010; Rennecker and Godwin 2005; Wajcman et al. 2010). This section first discusses self-control from a general theoretical perspective, then from an IS perspective.

Freud (1911, 1959) first described self-control in psychology as the pleasure and reality principle. The pleasure principle refers to the desire for immediate gratification, for instance, teenagers buying a videogame. The reality principle is established in the process of growing up and realising the need to accept delaying gratification because of certain obstacles. From then, self-control came to refer to “an individual's decision or ability to delay immediate gratification of desires in order to reach larger alternative goals” (Buker 2011). Individuals with high self-control are said to be better at regulating impulsive behaviours and delaying gratifications (Buker 2011; Tangney et al. 2004). The notion of self-control reflects self-discipline and has been used in health studies, education and social life (Cook et al. 1998; Gottfredson and Hirschi 1990; Wolfe and Johnson 1995). Tangney et al. (2004) suggest “...*individual differences in self-control would effectively predict positive outcomes across a variety of life domains*”. We conditionally accept this viewpoint and seek to apply the concept to IS, specifically within the context of ICT connectivity.

From an IS perspective, self-control is illustrated by the choices employees make in how they choose to manage the influence ICTs has on their work performance. For example, Allen and Shoard (2005) found that employees choose to have smartphones as a facilitator of the intrusion of work into their personal lives in return for higher personal productivity. This sense of control has resulted in an increase in autonomy, which in turn, gives employees the flexibility of how and when to communicate (Mazmanian et al. 2006). The corollary is that a lack of control can encourage the compulsive checking of email and result in an inability to disengage from work activity. The constant monitoring of emails can also reduce productivity because of inability to maintain task focus (Mazmanian et al. 2006; Renaud et al. 2006). Mazmanian et al. (2006) usefully grouped message responding behaviours of employees into two categories, constant responders and batch responders. Constant responders are those individuals who respond to emails straight away, as soon as they are received. On the other hand, batch responders are those individuals who delay their responses until a later time when a number of email messages have accumulated or at a scheduled time or place (Mazmanian et al. 2006). Such responsiveness illustrates another aspect of self-control, which has shown to impact employee productivity (Rennecker and Godwin 2005).

The examples above illustrate how employees are motivated to develop strategies for managing their ICT use. For instance, some employees choose to respond to incoming emails at only certain times of the day or switch their smartphones off after designated work hours (Mazmanian et al. 2013). Some workers moderate their ICT connectivity levels in their work environment by use of software applications such as *Selfcontrol* and *CanFocus*. Self-disciplining strategies can assist in boosting the positive consequences of ICT connectivity and counteract the potential for negative consequences.

An apparent gap in existing literature is research that explains how these strategies (or patterns of ICT self-discipline) impacts employees in a 21<sup>st</sup> Century ICT-connected work environment. Leung (2011) suggests that ICT connectivity is not the main issue for assessing the consequences associated with ICTs. Instead, peoples’ control over what passes through the communicative boundaries consequences of shapes the degree of connection that people experience. As a result, Leung (2011) called for new research into incorporating measures of self-control over ICTs. Derks and Bakker (2010) also called for empirically testing of the influence of the experience

of “individual control” on ICT use. In addition, Wajcman et al. (2010) made a similar call for investigation into how people manage their time and productivity within an ICT dominated environment. This suggests that ICT self-discipline is potentially an important phenomenon to explore as existing research suggests that ICT self-discipline may influence the effects ICTs have on employee performance.

## RESEARCH DESIGN

In this research, a three-phase mixed method approach was used. The research comprised of qualitative interviews, exploratory focus groups and a quantitative survey. The research population for all phases consisted of selected employees of New Zealand organisations whose roles involved carrying out ICT-supported business tasks (Gebauer et al. 2007). The unit of analysis was conducted at the individual level. In addition, purposive sampling was used to ensure a variety of jobs and working environments was covered.

