

Voluntary Work-related Technology Use during Non-work Time: A Narrative Synthesis of Empirical Research and Research Agenda

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The Internet and mobilization of information and communication technologies (ICTs) have made non-manual work increasingly portable and remotely accessible. As a result, a considerable number of employees use their ICTs to engage in work-related tasks during designated non-work time, even without contractual obligation. However, existing research on such voluntary work-related ICT use remains fragmented and spread across disciplines. The authors conducted a narrative review of 56 studies to identify themes in existing research, synthesize the evidence base and identify gaps in understanding. They identify five themes: (1) Social-normative organizational context, (2) Job-related characteristics and work processes, (3) Person characteristics, (4) Designated non-work time and well-being, and (5) Empowerment/Enslavement Paradox. A conceptual model of voluntary ICT use is developed by integrating the identified themes with existing organizational research, outlining the relationships between the identified themes and voluntary ICT use. The discussion emphasizes the need for more conceptual clarity on voluntary ICT use and related constructs, and for the integration of different disciplines and methodological approaches to advance knowledge in the field. The authors further identify person-centred research as a critical future avenue to explore different ICT user types. Additionally, more research into the mechanisms and moderating influences regarding voluntary ICT use and its outcomes is considered advisable to advance knowledge on the Empowerment/Enslavement Paradox and its potential resolution. The paper concludes with preliminary implications to inform practice, addressing the need for employers to provide control over voluntary ICT use and employees enacting this control.

Introduction

The convenience and reach of information and communication technologies (ICTs), including laptops, smartphones and tablets, have fundamentally

The authors wish to thank the members of the advisory panel for their invaluable comments on the search protocol. The authors would also like to thank Jenny Lynden for her helpful and insightful comments on a previous draft of this manuscript.

Parts of this research were presented at the Division of Occupational Psychology Annual Conference 2015, 7–9 January,

changed. The development of mobile computers paired with ever-growing Internet coverage, accelerating data transmission and virtual access, means that users are no longer restricted to static computers. Many work roles have thus become virtually boundaryless, as employees can work anywhere and

2015, Glasgow, United Kingdom, and at the 17th Congress of the European Association of Work and Organizational Psychology, 20–23 May, 2015, Oslo, Norway.

This work was supported by the Economic and Social Research Council [grant number ES/J500148/1].

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anytime (Davis 2002; Perry *et al.* 2001), potentially extending work duties into non-work time. This is illustrated by recent surveys showing that about half of the sampled employees use their ICTs to work during non-work time at least occasionally (GFI Software 2014; National Sleep Foundation 2011; Ofcom 2014).

In response to such figures and the frequently associated negative outcomes for employees' well-being and work–life balance, France implemented a law on the 'right to disconnect' in 2017; which mandates organizations of a certain size to define explicitly times during which availability is not required (Ministère du Travail, de l'Emploi, de la Formation Professionnelle et du Dialogue Social 2016). However, despite such measures by governments or individual organizations and the recognition in research that ICTs have profoundly changed work and non-work life as well as work–life boundaries (Bliese *et al.* 2017; Colbert *et al.* 2016), the evidence regarding the antecedents and consequences of work-related ICT use during non-work time is less clear. This is partly because there is a lack of conceptual clarity regarding what constitutes work-related ICT use during non-work time and whether such 'hidden work' would actually count as compensable work from a legal perspective (Brecher and Magnus 2017).

Empowerment/enslavement paradox

There are two contrasting perspectives about the potential consequences of staying available for work during non-work time, which Jarvenpaa and Lang (2005) labelled the 'Empowerment/Enslavement Paradox'. First, ICT use can empower employees by facilitating work–life balance through increased flexibility and control (Jarvenpaa and Lang 2005), which are job characteristics associated with higher levels of work satisfaction, health and well-being (Costa *et al.* 2006), and reduced work–life conflict (Hill *et al.* 2010). In line with work-related stress models (Besseyre des Horts *et al.* 2012; Day *et al.* 2010; Demerouti *et al.* 2001; Karasek 1979; Nixon and Spector 2014). Use of ICT could act as a buffer between work-related demands and perceived strain by increasing control and flexibility, thus being a protective factor for well-being. In contrast, use of ICT can make employees 'slaves' by electronically 'tethering' them to work 24/7 (Jarvenpaa and Lang 2005; Fender 2011; Richardson and Thompson 2012), decreasing flexibility and control (Besseyre des Horts *et al.* 2012; Day *et al.* 2010; Nixon and Spector 2014; Townsend and Batchelor 2008). Such

constant availability for work could blur work–life boundaries and limit employees' capacity to 'switch off' and recover (Geurts and Sonnentag 2006; Meijman and Mulder 1998; Zijlstra *et al.* 2014), resulting in reduced well-being (Besseyre des Horts *et al.* 2012; Day *et al.* 2010; Nixon and Spector 2014). Empirical support for either perspective or whether outcomes are potentially influenced by other factors remains inconclusive. It is therefore timely to conduct a review of existing research.

This paper refers to ICT use outside regular work hours and away from regular work premises with the purpose of performing work-related tasks and communications as 'voluntary work-related ICT use during non-work time', or 'voluntary ICT use' for short. Such voluntary and discretionary ICT use extends beyond the timing and amount of formally contracted work hours (e.g. at night, during evenings, weekends and holidays) in contrast to, for instance, contractual on-call work (Fenner and Renn 2004, 2010; Venkatesh and Vitalari 1992). We focus on the volitional element of ICT use in particular (e.g. proactively keeping ICTs switched on and connected to the Internet), although we acknowledge social pressures to engage in work-related ICT use during non-work time (e.g. Fenner and Renn 2010; Matusik and Mickel 2011; Mazmanian 2013) and employees being contacted by others (e.g. Arlinghaus and Nachreiner 2013; Schieman and Young 2013). A number of other terms have been used in this context, albeit inconsistently, including 'technology-assisted supplemental work' (Fenner and Renn 2004), 'extended availability for work' (Dettmers *et al.* 2016) or 'unregulated availability' (Pangert *et al.* 2016). Voluntary ICT use appears to be predominantly relevant for knowledge workers (Fenner and Renn 2010) whose work entails a high proportion of non-manual, digitally portable work. Our review focuses on voluntary ICT use as a behaviour, although we acknowledge that there are other relevant constructs such as employees' perceptions about constant work-related availability (Ayyagari *et al.* 2011; Day *et al.* 2012; Fender 2011).

Information and communication technologies-enabled working during non-work time has been discussed for more than two decades (e.g. Bailyn 1988). Research on the topic is, however, still emergent and dispersed across disciplines without a clear theoretical framework. Given that work-related ICT use is increasingly inspiring legislation and organizational policies, it is considered imperative to establish what is known to date to inform future research and practice accurately. In doing so, we considered it

essential to review and integrate systematically not only quantitative research, but also qualitative research, which, to our knowledge, has not been done to date.¹ Consequently, a systematic review of existing research on voluntary ICT use is suggested, guided by the following review questions: (1) What are the themes in existing empirical research relating to voluntary ICT use? (2) What associations with voluntary ICT use have been reported in these themes? (3) How can these themes be organized in a conceptual model?

This review makes three main contributions: first, we synthesize a broad body of literature to identify themes from dispersed research across several disciplines. Second, we integrate the reviewed evidence base into a conceptual model of voluntary ICT use, applying these themes to work towards a more holistic, coherent and transparent understanding of voluntary ICT. Third, we conclude with pathways for future research to advance this research area, which will ultimately contribute to inform policy-makers, employers and employees.

Method

We applied a systematic review approach to identify as comprehensive a body of relevant literature as possible (Denyer and Tranfield 2009; Petticrew and Roberts 2006; Rojon *et al.* 2011), comprising a series of iterative search and evaluation stages, which we outline in Figure 1.