In phase one, fifteen semi-structured interviews took place to refine the concept of ICT self-discipline (Myers and Newman 2007). For this phase, an exploratory interview protocol was developed consisting of open-ended questions (Creswell 2003). The interview protocol underwent five iterations of peer review, was pilot tested and finally used on the research population. The interviews took place in three rounds allowing for ‘checkpoints’ at each round to ensure continuing validity and reliability of the interview protocol (Johnson 1997). In each round, interviews were recorded, transcribed and the transcripts returned for review by the interviewees. To assure credibility of results, data analysis for each interview round went through four analytic iterations (Straub et al. 2004): (i) key idea highlighting, (ii) key themes analysis, (iii) affinity diagramming, (iv) expert review of findings. At the end of each interview round the protocol was modified where necessary. By the end of the third round, all results were crosschecked and peer reviewed for consistency.

In phase two, two focus groups comprising of professional work practitioners were conducted to further explore and build on themes emerging from phase one (Krueger and Casey 2009; Morgan 1988). A focus group protocol was developed consisting of open-ended questions to gain as many insights as possible (Miles and Huberman 1994). The focus group protocol underwent five iterations of peer review prior to being pilot tested then was used in recorded sessions. The focus groups were captured and analysed using the same discourse-analytic approach as the phase one interviews. A consistent convergence of findings from interviews and focus groups (saturation) triggered the end of data gathering in this phase. A working definition of ICT self-discipline was developed based on the emerging themes from the phase one interviews and the phase two focus groups.

In phase three, findings from the earlier phases informed the development of a quantitative survey instrument to empirically evaluate employee ICT self-discipline across a wider sample and to situate and test its influence in the connected workplace context. An expert panel in IS and psychology evaluated the quality of the items in the instrument (Straub et al., 2004). Further card-sort and internal validity steps established the instrument as reliable. A pilot test of the instrument was carried out with a population of 80 to ensure face validity to assess the extent that the instrument measures what it intends to measure (Hardesty and Bearden 2004). Exploratory Factor Analysis (EFA) was then used to carry out initial analysis of the interrelationships amongst variables and identify clusters of highly interrelated variables that reflect underlying themes (Straub 1989). The survey instrument was then refined and the final questionnaire was administered as an online survey. The survey ran for a four-week period and yielded a data set of 451 useable responses. Data was subsequently analysed through statistical testing to verify the measures of the research model (Gefen and Straub 2005; Hinkin 1998; Straub 1989). This included factor analysis and the assessment of the reliability of the measurement model, internal consistency reliability using Cronbach’s alpha (Hinkin 1998). These tests took place to ensure the measures for ICT self-discipline are consistent and accurate (Straub 1989).

## FINDINGS

Results from the interviews and focus groups assisted in meeting the first goal of this research, that is, to explore and define the concept of ICT self-discipline. The ‘theme’ frequency and extensiveness assisted in deciding the importance of findings (Krueger and Casey 2009). From this analysis, we define ICT self-discipline as the extent to which an individual can control his/her behaviours towards ICTs. Discussions during interviews and focus groups exemplified the importance of this phenomenon in the context of a connected workplace. For example: *“You see now [during the interview] I’ve got the phone on silent. That’s the thing with ICT’s I’ve got control over it, I can choose when I want to look at my emails and that’s the good things about it”* (P1). The data also showed the effect of self-discipline in the context of ICT connectivity, for instance: *“The biggest problem with ICTs is the disruption, if you can ignore it then there’s no way you will have a negative effect”* (P5).

When participants were asked to define the way they managed information flow through ICTs, they suggested having “strategies” in place or exerting “control” or “discipline”. Strategies included aspects such as: “switching-off”, “disconnecting”, or “setting times to check email.” These strategies included manipulating

individual availability (through ICTs) to others to deal with incoming exchanges, and, to make careful decisions on how to respond to or initiate exchanges, in other words dealing with outgoing exchanges.