Search strategy and study selection process

We established a search protocol to identify relevant research by conducting a scoping study and consulting an advisory panel of subject matter experts.² We then searched scientific databases across different research disciplines (business and management studies, psychology and social sciences), such as Business Source Complete, International Bibliography of the Social Sciences (IBSS) and PsycINFO, supplemented by searching conference proceedings, hand-searching references in key publications (e.g. Fenner and Renn 2010; Matusik and Mickel 2011; Park *et al.* 2011) and personal enquiries regarding relevant material in press.

¹For a recent systematic literature review of quantitative research, please see Ďuranová and Ohly (2016).

²The full search protocol and full list of identified studies is available from the corresponding author on request.

We applied three sets of search strings: the first set covered terms relating to voluntary ICT use (e.g. 'availability', 'non-work'), the second technology (e.g. 'email', 'phone') and the third work-related terms (e.g. 'organization', 'work'). To be included, studies had to be: (1) published in English language and (2) between January 1992 and March 2014; (3) a journal article, book/book chapter, dissertation or full conference paper; (4) containing empirical output (quantitative, qualitative or both); (5) examining a sample of office-based employed adults; and (6) relevant to voluntary ICT use (thereby excluding work arrangements such as telecommuting, mobile working and on-call work).³

We identified 73 relevant empirical studies through sifting first by title and abstract and subsequently screening the full texts.

Data analysis and synthesis

We undertook a narrative synthesis focusing on themes in existing research (Mays *et al.* 2005; Popay *et al.* 2006; Rousseau *et al.* 2008) to provide a comprehensive review of this heterogeneous research area, including both quantitative and qualitative studies (Briner *et al.* 2009; Denyer and Tranfield 2009).

Following Popay *et al.* (2006), we developed a preliminary synthesis through thematic analysis reading and re-reading of all studies to identify initial patterns and codes. These were refined by the research team and organized into a framework of overarching themes. The first author subsequently developed the preliminary synthesis further to review the relevance and prevalence of these themes, which were revised within the research team as necessary. Finally, we applied focused conceptual mapping to investigate the associations within and between the extracted themes to focus our synthesis (Popay *et al.* 2006). As a result of this iterative process, 17 of the initially identified studies were omitted from further analysis, as we judged them to be less relevant to our research questions, leaving a pool of 56 studies.

³We focused on office-based employees as opposed to mobile workers, telecommuters or on-call workers, given that these are formally agreed work arrangements. We acknowledge that voluntary ICT use could be relevant for these groups as well, but the themes specific to these formal work arrangements might cloud the themes in relation to voluntary ICT use. We thus decided to exclude samples which consisted entirely of members of the listed groups.

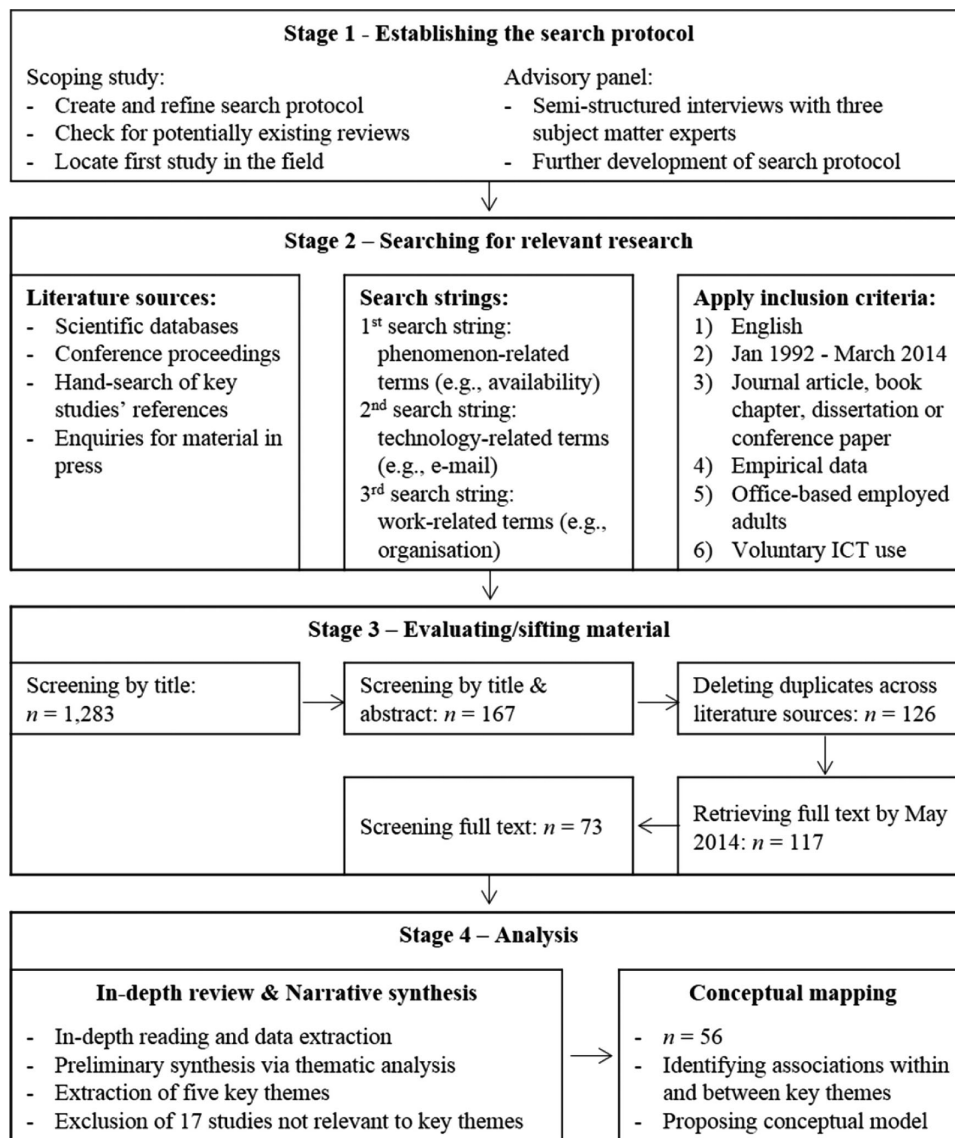


Figure 1. Flow diagram outlining the review process

Reviewing existing research

There were 30 quantitative, 21 qualitative and five mixed-methods studies. Forty-eight studies were published as journal articles, three were unpublished dissertations, and three were published conference proceedings. The remaining two studies were a book chapter and an unpublished conference manuscript. The sources for the journal articles evidenced the multidisciplinary nature of this research area with a third of these articles being published in business and management journals ($n = 16$), 14 articles in psychological journals, 11 in social sciences journals,

and six studies in information systems journals. One journal article by Arlinghaus and Nachreiner (2013) examining health problems associated with voluntary ICT use was published in *Chronobiology International*, a journal in physiology. Please see Table S1 in the Supporting information for more detail on the reviewed studies.

We extracted five themes: (1) 'Social-normative organizational context' covers social norms and expectations about voluntary ICT use. (2) 'Job-related characteristics and work processes' refers to the role of processes at work and job roles, particularly increased flexibility due to ICTs. (3) 'Person

characteristics' addresses individual characteristics associated with voluntary ICT use. The fourth theme reflects how the possibility to work anywhere and anytime encroaches into (4) 'Designated non-work time and well-being'. The last theme addresses the (5) 'Empowerment/Enslavement Paradox' and how it might be explained. Most primary studies featured more than one of these themes, with the most frequent theme being the fourth theme ($n = 49$) followed by the second theme ($n = 37$). Similarly represented were the first ($n = 27$) and the third themes ($n = 30$). The fifth theme was discussed least ($n = 23$), but we confined the synthesis to papers offering explanations for the Empowerment/Enslavement Paradox rather than merely alluding to it.

Social-normative organizational context

In qualitative research, employees have frequently expressed the perceived pressure exerted by their organizational context to be constantly available and to engage in work-related ICT use during non-work time (Barley *et al.* 2011; Cavazotte *et al.* 2014; Currie and Eveline 2011; Crowe and Middleton 2012; Golden 2013; Harmer *et al.* 2008; Ladner 2008; Lowry and Moskos 2008; Maliszewski 2013; Matusik and Mickel 2011; Mazmanian 2010, 2013; Mazmanian *et al.* 2006, 2013; Middleton 2007; Porter and Kakabadse 2006; Quesenberry and Trauth 2005; Schlosser 2002; Stoner *et al.* 2009; Towers *et al.* 2006). Matusik and Mickel (2011) further outlined that perceived pressure to be responsive is more frequently reported with a high number of different expectation sources (e.g. not just one's supervisor, but also several colleagues). Perceived pressures were also higher when these expectation sources were vague about what is actually expected. Quantitative research underlines a positive association between subjective norms to be available and ICT use (Fender 2011; Fenner and Renn 2010; Richardson 2010; Richardson and Benbunan-Fich 2011). Whereas existing research depicted norms and expectations as antecedents of voluntary ICT use, employees' compliance fuels a culture of expected constant availability in return (Barley *et al.* 2011; Mazmanian 2010; Mazmanian *et al.* 2006).

There are contextual cues from which employees deduce desired levels of constant availability within their organization. One such cue is the distribution of ICTs by employers, which is positively associated with ICT use (Richardson 2010; Richardson and Benbunan-Fich 2011). Furthermore, employees in

qualitative studies have reflected that voluntary ICT use takes place in particular organizational cultures that value aspects such as long work hours (Maliszewski 2013; Towers *et al.* 2006), immediacy (Funtasz 2012; Golden 2013; Middleton 2007) and strong dedication to one's job (Maliszewski 2013). In line with Maliszewski (2013), a quantitative study also reported organizational expectations of high dedication to work, in terms of integrating work into one's private life, to be positively associated with voluntary ICT use (Park *et al.* 2011). The amount of work-related contact during non-work time received by an employee (e.g. calls, emails) was another contextual cue: the more work-related contacts, the more employees engaged in responsive behaviours, such as leaving ICTs switched on and keeping them close (Fender 2011). Where an explicit requirement of availability during non-work time exists, it appears to be a stronger influence than the more implicit cue of distributing devices (Adkins and Premeaux 2014).

Job-related characteristics and work processes

Other integral parts of the organizational context are job-related characteristics and work processes. Since ICTs have removed many time- and space-related constraints of non-manual work, flexibility and control regarding when and where work takes place is a frequent theme in research. In numerous qualitative studies, employees have expressed how ICTs have increased (or are assumed to increase) their work-related flexibility and control (Alexander *et al.* 2010; Allen and Shoard 2005; Cavazotte *et al.* 2014; Currie and Eveline 2011; Funtasz 2012; Golden 2013; Lowry and Moskos 2008; Mazmanian 2010; Mazmanian *et al.* 2013; Middleton 2007; Middleton and Cukier 2006; Quesenberry and Trauth 2005; Stoner *et al.* 2009; Towers *et al.* 2006). However, the decrease in perceived flexibility and control has also been reported by employees (Crowe and Middleton 2012; Quesenberry and Trauth 2005). Evidence in quantitative research was similarly mixed when examining perceived control as consequence of voluntary ICT use: whereas one study found partial support for the positive association between voluntary ICT use and perceived job control (Richardson and Thompson 2012), several studies did not find an association (Duxbury *et al.* 1996; Richardson 2010; Ward and Steptoe-Warren 2014).

In contrast, quantitative studies reported that employees who have higher perceived flexibility and control over their work tend to use ICTs more

frequently, conceptualizing these job characteristics as antecedents or prerequisite of voluntary ICT use (Schieman and Glavin 2008; Senarathne Tennakoon *et al.* 2013). Similarly, considering ICTs to be flexibility-enablers appears to encourage use during non-work time (Diaz *et al.* 2012).

Closely related to perceived flexibility and control, performance and productivity was another dominant theme, with increases in self-reported efficiency and performance having been expressed in numerous qualitative studies (Allen and Shoard 2005; Funtasz 2012; Golden 2013; Golden and Geisler 2007; Lowry and Moskos 2008; Mazmanian 2013; Middleton 2007; Towers *et al.* 2006). These increases have been attributed by employees to being able to use time more efficiently (Mazmanian 2010), for instance by using formerly unproductive time to do work (e.g. during commuting time; Allen and Shoard 2005; Golden and Geisler 2007; Harmer *et al.* 2008; Lowry and Moskos 2008), or by working with fewer interruptions (Ladner 2008; Noble and Lupton 1998). Employees have also appreciated the benefits of being able to monitor continuously the information flow and thus stay on top of things by spreading out the daily workload and managing emails more effectively (Allen and Shoard 2005; Barley *et al.* 2011; Cavazotte *et al.* 2014; Crowe and Middleton 2012; Golden and Geisler 2007; Mazmanian 2010; Mazmanian *et al.* 2006, 2013; Noble and Lupton 1998). In quantitative studies, being responsive during non-work time has also been associated with increased self-reported performance (Fender 2011). Furthermore, considering ICTs to be useful for productivity has been reported as a motivator to use ICTs (Fender 2011; Fenner and Renn 2010; Senarathne Tennakoon *et al.* 2013; Venkatesh and Vitalari 1992).

Voluntary ICT use has not only been associated with flexibility and improved work processes, but also with increased job demands (Adkins and Premeaux 2014; Boswell and Olson-Buchanan 2007; Middleton 2007; Schieman and Glavin 2008; Senarathne Tennakoon *et al.* 2013), more specifically, the intensification and extension of work. Work intensification (i.e. increased perceived workload) due to the possibility to be able to work 24/7 has been expressed in several qualitative studies (Barley *et al.* 2011; Cavazotte *et al.* 2014; Currie and Eveline 2011; Noble and Lupton 1998). Work extension in terms of longer work hours has also been reported in qualitative studies attributing longer work hours to ICT use (Allen and Shoard 2005; Cavazotte *et al.* 2014;

Currie and Eveline 2011; Ladner 2008; Mazmanian 2010; Middleton 2007; Noble and Lupton 1998; Porter and Kakabadse 2006; Prasopoulou *et al.* 2006; Stoner *et al.* 2009; Towers *et al.* 2006), which has also been found in several quantitative studies (Duxbury *et al.* 1992, 1996; Towers *et al.* 2006). Further quantitative studies have also reported the extension of work hours as an antecedent of ICT use (Adkins and Premeaux 2014; Schieman and Glavin 2008).

Person characteristics

The third theme encompasses person characteristics, such as individual preferences, motives and reflections of voluntary ICT use, with reference to human agency and individual choice, in contrast to the importance of expectations and social norms discussed in the first theme. Particularly within qualitative studies, employees have stressed that voluntary ICT use is a conscious personal choice that can be actively regulated (Allen and Shoard 2005; Barley *et al.* 2011; Cavazotte *et al.* 2014; Currie and Eveline 2011; Golden 2013; Golden and Geisler 2007; Harmer *et al.* 2008; Mazmanian *et al.* 2006; Noble and Lupton 1998; Schlosser 2002; Stoner *et al.* 2009), but which depends on individual preferences. For instance, qualitative research indicated that employees with a preference for integrating work and private life tend to perform voluntary ICT use to a higher extent than those with a segmentation preference (Crowe and Middleton 2012; Golden 2013; Golden and Geisler 2007; Mazmanian 2010; Noble and Lupton 1998). Quantitative studies support the role of boundary preferences, where a segmentation preference has been associated with less voluntary ICT use (Adkins and Premeaux 2014; Olson-Buchanan and Boswell 2006; Park and Jex 2011; Park *et al.* 2011; Richardson 2010; Richardson and Benbunan-Fich 2011; Senarathne Tennakoon *et al.* 2013).

Employees have further expressed the analogous automatic and habitual, if not compulsive, character of ICT use (Barley *et al.* 2011; Cavazotte *et al.* 2014; Funtasz 2012; Matusik and Mickel 2011; Mazmanian 2010; Mazmanian *et al.* 2006, 2013; Middleton and Cukier 2006; Stoner *et al.* 2009) with self-discipline being considered necessary to restrict ICT use and maintain work–life boundaries (Allen and Shoard 2005; Harmer *et al.* 2008; Matusik and Mickel 2011). This indicates the importance of psychological capabilities supporting the behavioural execution of personal preferences.