In terms of available strategies to deal with incoming exchanges, disconnecting was frequently mentioned in the focus groups. These strategies responded to the “push” mechanism of connectivity. P20 explained: *“There are so many mechanisms to get in touch, we are pretty connected I mean if someone wants to get in touch with me right now they have my cellphone number, they will happily call me on my cellphone. I control my other things, like I don’t have email pop ups, you don’t need to respond instantly to a text message, it’s only phone calls you respond to immediately. I don’t use push notifications in general. All my notifications are off I don’t get anything pushed to me...If I want to I can find stuff out myself.”* This illustrates that some individuals disconnected themselves by reducing their availability to others through turning off the notification of incoming exchanges. This does not imply discontinuing the use of their ICTs, rather, this suggests that individuals limit the notification of information pushed to the user by “switching-off” or ignoring incoming information via filtering. Other strategies of disconnecting also included turning off instant messaging and not checking email routinely. Having strategies in place meant employees could manipulate their availability. It also meant that employees practiced “good time management” skills, which was consistently seen as an essential by all focus group participants.

In terms of dealing with outgoing exchanges – when contacted, individuals either manipulated the media choice to respond or delayed the response, and when initiating communication, individuals carefully tailored their contact approach. These strategies responded to the “pull” mechanism of connectivity. To illustrate the response strategy, P16 explained: *“Often I get asked a question if someone is working on another project but touches on my area of expertise. If they ask through email I usually don’t respond and that forces them to book a time in my calendar. If I can answer it off the top of my head I will, if I can’t I either leave it or tell them to set a time to go through it...It’s easier to get information through other means, like person to person or through the phone.”* What this implies is that individuals are careful in deciding when to use media and which connectivity channels to use to contact others. Having such a strategy in place makes an individual’s communication more effective.

Findings from the first and second data gathering phases assisted in the development of the survey instrument to measure ICT self-discipline. Work on self-control by Tangney et al. (2004) also assisted in the development process. The result was a 15-item scale to measure ICT self-discipline (Table 1).

Table 1. ICT Self-Discipline Initial Items

Item
1. I am very good at ignoring exchanges through ICTs, even if I am tempted to check them.
2. I have a very hard time breaking bad habits with ICTs.
3. It is very hard to stop myself from doing things with my ICTs even if I know they are unnecessary.
4. I always use my ICTs for fun even if they will have a bad impact on me.
5. I always do things with my ICTs for fun even if they keep me from getting work done.
6. I can always regulate my behaviours with ICTs.
7. I am always able to refuse exchanges through ICTs that are not immediately relevant.
8. I wish I had more self-discipline when using my ICTs.
9. People say that I have high self-discipline when using my ICTs.
10. I find it very difficult to ignore my ICTs when they are nearby.
11. I am always able to stay focused and not let ICTs interrupt me.
12. I always use ICTs without thinking through all the consequences.
13. I always do things with my ICTs for fun even if they disrupt my work-day.
14. While at work, I never use ICTs for personal matters.
15. While at work, I only use ICTs for work related matters.

A pilot survey was run and showed convincing reliability and inter-relation amongst the measures for ICT self-discipline. However, some items were concerned with factors outside of the scope of ICT self-discipline in this study (e.g. hedonic aspects such as fun and enjoyment, and work-life balance). Survey pilots are normally carried out to test the overall instrument to ensure that there are no unanticipated difficulties (Alreck & Settle, 1995; Boudreau et al., 2001; Moore & Benbasat, 1991). Thus, it is normal to be trimming down questionnaires to a smaller and more accurate set of items. Therefore the pilot study items were either deleted or re-worded. As a results, the survey items were reviewed by an expert panel and tested in the online survey. The initial assessment of the measurement model was convincing and showed that some items were successful (Table 2).

Table 2. ICT Self-Discipline Items Analysis

Item	Factor Loading	Composite Reliability (CR)	Average Variance Explained (AVE)
1. I am good at ignoring incoming communication through ICTs, even if I am tempted to check them.	0.784		
2. I am always able to refuse communications through ICTs that are not immediately relevant for my work.	0.773	0.855	0.597
3. I am highly disciplined when using my ICTs.	0.706		
4. I am always able to stay focused and do not let ICTs interrupt me.	0.836		

At this stage, all the factors loaded greater than the 0.6 threshold, which means the items explained the construct of ICT self-discipline well (Gefen and Straub 2005; Hair et al. 2009). The composite reliability (CR) explains to what degree a set of items proposed to measure the same thing produce similar results. The CR for this ICT self-discipline indicated a good level of internal consistency, thus reliability (Hair et al. 2011). Lastly, the Average Variance Extracted (AVE) that measures the amount of variance captured from the construct indicators relative to the variance from measurement error. The AVE for this construct exceeded the threshold of 0.5 which shows convergent validity amongst the items (Gefen and Straub 2005). While the results are promising, further analysis continues to take place to further assess the quality of this measurement scale.

It was noticeable during interviews and focus groups that ICT self-discipline has influence on the connected workplace. Some participants explained that without exerting “ruthless” strategies, or self-discipline, including strong time management skills and filtering mechanisms, their productivity would fail to improve or even exist. For example: “[ICT connectivity] is an issue and we need to review it. We don’t have a policy on mobile phones and email. The impact on productivity is never assessed...maybe we need to look at some ways to improve the way people use those tools.” (P19). This excerpt raises the need for awareness of ICT self-discipline in the workplace so that employees can better manage information exchanges through ICTs to enhance their productivity. Some of individuals’ behaviours of technology use stems from obsessive and compulsive behaviours and addictive behaviour to continuously check or use ICTs which can lead to a decline in productivity (Mazmanian et al. 2006; Towers et al. 2008). Using “personal information management” techniques addresses this issue of ICT behaviours (Dabbish and Kraut 2006; Mazmanian et al. 2013). Personal information management techniques can be regarded as a form of self-discipline, which has proven to lead to more positive outcomes (Buker 2011; Tangney 2004). Such findings support our larger research project investigating the moderating influence of ICT self-discipline on the effect of ICT connectivity on employee productivity. Our wider project currently uses the ICT self-discipline instrument presented in this paper to test its influence on the effect of ICT connectivity on employee productivity.

## DISCUSSION

The research results to date are promising in that they have highlighted the importance of ICT self-discipline in an ICT-connected work environment. Employees demonstrated different strategies in managing information through ICTs. This included ignoring incoming communication through ICTs, initiating communication through the appropriate means, and reducing ICT connectivity during stressful work periods. The quantitative results were also promising, based on the initial statistical analyses conducted. Results also indicated the potential influence that ICT self-discipline can have on the effect of ICT connectivity on employee productivity – this is currently being tested further.

Employees are often encouraged to discipline their behaviours towards ICTs in order to experience more positive experiences with ICTs. For instance, if an employee’s work requires concrete focus then it may make sense to reduce the level of ICT connectivity in order to minimise distractions. Or, when fellow employees approach a colleague through ICTs for information they need to keep in mind that they could be interrupting that colleague’s workflow in return for their own benefit. Therefore, employees need to be considerate in such cases to avoid counter-productivity. To encourage this, managers and policy makers should think carefully about their work policies with regards to employee freedom in how to perform their work. Tailored technology applications and/or strategies can assist employees to enhance work performance by gatekeeping their use of communications technologies.

The notion of ICT self-discipline is necessary for the constantly connected workplace. Having ICT self-discipline can help us to ensure ICTs have a positive impact on employee performance, and in subsequent organisational success. In support of our views, Baumeister and Tierney (2011) suggests: “*no matter what new technologies arise, no matter how overwhelming some of the new threats seem, humans have the capacity to deal with them*”. Thus, with more ability to control behaviours towards ICTs employees can make more effective decisions on whether to choose to connect or to disconnect, because *that* is the question.