Turning to employees' motives, voluntary ICT use is commonly believed by employees to be considered an expression of going the extra mile by employers. Qualitative studies attribute such behaviours to highly dedicated and career-oriented employees (Cavazotte *et al.* 2014; Crowe and Middleton 2012; Maliszewski 2013; Mazmanian 2013; Middleton 2007; Stoner *et al.* 2009). This notion was supported by quantitative studies which have reported a positive association between voluntary ICT use and the broader construct of dedication, including job involvement and ambition (Boswell and Olson-Buchanan 2007; Park and Jex 2011; Park *et al.* 2011). Considering it a behavioural manifestation of existing tendencies to overwork, a high extent of voluntary ICT use has also been associated with excessive dedication to work, namely workaholism (Mazmanian 2010; Middleton and Cukier 2006; Porter and Kakabadse 2006). Regarding the conjecture of dedication based on voluntary ICT use, this behaviour has also been suggested as a tool for impression management, that is, to appear dedicated, reliable and indispensable to supervisors, colleagues and customers (Allen and Shoard 2005; Barley *et al.* 2011; Funtasz 2012; Harmer *et al.* 2008; Ladner 2008; Mazmanian 2010, 2013).

Designated non-work time and well-being

As voluntary ICT use, by definition, takes place outside contracted work time, its effects on non-work time and work–life balance have been a prominent area of research.

Voluntary ICT use and work–life interface. Information and communication technologies enable employees to work anywhere and anytime and have changed how we perceive the concepts of work and non-work time and the boundaries between them (Noble and Lupton 1998; Prasopoulou *et al.* 2006). Accordingly, employees perceive work–life boundaries to be increasingly blurred (Barley *et al.* 2011; Cavazotte *et al.* 2014; Prasopoulou *et al.* 2006; Schlosser 2002) and work hours to extend into designated non-work time (see previous section). This is not necessarily detrimental, but could lead to a feeling that work never ends (Fender 2011; Mazmanian 2010; Mazmanian *et al.* 2013). A few studies, in contrast, depicted ICTs as facilitators of work–life balance (Quesenberry and Trauth 2005; Stoner *et al.* 2009; Wajcman *et al.* 2008, 2010), assisting employees in fulfilling family responsibilities and thereby improving the management of work and family life (Currie

and Eveline 2011; Golden 2013; Golden and Geisler 2007; Harmer *et al.* 2008). Despite such potential benefits, ICT use extending work into non-work time is predominantly associated with work–life conflict, as conflicting roles create interpersonal tensions.⁴ The association between engaging in voluntary ICT use and negative interferences with non-work life has been a prevalent theme in qualitative studies (Barley *et al.* 2011; Cavazotte *et al.* 2014; Funtasz 2012; Harmer *et al.* 2008; Ladner 2008; Lowry and Moskos 2008; Maliszewski 2013; Mazmanian 2010, 2013; Middleton 2007; Middleton and Cukier 2006; Porter and Kakabadse 2006; Quesenberry and Trauth 2005; Towers *et al.* 2006), as well as in numerous quantitative studies (Boswell and Olson-Buchanan 2007; Derks and Bakker 2014; Diaz *et al.* 2012; Duxbury *et al.* 1992, 1996; Fender 2011; Fenner and Renn 2010; Park and Jex 2011; Richardson and Thompson 2012; Schieman and Glavin 2008; Schieman and Young 2013; Voydanoff 2005; Ward and Steptoe-Warren 2014). Only a few studies have not found a direct association between voluntary ICT use and work–life conflict (Adkins and Premeaux 2014; Berkowsky 2013; Derks *et al.* 2014a).

Voluntary ICT use and recovery. During non-work time, it is considered important for employee well-being to refrain from work-related activities and to detach psychologically from work to replenish psychophysiological resources that were depleted by work-related demands; a process referred to as recovery from work (Cropley and Zijlstra 2011; Meijman and Mulder 1998; Sonnentag 2001; Zijlstra *et al.* 2014). Voluntary ICT use has been suggested to interfere with this recovery process: numerous quantitative studies have reported voluntary ICT use to be negatively associated with engagement in recovery activities (Derks *et al.* 2014a) and psychological detachment (Barber and Jenkins 2014; Derks *et al.* 2014b; Ohly and Latour 2014; Park *et al.* 2011; Richardson 2010; Richardson and Thompson 2012; Ward and Steptoe-Warren 2014), usually examining a lack of recovery from work as outcome of voluntary ICT use. In several qualitative studies, employees have referred

⁴Different labels have been used (e.g. 'work–family conflict', 'work–family interference', 'work–home conflict', 'work–home interference', 'work–family spillover'), with a common conceptualization of negative interference from differing work and family role demands (Greenhaus and Beutell 1985). We consequently pooled these different labels under the term 'work–life conflict'.

to the negative influence of voluntary ICT use in terms of a difficulty to disconnect mentally or an inability to switch off (Maliszewski 2013; Mazmanian et al. 2006). The inhibition of psychological detachment was, in turn, associated with work–life conflict (Richardson and Thompson 2012; Ward and Steptoe-Warren 2014) and reduced psychological well-being (Derks et al. 2014b; Mazmanian et al. 2006; Richardson 2010; Ward and Steptoe-Warren 2014).

Furthermore, voluntary ICT use has been associated with sleep problems, partially via a lack of psychological detachment (Barber and Jenkins 2014; Lanaj et al. 2014; Schieman and Young 2013). Lanaj et al. (2014) reported that voluntary ICT use in the late evening is associated with decreased sleep quantity and the perception of insufficient replenishment of resources during the previous evening and night reported the next morning.

Voluntary ICT use and well-being. The evidence base on employee well-being is mixed regarding voluntary ICT use. Quantitative studies have frequently reported that voluntary ICT use is negatively associated with well-being, mostly psychological well-being (Duxbury et al. 1996; Fender 2011; Ohly and Latour 2014; Schieman and Young 2013; Voydanoff 2005), but also sickness absence and self-reported health impairments (Arlinghaus and Nachreiner 2013). Similar associations have been reported in qualitative studies where employees have expressed stress due to constant availability for work (Barley et al. 2011; Currie and Eveline 2011; Maliszewski 2013; Mazmanian 2010; Mazmanian et al. 2013). However, an increase in well-being has also been reported in qualitative studies (Mazmanian 2013; Middleton 2007).

Empowerment/Enslavement Paradox

The Empowerment/Enslavement Paradox has been apparent across research investigating voluntary ICT use, with contradictory findings being reported regarding the simultaneous benefits and drawbacks. Several of the reviewed studies have suggested potential origins for such paradoxical observations.

Adopting and modifying ICT use. Information and communication technologies are fast-evolving, and employees frequently have to adapt to new technologies, drawing on previous experiences and knowledge. However, ICT proficiency and familiarity have rarely been considered. Nevertheless, a few studies,

predominantly qualitative, have discussed ICT use from the perspective of an iterative process. Porter and Kakabadse (2006) suggested an initial over-adaptation, that is, high usage, as a normal reaction when a new technology is implemented in the workplace; it usually levels off as an employee gets accustomed and finds the right individual balance of use. An inability to find this balance and remain over-engaged can, however, cause an employee to become addicted to ICTs (Porter and Kakabadse 2006). How ICT use can evolve in an organization was also discussed by Mazmanian (2010, 2013): her research found that employees have different initial approaches to voluntary ICT use, which can then follow different use trajectories. According to Mazmanian's (2013) ethnographic study, which follows the implementation of mobile ICTs within an organization over three years, norms within one's immediate work group influence these trajectories: if the members of one's work group agree that ICT use has to be flexible and individual, it improves the group members' attitude towards ICTs and their benefits (Mazmanian 2013).