## CONCLUSION

The purpose of this paper was to investigate the notion of ICT self-discipline in the workplace. The paper began with a review of literature covering the topic of investigation. This was followed by the research design then a discussion of key findings. Through qualitative interviews and focus groups we developed a definition of ICT self-discipline – the extent to which an individual can control his/her behaviours towards ICTs. Through quantitative methods we developed a set of empirically tested items to measure the phenomenon.

We find that this study provides new insights for both researchers and practitioners by introducing the new concept of ICT self-discipline. From a research point of view, we contribute a new and relevant phenomenon of ICT self-discipline to the IS literature. Our findings answer previous calls from scholars on the topic of self-control and give further insight into an area that is of current concern in the popular media and in work practice. Such findings can assist future IS researchers to develop work practices that deal with ICT connectivity. From a practitioner viewpoint, this study potentially contributes analysis and insight of a new phenomenon – ICT self-discipline that is relevant for the ‘connected’ workplace. Findings from this research should assist policy makers in managing the change in the nature of work caused by ICTs. The findings also have the potential to inform the development of new technology applications that address the connected workplace.

This research was limited to a New Zealand context, thus it is possible that other culturally situated contextual factors may have influence on the topic explored in this research. This opens up opportunities for future research. Additionally, a planned longitudinal study will provide further insight on the topic of investigation. Future research may also take an experimental approach to test the impact of the ICT self-discipline (or the lack of).

## REFERENCES

- Ayyagari, R., Grover, V., & Purvis, R. (2011). Technostress: Technological antecedents and implications. *MIS quarterly*, (35:4), pp. 831-869.
- Ball-Rokeach, S. J., Gibbs, J., Jung, J. Y., Kim, Y. C., & Qiu, J. L. (2000). *The globalization of everyday life: Visions and reality*. Metamorphosis Project White Paper. Communication Technology and Community Program, Annenberg School for Communication. University of Southern California.
- Baron, N. S. (2010). *Always on: Language in an online and mobile world*. New York, USA: Oxford University Press.
- Baumeister, R. F., & Tierney, J. (2012). *Willpower*. London: Penguin Group.
- Buker, H. (2011). Formation of self-control: Gottfredson and Hirschi’s general theory of crime and beyond. *Aggression and Violent Behavior*, (16) , pp. 265-276.
- Burton-Jones, A., & Straub, D. W. (2006). Reconceptualizing system usage: An approach and empirical test. *Information Systems Research*, (17:3), pp. 228-246.
- Castells, M. (2011). *The Rise of the Network Society: The Information Age: Economy, Society, and Culture Volume I (Vol. 12)*. West Sussex: Wiley-Blackwell.
- Creswell, J. W. (2003). *Research Design: Qualitative, quantitative, and mixed methods approaches*. California: Sage Publications.
- Coker, B. L. S. (2011). Freedom to surf: the positive effects of workplace Internet leisure browsing. *New Technology, Work and Employment*, (26:3), pp. 238-247.
- Cook, M., Young, A., Taylor, D., & Bedford, A. P. (1998). Personality correlates of alcohol consumption. *Personality & Individual Differences*, (4), pp. 641–647.
- Davis, G. B. (2002). Anytime/anyplace computing and the future of knowledge work. *Communications of the ACM*, (45:12), pp. 67-73.

- Derks, D., & Bakker, A. (2010). The Impact of E-mail Communication on Organizational Life. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, (4:1).
- Dery, K. and MacCormick, J.S. (2012). Managing Connective Flow to Effectively Support Employees in a Mobile Workplace. *Management Information Systems Quarterly Executive*, (11:4), pp. 159-173.
- Engel, G.V. (1970). Professional autonomy and bureaucratic organization. *Administrative Science Quarterly*, (15), pp. 12-21.
- Freud, S. (1911/1959). *Formulations regarding the two mental functioning*. New York: Basic Books.
- Gebauer, J., & Shaw, M. J. (2004). Success factors and impacts of mobile business applications: results from a mobile e-procurement study. *International Journal of Electronic Commerce*, (8:3), pp. 19-41.
- Gebauer, J., Shaw, M. J., & Subramanyam, R. (2007). *Once Built Well, They Might Come: An Empirical Study of Mobile E-Mail*. College of Business. University of Illinois Urbana-Champaign.
- Gottfredson, M. G., & Hirschi, T. (1990). *A general theory of crime*. Palo Alto, CA: Stanford University Press.
- Gupta, A., Li, H., & Sharda, R. (2013). Should I send this message? Understanding the impact of interruptions, social hierarchy and perceived task complexity on user performance and perceived workload. *Decision Support Systems*, (55), pp. 135-145.
- Hackman, J. R. & Oldham, G. R. (1975). Development of job diagnostic survey. *Journal of Applied Psychology*, (60), pp. 159-170.
- Hardesty, D. M., & Bearden, W. O. (2004). The use of expert judges in scale development: Implications for improving face validity of measures of unobservable constructs. *Journal of Business Research*, (57:2), pp. 98-107.
- Hitt, L. M., & Brynjolfsson, E. (1996). Productivity, business profitability, and consumer surplus: three different measures of information technology value. *MIS quarterly*, (20:2), pp. 121-142.
- Hou, C. (2012). Examining the effect of user satisfaction on system usage and individual performance with business intelligence systems: An empirical study of Taiwan's electronics industry. *International Journal of Information Management*, (32), pp. 560-573.
- Hung, W. H., Chang, L. M., & Lin, C. H. (2011). *Managing The Risk Of Overusing Mobile Phones In The Working Environment: A Study Of Ubiquitous Technostress*. Paper presented at the Pacific Asia Conference on Information Systems, Brisbane, Australia.
- Johnson, R. B. (1997). Examining the validity structure of qualitative research. *Education*, (118:2), pp. 282-292.
- Karr-Wisniewski, P., & Lu, Y. (2010). When more is too much: Operationalizing technology overload and exploring its impact on knowledge worker productivity. *Computers in Human Behavior*, (26:5), pp. 1061-1072.
- Kemppila, S., & Lonnqvist, A. (2003). Subjective productivity measurement. *Journal of American Academy of Business*, (2:2), pp. 531-537.
- Kolb, D. G. (2008). Exploring the metaphor of connectivity: attributes, dimensions and duality. *Organization studies*, (29:1), 127-144.
- Kolb, D. G., Caza, A., Collins, P. D. (2012). States of connectivity: New questions and new directions. *Organization Studies*, (33:2), pp. 267-273.
- Krueger, R. A., & Casey, M. A. (2009). *Focus groups: A practical guide for applied research*. California: Thousand Oaks.
- Leung, L. (2011). Effects of ICT Connectedness, Permeability, Flexibility, and Negative Spillovers on Burnout and Job and Family Satisfaction. *Human Technology*, (7:3), pp. 250-267.
- MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioural research: Integrating new and existing techniques. *MIS Quarterly*, (35:2), pp. 293-334.
- Mazmanian, M. (2013). Avoiding the trap of constant connectivity: When congruent frames allow for heterogenous practices. *Academy of Management Journal*, (56:5), pp. 1225-1250.
- Mazmanian, M., Orlikowski, W., & Yates, J. A. (2006). *Crackberries: The social implications of ubiquitous wireless e-mail devices*. Paper presented at the EGOS, Bergen.