Behavioural and cognitive modifications of voluntary ICT use further depend on how this behaviour is seen and how its consequences are evaluated. Using a grounded theory approach, Matusik and Mickel (2011) qualitatively categorized three different user profiles based on their different evaluations of and subsequent boundary creation patterns around ICT use. Whereas highly enthusiastic users do not perceive any negative consequences of voluntary ICT use and hence do not impose any boundaries around it, more balanced users who consider ICT use to have both positive and negative consequences set up specific boundaries to constrain it. A third group resembles balanced users in acknowledging advantages and disadvantages; however, this group struggles to implement boundaries around ICT use as they perceive expectations to be accessible.

Buffering and exacerbating factors in the context of voluntary ICT use. Several factors in the employees' context may influence the effects of voluntary ICT use. First, there appear to be several factors that may buffer the impact of ICT use or even facilitate benefits. One group of buffering factors comprises various job resources, especially job autonomy and schedule control. These resources, which represent an employee's more general control over how and when work tasks are performed, have been reported to buffer the positive association between voluntary ICT use and work–life conflict (Schieman and Glavin

2008; Schieman and Young 2013), as well as the negative association of such ICT use and engagement in recovery processes such as sleep (Schieman and Young 2013). In addition to job autonomy, a perceived organizational norm about permissible work–life segmentation has been found to have similar buffering effects (Derks *et al.* 2014b). The commonality of these factors is that they increase employees' discretion over their own ICT use and thus the perceived control which has been reported to be essential for ICT use to be beneficial (Quesenberry and Trauth 2005; Stoner *et al.* 2009). Actively seizing control over ICT use and consciously managing one's time and work–life boundaries have been highlighted as a buffer between voluntary ICT use, and recovery processes and work–life balance (Barber and Jenkins 2014; Fenner and Renn 2010; Lowry and Moskos 2008). Psychological detachment and relaxation activities also act as buffer between voluntary ICT use and work–life conflict (Derks and Bakker 2014).

In contrast, several factors can exacerbate the negative outcomes of voluntary ICT use. First, in line with the aforementioned need to feel in control over ICT use, feeling pressured by expectations to use ICTs during non-work time, appears to undermine the perceived discretion over ICT use and thus exacerbates its drawbacks (Fender 2011; Ohly and Latour 2014; Quesenberry and Trauth 2005; Stoner *et al.* 2009). Exacerbating factors also include job demands: perceiving one's job as demanding has been reported to aggravate the associations of voluntary ICT use, and work–life conflict (Boswell and Olson-Buchanan 2007; Schieman and Young 2013) and sleep (Schieman and Young 2013). Furthermore, it appears that employees experiencing high work–life conflict struggle to detach psychologically and relax when engaging in voluntary ICT use (Derks *et al.* 2014a).

Justification and rationalization. Existing research builds mostly on self-report data and employees' reflections and sensemaking processes. We thus have to acknowledge that such reflections and sensemaking processes might be susceptible to subjective distortions and, in particular in qualitative studies, could be strongly dependent on the impression an employee wants to give and how they want to justify their use (also to themselves). A critical evaluation of employees' reflections is therefore imperative (Cavazotte *et al.* 2014). For instance, in qualitative studies, employees have frequently rationalized their own ICT use as necessary and useful. Although they

acknowledge negative consequences, they consider this a fair trade-off for the gained flexibility and autonomy and thus appear to suppress or downplay these negative aspects (Allen and Shoard 2005; Cavazotte *et al.* 2014; Harmer *et al.* 2008; Middleton 2007; Middleton and Cukier 2006). Furthermore, employees also stress that their excessive ICT use is, despite the negative outcomes, in accordance with personal preferences and choices and necessary for their professional image and career advancement (Cavazotte *et al.* 2014; Harmer *et al.* 2008; Mazmanian *et al.* 2013). Another distortion in relation to evaluating voluntary ICT use were double standards that became apparent in employees' reflections, with their own ICT use being described as appropriate and at their own discretion, whereas others' use (even if it is highly similar to one's own) being considered highly inappropriate (Towers *et al.* 2006).

Towards a conceptual model of voluntary ICT use

In the final step of our synthesis, we applied a conceptual mapping framework to review the associations within and between the themes and interpret them in light of existing organizational research resulting in a proposed conceptual model of voluntary ICT use, which is illustrated in Figure 2 to help guide future research.

Organizational context – Social-normative context

The prominence of expectations and perceived norms to be constantly available for work implies that many employees feel obliged to engage in the 'always-on' culture, stipulating everyone to be constantly available and responsive. The notion that work-related ICT use is embedded in certain social-normative contexts has been proposed since the early stages of relevant research (Orlikowski 1992; Venkatesh *et al.* 2003), based on the assumption that individuals imitate others around them to gain their approval, avoid disapproval and achieve goals (Bandura 1986; Garrick 1998). The influence of such norms appears heightened when new ICT-related developments happen (e.g. when email became more broadly accessible to employees at all levels), or when socializing in a new work environment (Venkatesh *et al.* 2003). This is in line with more general research emphasizing that social parties and norms in the organizational context influence employees' choices

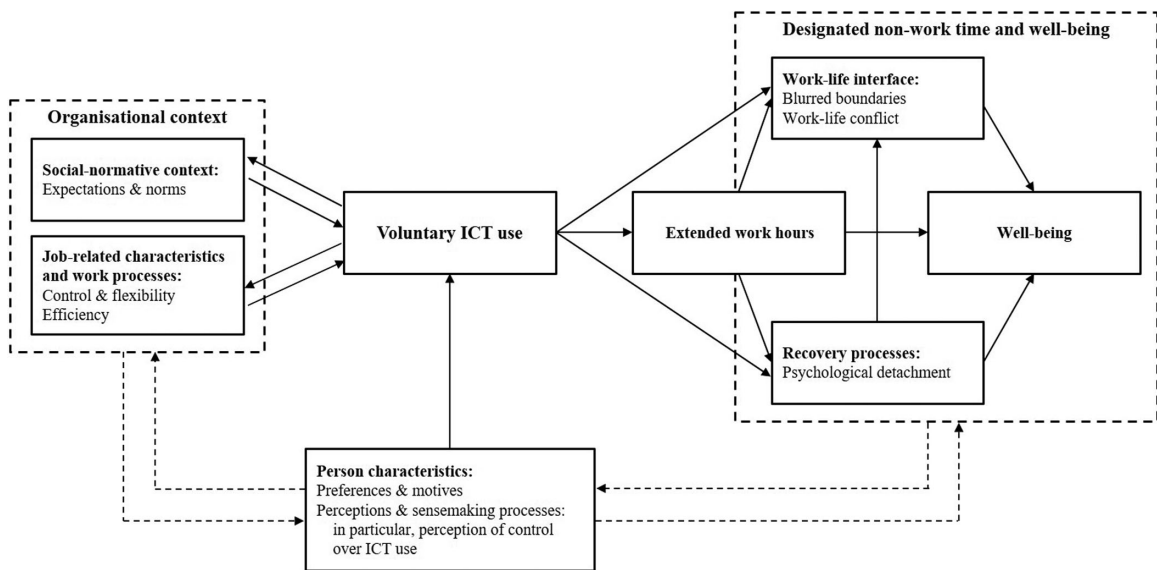


Figure 2. Conceptual model of voluntary ICT use

regarding their work–life boundaries (Dijkers *et al.* 2007; Koch and Binnewies 2015).

In addition to the role of expectations as drivers behind voluntary ICT use, it has been highlighted that employees shape and strengthen future expectations through behavioural compliance (e.g. a colleague who has been available at all times is expected to be available in the future). The always-on culture is thus enforced and maintained through compliance, creating a self-sustained vicious ‘cycle of responsiveness’ (Perlow 2012), which becomes difficult to break. Accordingly, we propose a bidirectional association between the social-normative organizational context and voluntary ICT use.