- Mazmanian, M., Orlikowski, W., Yates, J. (2013). The autonomy paradox: The implications of mobile email devices for knowledge professionals. *Organization Science*, (24:5), pp. 1337-1357.
- McKinsey Global Institute. (2013). Disruptive technologies: Advances that will transform life, business, and the global economy.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. California: Sage Publications.
- Mitra, S., Sambamurthy, V., & Westerman, G. (2011). Measuring IT Performance and Communicating Value. *MIS Quarterly Executive*, (10:1), pp. 47-59.
- Moore, B. E., & Ross, T. L. (1978). *The Scanlon way to improved productivity*. New York: John Wiley & Sons.
- Morgan, D. (1988). *Focus Groups as Qualitative Research*. California: Sage.
- Myers, M. D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organisation*, (17:1), pp. 2-26.
- Perlow, L. A. (2012). *Sleeping with Your Blackberry: How to Break the 24/7 Habit and Change the Way You Work*. Massachusetts: Harvard Business School Press.
- Perlow, L. A., & Porter, J. L. (2009). Making time off predictable and required. *Harvard Business Review*, (87:10), pp. 102-109.
- Ramirez, Y. W., & Nembhard, D. A. (2004). Measuring knowledge worker productivity: A taxonomy. *Journal of intellectual capital*, (5:4), pp. 602-628.
- Renaud, K., Ramsay, J., & Hair, M. (2006). " You've got e-mail!"... shall I deal with it now? Electronic mail from the recipient's perspective. *International Journal of Human-Computer Interaction*, (21:3), pp. 313-332.
- Rennecker, J., & Godwin, L. (2005). Delays and interruptions: A self-perpetuating paradox of communication technology use. *Information and Organization*, (15:3), pp. 247-266.
- Rice, R. E., & Leonardi, P. M. (2013). Information and communication technology in organizations: Studies of influences, contexts and processes, and outcomes across disciplines. In L. Putnam & D. K. Mumby (Eds.), *Sage handbook of organizational communication*. Thousand Oaks, CA: Sage.
- Richardson, K., & Benbunan-Fich, R. (2011). Examining the antecedents of work connectivity behavior during non-work time. *Information and Organization*, (21:3), pp. 142-160.
- Rose, E. (2013). Access denied: Employee control of personal communications at work. *Work, Employment & Society*, (0:0), pp. 1-17.
- Rossi, E. (2002). *Uses & gratifications/dependency theory*. Retrieved March 15, 2013, from <http://zimmer.csufresno.edu/~johnca/spch100/7-4-uses.htm>
- Sharma, A. (1997). Professional as agent: Knowledge asymmetry in agency exchange. *The Academy of Management Review*, (22:3), pp. 758-798.
- Sorensen, C., & Pica, D. (2005). Tales from the police: rhythms of interaction with mobile technologies. *Information and Organization*, (15:2). pp. 125-149.
- Straub, D., Boudreau, M. C., & Gefen, D. (2004). Validation guidelines for IS positivist research. *Communications Of the AIS*, (13:1), pp. 380-427.
- Straub, D., & Karahanna, E. (1998). Knowledge Worker Communications and Recipient Availability: Toward a Task Closure Explanation of Media Choice. *Organization Science*, (9:2), pp. 1047-7039.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of personality*, 72(2), pp. 271-324.
- Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., & Ragu-Nathan, T. (2007). The impact of technostress on role stress and productivity. *Journal of Management Information Systems*, (24:1), pp. 301-328.
- The Guardian. (2013, 10th May). Conscious computing: How to take control of your life online, *The Guardian*. Retrieved from <http://m.guardian.co.uk/technology/2013/may/10/conscious-computing-twitter-facebook-google>
- Torkzadeh, G., & Doll, W. J. (1999). The development of a tool for measuring the perceived impact of information technology on work. *Omega*, (27:3), pp. 327-339.



- Towers, I., Duxbury, L., Higgins, C., & Thomas, J. (2006). Time thieves and space invaders: technology, work and the organisation. *Journal of Organisational Change Management*, (19:5), pp. 593-618.
- Wajcman, J., Rose, E., Brown, J. E., & Bittman, M. (2010). Enacting virtual connections between work and home. *Journal of sociology*, (46:3), pp. 257.
- Wolfe, R. N., & Johnson, S. D. (1995). Personality as a predictor of college performance. *Educational & Psychological Measurement*, (55), pp. 177-185.
- Zhu, J. J. H., & He, Z. (2002). Perceived characteristics, perceived needs, and perceived popularity: Diffusion and use of the Internet in China. *Communication Research*, (29:4), pp. 466-495.