Organizational context – Job-related characteristics and work processes

Employees frequently expressed that job control, flexibility and efficiency have been increased by ICTs that enabled anytime–anywhere opportunities. Support for such positive associations is, however, mixed, as a decrease in perceived control due to constant technology use has also been reported in several qualitative studies, especially as a long-term outcome as opposed to the frequently reported initial enthusiasm about ICTs. This indicates that future research needs to examine under which conditions the relationship is positive, negative or potentially non-linear. Additionally, we note a clear need for objective measures investigating changes in work-related performance, as

a subjective improvement in performance due to ICT use has been reported, but not objectively supported.

Perceived increases in control, flexibility and efficiency can contribute to a positive attitude regarding the usefulness of voluntary ICT use, which is consequently proposed to predict future use, consistent with existing models highlighting the role of positive attitudes about ICTs in future usage intentions (Davis *et al.* 1989; Venkatesh and Bala 2008; Venkatesh *et al.* 2003). The aforementioned long-term reduction of perceived control might originate in changes in the perception of ICT use: by monitoring and reflecting their ICT use more actively, employees might come to a realization that ICT use is less under their control or less useful than initially thought, hence they change their attitude towards ICT use. This might not necessarily change the behaviour as such, but it might change the underlying motives, which, as Ohly and Latour (2014) suggested, could change how ICT use affects employees. In summary, similar to the social-normative context, it appears that the concepts of control, flexibility and efficiency have bidirectional associations with voluntary ICT use.

Designated non-work time and well-being

Synthesizing research on voluntary ICT use, it became apparent that a major focus has been on the effects of this behaviour on non-work time, as this is the time-frame when it takes place.

An increase in non-contracted work hours due to voluntary ICT use is the first proposed outcome and mechanism of how ICT use can affect non-work time and well-being, as it is one of the main pathways by which work can spill over into designated non-work time. An increase in work hours has not been examined as an intermediate variable that is linked to other outcome variables in existing research on voluntary ICT use. However, drawing on findings from organizational research, which has found that long work hours, an established job demand, are associated with a higher need for recovery (Jansen *et al.* 2003), increased work–life conflict (Hill *et al.* 2010; Ng and Feldman 2008), and reduced psychological and physiological well-being (Arlinghaus and Nachreiner 2014; Ng and Feldman 2008; Nixon *et al.* 2011; Virtanen *et al.* 2012), we propose that prolonging work hours is one potential mechanism through which voluntary ICT use can affect the work–life interface, recovery processes and well-being.

Furthermore, voluntary ICT use has frequently been associated with work–life conflict, as work-related ICT use encroaches into non-work time. Voluntary ICT use during non-work time has accordingly been described as boundary-spanning demand, which makes the boundaries around employees' private life more permeable and therefore causes role conflicts (Voydanoff 2005). This is in line with organizational research on boundary management stating that employees who have more permeable boundaries tend to experience more work–life conflict (Hecht and Allen 2009; Kinman and Jones 2008). Experiencing such conflicts can have knock-on effect such as reduced well-being (Amstad *et al.* 2011) and turnover intentions (Ferguson *et al.* 2016). Accordingly, several reviewed studies reported work–life conflict as a mediator between voluntary ICT use and reduced well-being (Derks and Bakker 2014; Schieman and Young 2013; Voydanoff 2005).

Voluntary ICT use brings work into designated non-work time, not just by extending work hours cutting down available down-time, but also extending employees' cognitive and emotional engagement in their work into non-work time: work-related ICT use keeps work on one's mind with a potentially constant stream of new work-related information that is commonly 'pushed' directly on the screen of mobile devices (Future Work Centre 2015), with these incoming communications potentially triggering negative emotions, depending on their affective tone (Butts *et al.* 2015). As evident from numerous reviewed studies, employees appear to be less capable

of mentally switching off when engaging in voluntary ICT use. In line with previous research on psychological detachment (Sonnetag and Fritz 2015), failing to switch off during non-work time is further associated with reduced well-being (Derks *et al.* 2014b; Richardson 2010; Ward and Steptoe-Warren 2014). In addition to affecting well-being, a lack of psychological detachment due to voluntary ICT use has also been associated with work–life conflict (Richardson and Thompson 2012; Ward and Steptoe-Warren 2014), where employees endeavour simultaneously to work and engage in non-work activities, such as dinner with family, but only give partial attention to the non-work activity, which is noticed and reproached by family members (Ladner 2008; Voydanoff 2005). We thus propose psychological detachment as another potential mechanism through which voluntary ICT use affects work–life conflict and, subsequently, well-being.

Person characteristics

Finally, we propose person characteristics, in particular, individual preferences and motives as antecedents of voluntary ICT use. In contrast to the role of the social-normative context, the influence of a self-imposed component of ICT use during non-work time should not be underestimated: Ohly and Latour (2014), for instance, found a considerably higher percentage of employees with an internal motivation to perform work-related ICT use during non-work time than with an external motivation. Additionally, there may be motives unrelated to technology use, as employees might think that making themselves constantly available could project their commitment and ambition (Symon and Pritchard 2015).

Furthermore, the conceptual model proposes a moderating role for the individual employee, where their perceptions, preferences and motives are considered a filter through which the outcomes of voluntary ICT use are evaluated (Derks *et al.* 2016; Ďuranová and Ohly 2016). The employee accordingly forms certain attitudes towards voluntary ICT use that shape future engagement in this behaviour. Such attitudes may change and fluctuate as, for instance, one's attitude might be changed by a severe argument with one's partner about constant ICT use triggering a reflection of ICT use and its outcomes, which could result in a change in behaviour (Cox *et al.* 2013). We identified the perception of control, in particular, as crucial in explaining the Empowerment/Enslavement Paradox. Feeling in control over how work tasks are performed and perceiving that ICT use is at one's own discretion

has been reported as a buffer between voluntary ICT use and negative outcomes such as reduced well-being (Ohly and Latour 2014; Schieman and Young 2013), inhibited recovery processes (Schieman and Young 2013) and work–life conflict (Schieman and Glavin 2008). This is in line with organizational research emphasizing the importance of perceiving to have control over when and where to work (Costa *et al.* 2004; Nixon and Spector 2014; Tausig and Fenwick 2001) and over one's work–life boundaries (Mellner 2016; Piszczek 2017) in relation to recovery from work and well-being. Feeling externally controlled in one's work behaviour has, however, been reported to inhibit benefits and exacerbate negative consequences (Gagné *et al.* 2015; Gillet *et al.* 2013; Ohly and Latour 2014; Trépanier *et al.* 2015). Accordingly, perceived expectations to be available during non-work time have been negatively associated with psychological detachment (Dettmers 2017; Mellner 2016) and well-being (Dettmers 2017; Piszczek 2017), and positively with work–life conflict (Derks *et al.* 2015). If flexibility is not at one's discretion, voluntary ICT use appears to resemble on-call work, which is a work arrangement in which work-related contacts are unpredictable and associated with increased perceived stress, reduced recovery from work, sleep problems and fatigue (Nicol and Botterill 2004).

It should further be noted that employees' perceptions of ICT use can be influenced by the social-normative context, which may champion that 'ideal' employees prioritize work above all other life domains and continuously strive towards career advancement (Bailyn 2006; Symon and Pritchard 2015). If their motive is to be or portray being the ideal employee, frequently measured by long work hours and overtime presence (including virtual presence), they might have internalized these values and evaluate the outcomes of ICT use accordingly: negative outcomes of ICT use might be seen as acceptable trade-off, given all the perceived benefits of this behaviour in terms of flexibility, efficiency and getting ahead in one's career (Allen and Shoard 2005; Cavazotte *et al.* 2014; Harmer *et al.* 2008). Such employees are likely to emphasize the element of personal choice. If employees are, however, less willing to prioritize work above other life domains, they are likely to experience discomfort within a social-normative context that expects constant availability as proxy for commitment due to a misfit of their preferences with their employer's culture (Kreiner 2006). The latter group of employees might express perceived pressures rather than personal choice.

Discussion

This paper discusses findings of a systematic narrative review on voluntary work-related ICT use during non-work time, including both quantitative and qualitative research. Five themes across 56 studies were identified: (1) Social-normative organizational context, (2) Job-related characteristics and work processes, (3) Person characteristics, (4) Designated non-work time and well-being, and (5) Empowerment/Enslavement Paradox. Fundamentally, our synthesis elucidates that voluntary ICT use is enacted in a complex interplay of organizational and individual factors, simultaneously associated with empowerment and enslavement of employees. However, our knowledge on the conditions under which empowerment is facilitated and enslavement and detrimental consequences are alleviated remains limited. The proposed conceptual model of voluntary ICT use integrates the findings of this review with established organization research to outline potential pathways for contextual and individual influences of voluntary ICT use as avenues for future research.

Pathways for future research

Theoretical and methodological advancements. Despite the considerable body of research available, future research would benefit from intra- and interdisciplinary collaboration to build effectively on existing evidence. Although a very relevant behaviour to many individuals, which prompts policy-making and legislation, little is theoretically defined and established across research disciplines regarding voluntary ICT use. Future studies need to carve out in more detail what constitutes voluntary ICT use and related concepts. A clear, transparently communicated operational definition of voluntary ICT use is a necessary starting point for the clarity and measurement of this concept and thus integration of findings. Whereas some of the reviewed studies explicitly focused on certain types of ICT use, for example, work-related smartphone use in the evening (e.g. Derks *et al.* 2014b; Lanaj *et al.* 2014; Ohly and Latour 2014), numerous studies examined more generic work-related technology use without reference to specific time-frames. This makes it challenging to extract and compare research findings and elucidate the contradictions, owing to the disparate nature of the literature. Albeit more apparent in more recent research, future research

would benefit from more clarity and transparency on how ICT use has been defined and operationalized.

Second, although multidisciplinary and different methodological approaches are inherent in this area and highly valuable, they pose challenges regarding the integration of evidence and generalization of findings. For instance, whereas qualitative studies reported the importance of individual perceptions and motives, few quantitative studies have built on these findings. Future research ought to be complementary and integrated to advance our understanding. Qualitative research could provide rich data on higher-order ICT user types, consequently informing future quantitative research through the application of person-centred approaches. Similar to the approach by Kossek *et al.* (2012) in relation to boundary management styles, this may facilitate the design of a screening questionnaire of ICT user types not only to advance understanding of individual motives and preferences, but also to provide human resources departments with guidelines to identify user types and provide support accordingly.

Additionally, future research should aim to use advanced methods to prioritize longitudinal and experimental designs to further knowledge about actual mechanisms, such as the aforementioned positive, negative or non-linear relationships between ICT use and its outcomes over time, including diary studies at the daily micro-level, as well as long-term longitudinal studies. Using such advanced methods could help to establish how ICT use affects employees in the short-term (e.g. daily) and long-term and is itself affected by the evaluations of such use. Additionally, such methods would enable monitoring of societal trends regarding voluntary ICT use, such as an even deeper embeddedness of voluntary ICT use in our daily habits or a move to a more conscious, purposeful voluntary ICT use within boundaries. We further suggest not only using self-report data, but combining them with objective data such as electronic tracking of time spent with ICTs, which is frequently underestimated by employees (Renaud *et al.* 2006). This would enable investigating potential discrepancies between the subjective experiences in relation to ICT use and the objectively occurring ICT use: in particular, whether the objectively occurring ICT use is actually relevant or whether the subjective experiences define how employees are affected. Qualitative research paradigms would be well placed to apply phenomenological approaches to examining the individual experiences of ICT use in depth. Additionally, social-constructivist perspectives could advance our

knowledge on how ICT use is enacted in certain contexts, including other sources of qualitative data such as reflections of family members about ICT use during non-work time or reflections of different members of the same organization or team discussing expectations and work processes.

An inherent challenge of researching voluntary ICT use is the fast-evolving nature of ICTs and the associated rapid changes they cause in the workplace from a socio-technological perspective. Accordingly, a further avenue for future research would be to create an evidence-based timeline displaying the trajectories of ICTs and ICT use, illustrating whether existing findings remain applicable or have to be reconsidered. For example, it remains inconclusive to what extent early research on static desktop computers is still applicable to more recent technological developments. This was not possible in the current review, owing to insufficient detail in the literature, such as an explicit statement about which actual ICTs or types of ICT use were examined or when data had been collected. Although temporal changes in ICTs and their use are frequently implied in existing research, they have rarely been examined empirically, rendering it unfeasible to deduce an evidence-based timeline. Future research might examine time-related trajectories systematically: for instance, by focusing on ICT adoption processes in recent graduates entering their first job or using large-scale panel research. This may, in turn, inform understanding of the social-normative context for individuals' ICT use.

Given the omnipresence of an always-on culture and internalized norms that make constant connectivity the 'new normal' in the professional context, future research has to consider whether it is fruitful to continue examining social norms to engage in voluntary ICT use as predictors of this behaviour (Middleton *et al.* 2014; Perlow 2012; Venkatesh *et al.* 2003). Instead, future research may need to address how new societal trends which deviate from the status quo can impact ICT use. For example, Ofcom's (2016) *Communications Market Report* stated that a considerable number of individuals take purposeful breaks from constant connectivity in the form of a digital detox in deviance to the always-on culture. Additionally, an issue which has not been addressed in the reviewed literature and has only been examined in more recent publications relates to the always-on culture in which constant connectivity is frequently taken for granted (Loeschner 2017; Stephens and Ford 2016): how does this culture affect employees who cannot have constant connectivity because of

either a lack of equipment or restricting organizational policies?

'Voluntary' ICT use: internally or externally motivated. A major topic area in existing research was to examine why employees engage in voluntary ICT use. A prominent theme here was the social-normative context, with employees stating that they engage with ICT use because everyone else expects constant availability, thus questioning the 'voluntary' nature of ICT use. Nonetheless, the self-motivated aspect of ICT use remains an equally important theme, as ultimately employees choose to use ICTs during non-work time. The paradox between these two prominent themes cannot be resolved easily, given that there are suggested to be different groups of ICT users. Some employees might engage in voluntary ICT use because they genuinely want to and thrive on the enabled flexibility and control, whereas others use them only to comply with expectations to avoid sanctions associated with non-compliance. There might also be groups with more ambiguous characteristics: employees who stress the self-determined aspect of ICT use, but actually experience expectations of constant availability, which is considered a signature feature of ideal employees sacrificing time in other life domains for work. Such employees might have accepted and internalized these expectations and, given their belief that they cannot change their behaviour, they have changed their attitude towards it (Bailyn 2006; Cox et al. 2013). In contrast, frequent ICT users who struggle to detach from work, fear to miss out on new information or are overly engaged in work might use expectations of constant availability as a scapegoat for their behaviour. Furthermore, employees might report expectations to be constantly available, but those could be based on misperceptions rooted in an assumed always-on culture rather than actively enforced expectations (GFI Software 2014; Renaud et al. 2006). We conclude that there are multiple layers as to why employees engage in voluntary ICT use, which, at the current stage of existing research, cannot be easily distinguished, but nevertheless need to be considered critically. We propose that there are different types of ICT users that are defined by interactions between the social-normative context, the characteristics of the ICT user and their attitudes towards ICT use.

Outcomes of ICT use: mechanisms and moderators. In addition to the question of why employees engage in voluntary ICT use, we have identified a substantial

body of literature examining the outcomes of this behaviour. The reported outcomes have been found mostly in the context of designated non-work time, with well-being as a follow-up outcome. Overall, the identified outcomes have been predominantly negative, with voluntary ICT use extending work into private life, behaviourally, cognitively and emotionally and thus blurring the boundaries between these life domains. However, as outcomes have not been exclusively negative, we conclude that there are moderators and mediators that could modify the outcomes and thus explain previous paradoxical findings. To expand understanding of the conditions under which voluntary ICT use is beneficial rather than detrimental, we propose that research into such moderators and mediators should be expanded, as has been similarly requested in the broader research field of flexible work arrangements (de Menezes and Kelliher 2011; Gajendran and Harrison 2007).

First, future research should expand knowledge on how voluntary ICT use might impede recovery processes. To date, research has focused mainly on psychological detachment, which describes refraining from work-related thoughts in general. However, less is known about different ways of thinking about work-related issues during non-work time and how they might affect the recovery process (Cropley and Zijlstra 2011). Whereas some work-related communications can be emotionally charged and thus inhibit recovery, others might help to solve issues, hence bringing closure and facilitating switching off (Cropley and Zijlstra 2011; Querstret and Cropley 2012; Syrek and Antoni 2014).

Regarding the work–life interface, existing research has focused largely on work–family conflict, which has been highlighted as a limitation of research in the broader field of work–life balance (Gatrell et al. 2013). This focus implies that voluntary ICT use mainly affects family life; less attention has been given to other aspects of the work–life conflict, such as conflicts with friends, or other non-work activities that employees might engage in, such as voluntary service or 'me time'. Examining other life arrangements and activities could provide a more fine-grained picture of how voluntary ICT use affects the work–life interface.

We have proposed the use of person-centred approaches to identify different ICT user types. These user types could not only explain different levels of engagement in voluntary ICT use, but could also explain how employees react differently to ICT use. Future research could hereby draw on research into person–environment fit relating to preferences

and supplies (Kreiner 2006; Rothbard *et al.* 2005) to examine whether an employee who perceives pressures to be available, but who would prefer not to engage in ICT use during non-work time (i.e. misfit) would be affected differently from an employee who perceives pressures to be available, but who is willing to engage in ICT use to advance their career (i.e. fit).

Practical implications

The majority of the reviewed studies suggest that voluntary ICT use is associated with negative outcomes; benefits from ICT use are also evident, but less prominent and more complex to disentangle, given the currently predominant ways of using ICTs habitually and thus without much conscious thought. Our review indicates that voluntary ICT use can be stressful and detrimental to an employee's well-being, particularly in the long run, given a common lack of active management and perceived control. We conclude from this that the benefits of ICTs definitely exist, but they require different, smarter management. Considering the costs incurred by mental ill-health and work-related stress to both governments and employers (European Agency for Safety and Health at Work 2014; OECD 2014; Sainsbury Centre for Mental Health 2007) and the business case that was made in favour of employer initiatives to reduce them (European Agency for Safety and Health at Work 2014), employers should be interested in supporting employees in finding a way to work more smartly with ICTs rather than merely longer.

Being in control over ICT use and actually feeling empowered by it appear to be paramount for the beneficial use of ICTs. Accordingly, employers should ensure that employees do not feel pressured into using ICTs during non-work time. We propose that voluntary ICT use has to be implemented sensibly in an organization with employers providing clearly communicated formal guidelines in relation to expectations of (non)availability. With such explicit guidelines, employees have formal parameters within which they have control over their ICT use and on which they can rely. However, these formal guidelines have to be enacted within the more implicit culture of the organization. If the organization preaches that availability is not expected, but the direct supervisor practices the opposite, employees are likely to comply with the more immediate social agent who has managerial power over them.

However, even if employees formally have full control to disengage from work and to refrain from

ICT use during non-work time, such control might not necessarily be actively enacted by employees. For many employees, checking ICTs has become a habit (Matusik and Mickel 2011; Mazmanian *et al.* 2013); individuals frequently do not even realize how often they do it (Renaud *et al.* 2006) and, even if they do, they feel psychologically incapable of restricting their own use (Harmer *et al.* 2008). However, actively setting up boundaries around ICT use has been reported to counteract the negative outcomes of voluntary ICT use and is considered part of broader work–life balance self-management competencies that can be trained (Kossek 2016; McDowall and Lindsay 2014). Training in such competencies should be provided and encouraged by employers, as well as used and implemented by employees.

Should employers restrict ICT use to enact their responsibilities regarding supporting employee well-being? This is a question that cannot be easily answered yet. In recent years, employers have implemented several technological restrictions on connectivity; some of which have been discussed in the popular press, such as shutting down email forwarding from servers after regular work time (British Broadcasting Corporation 2011) or the voluntary service to delete emails automatically when an employee is away on holidays (Gibson 2014). To our knowledge, evidence of the effectiveness of these technologically implemented measures has not been published. It should be noted that, although it is important for an employer clearly to signal support for employees taking down-time, this review elicited considerable self-imposed components of voluntary ICT use. Many employees appear to welcome the flexibility offered by ICTs and do not appreciate externally imposed technological restrictions of their autonomy, finding ways to circumvent these restrictions if wanted. Some of these measures, such as the deletion of emails while on holiday, are voluntary services meaning that employees can avoid them if they want to. We thus argue that employers should be cautious about one-size-fits-all solutions in relation to voluntary ICT use, since this review elicited that this behaviour considerably depends on contextual and individual circumstances and their interactions. This further emphasizes the demand for self-management, which is embedded in a supportive organizational culture.

Limitations

Our review, which considers a multidisciplinary and emerging area, came with several challenges,

including the lack of accepted definitions that required a sensitive and iterative, as opposed to specific, search protocol. Although this is not uncommon in systematic reviews on emerging research areas (Petticrew and Roberts 2006), we inevitably faced a large number of potentially relevant studies discussing a variety of concepts. We thus had to strike a balance between summarizing the existing state of research in detail, while highlighting a consensus on major issues and findings. Although our search protocol was purposefully inclusive, we can, however, not rule out the possibility of missing out on relevant studies, as we were at risk of making the search too unwieldy to manage.

A second limitation is that future research and reviews may benefit from a more inclusive approach to sampling, which currently limits the drawn conclusions to typical office-based employees. For instance, we excluded research focusing exclusively on mobile workers, telecommuters or employees with on-call duty who might also engage in voluntary ICT use, irrespective of their formal work arrangements, during traditional non-work time. Similarly, manual workers are not reflected in our review, as they have not been explicitly represented in the reviewed literature, either because voluntary ICT use is not really relevant to this type of worker or because researchers in the reviewed literature assumed that it is not relevant. However, given the omnipresence of ICTs in the work context, it might be of interest for future research to examine voluntary ICT use in manual workers.

Third, the number of studies published on this research area has increased sharply in the years leading up to this review, but for pragmatic reasons we had to set a limit to the search process to advance with the actual review and, consequently, more recent publications are not included in the systematic review; it remains an issue in this domain that even the most recent publications are to a certain extent already outdated, as technologies evolve faster than research is published.

Finally, owing to the mainly cross-sectional data reviewed, the mechanisms and effective directions of voluntary ICT use had to be deduced from assumptions made in the primary papers, as well as from established organizational research, meaning that our model requires further testing and potentially revisions.

Conclusions

Given the increasing embeddedness of ICTs in everyday life and 24/7 access to work, numerous

stakeholders, such as policy-makers, employers and employees, long to know how benefits of modern ICTs can be maximized in the work context and drawbacks be avoided, or at least alleviated. This interest has resulted in a substantial amount of research, but owing to lack of evidence integration, empirical findings remain fragmented and dispersed. Consequently, substantial advances of this research area are a long time coming. This paper represents a comprehensive, evidence-based review, which synthesized existing empirical studies on engaging in work-related technology use outside work time that is not formally mandated, in order to propose a conceptual model of this behaviour. Based on this synthesis, it appears that such voluntary ICT use is not inherently 'good' or 'bad', but a complex matter, as it is highly interwoven with the organizational context, person characteristics and work-life management. The lack of perceived control over ICT use, as well as a lack of actively seizing control, were proposed as vital factors in the distinction between being empowered and being enslaved by ICTs. We further revealed gaps in our knowledge, pointing out pathways for future research applying the proposed conceptual framework as guidance. We consider a major scope of future research to strive to understand better why employees experience and react to voluntary ICT use in different ways. Knowing more about this 'black box' will facilitate the empowerment of individual employees by supporting them in becoming active managers of their own ICT use.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher’s website:

Table S1. Summary of individual studies (listed alphabetically by author within research approaches).