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The Psychology of the Internet @ Work

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Introduction

The Internet has radically changed the way we work, and the way work is organized. Similar to other core technologies in the past, such as steam engines, electricity, or computer technologies, the Internet influences not only singular work activities or discrete branches, but affects nearly all aspects of work in a striking speed of time. For industrial and organizational psychologists, it is therefore essential to understand the implications of the Internet at work from different levels of analysis. At the micro level, Internet-based technologies have significant implications not only for the experience and behavior of the individual worker, for her or his work motivation, trust experience, and individual performance, but also for health and wellbeing and for required competencies at work. At the meso level, the Internet offers new strategies for work organizations, for recruiting and selection of employees, for leadership and teamwork, and for training and development. At the macro level, Internet-based work has implications for societies as a whole, creating new opportunities for economically underdeveloped regions and for the integration of disadvantaged workers, but also for new conflicts and legal problems in increasingly global workplaces. This edited handbook covers these three perspectives in an integrative way, providing state-of-the-art reviews of existing research, guidance for future work, and suggestions for practitioners.

In this first chapter, we start with a brief history of the Internet at work to understand the specific characteristics of Internet-based technologies that underlie different qualitative shifts in working conditions. In doing so, we identify five core characteristics of Internet-based work that might clarify and structure the still divergent usage of concepts in this emerging field. Moreover, such a task-oriented approach might help to analyze more precisely the various implications of Internet-based technologies for work-related experiences and behaviors as the main focus of work and organizational psychologists. We provide
initial suggestions and examples for this idea, and illustrate general opportunities and risks of the core characteristics at the three main levels introduced above, that is, the individual worker, work organizations, and societies. After these more general observations, we provide a preview of the other chapters in this handbook. In addition to newest findings from scientific research in the different fields, the book provides best practices for the usage and optimization of these rapidly evolving technologies for different sectors and industries.

A Brief History of the Internet at Work

The high prevalence of Internet-based technologies at work is reflected in a multitude of labels, such as “online” (e.g., online assessment), “web” (e.g., web-based working), “virtual” (e.g., virtual teams), “e-” (e.g., e-leadership), “cyber” (e.g., cyber loafing), “tele-” (e.g., telework), or “digital” (e.g., digital divide). Originating in different research traditions and disciplines, these different labels might be confusing when considering what the core attributes of Internet-based work might be. For instance, Internet-based work implies more than just electronically mediated information, and can also be relevant when people collaborate at short distances in the same building.

The Internet is a global communication system that connects private, public, academic, business, and government networks using a broad and constantly developing array of electronic, wireless, and optical technologies (Internet, n.d., retrieved November 15, 2016, from https://www.britannica.com/technology/Internet; see also Internet, n.d., retrieved November 15, 2016 from https://en.wikipedia.org/wiki/Internet). Thus, in addition to electronic computer technologies, global accessibility and interactivity are core characteristics of the Internet. Moreover, the Internet functions without a central governing body, with different autonomous networks being voluntarily interconnected.

The Internet emerged from early computer networks developed in the 1960s, such as the Advanced Research Projects Agency Network (ARPANET; e.g., Leiner et al., 1997). These communication networks were expanded to the 1980s in order to provide efficient communication for science and military needs. For instance, based on the ARPANET, the first email was sent 1971, and the File Transfer Protocol (FTP) specification was defined in 1973. However, the birth of the Internet as we know it today can be dated in 1990 when the ARPANET was opened for commercial usage. This was followed quickly by the first web page in 1991, and the first live stream (of a lab coffee pot) in 1993 (Trojan Room coffee pot, n.d., retrieved November 15, 2016, from https://en.wikipedia.org/wiki/Trojan_Room_coffee_pot). In addition, early forms of crowdsourcing started at that time, such as the Linux operating system software development project, one of the most successful Open Source software development projects. Open Source projects such as Linux, which had no strong financial incentives or organizational structures, demonstrated the potential of collaborative work via the Internet (e.g., Hertel, Niedner, & Herrmann, 2003; Saxena, Deodhar, & Ruohonen, 2017).

In 1995, the Internet was globally commercialized, and Internet-based (e-commerce) enterprises such as eBay and Amazon were founded. In the remaining years of the twentieth century, there was tremendous excitement about Internet-related businesses, with pundits predicting that brick and mortar stores would be replaced by click-and-order markets. This development led to an exploding stock market, and ultimately to the so-called “dotcom crisis” in 2000, when the hype surrounding Internet businesses finally burst, with many early e-commerce innovators becoming bankrupt. Following this hype-and-bust cycle, Internet-based e-commerce stabilized and set the stage for further, more solid developments (e.g., Fenn & Raskino, 2008). In addition, new developments in
multimedia and collaboration tools emerged in the mid-2000s that allowed for individuals to not only consume content but to also interactively and collaboratively create new content (“Web 2.0”). Wikipedia and other knowledge communities expanded on the idea of crowdwork, from rather specialized communities such as software developers in Open Source software projects, to the whole population (e.g., Schroer & Hertel, 2009). Moreover, social media tools such as Facebook, Twitter, YouTube, LinkedIn, Viadeo, and Skype supported both organizational and non-organizational communities to develop around common interests. The introduction of Internet-connected mobile “smart” phones (e.g., the first Apple iPhone in 2007) was a major step towards permanent accessibility at work, allowing users to not only make phone calls but to also access emails, webpages, and Internet-based data files. Somewhat ironically, the first email-free workday was also introduced in 2007 in some companies as a result of workers’ reactions towards the high number of emails to be attended every day.

Only a few years later, the idea of Internet-based collaboration was picked up by commercial or semi-commercial initiatives in so-called “sharing” communities, providing new services for transportation (Uber), housing (Airbnb), or labor leasing (Amazon Mechanical Turk). Notably, workers and service providers in these communities often lack conventional labor rights protection and insurances, raising various legal and ethical questions with these new conceptualizations of work.

More recently, the increasing use of sensor technologies has enabled again a new level of interactivity of the Internet, including direct connections between artifacts and machines (“Internet-of-Things”), which has further increased the speed of work and commerce. Although automatic driving, smart clothes, and smart offices provide many facilitations at work, these innovations can also cause risks and strain, and have been accused of destroying workplaces in various industries. For instance, use of the global positioning system (GPS) in monitoring in transportation businesses, while facilitating logistics and security issues, also puts pressure and strain on drivers, and automatic driving might even replace human drivers. Moreover, artificial intelligence might substitute important leadership tasks such as decision making in complex scenarios (Parry, Cohen, & Bhattacharya, 2016). Thus, Internet-based innovations at work come both with opportunities and challenges for the individual worker, for work organizations, and for societies (Cascio & Montealegre, 2016; Stone & Dulebohn, 2016).

We do not know exactly what will come next. One of the exciting aspects of doing research in this field is the innovative potential of the Internet for work and work organization over the coming decades. New technologies, tools, and business ideas are continually invented, some being picked up immediately, some only after a delay of months or even years, and some perhaps never. However, in order to understand the implications of the Internet at work, it might be useful to abstract from discrete tools and phenomena, and reconsider basic characteristics of the Internet from a task-oriented perspective.

Core Characteristics of Internet-Based Work

Internet-based work has been associated with many different attributes, for instance with high team diversity (e.g., Hoch & Kozlowski, 2014) or more autonomy at work (e.g., Gajendran & Harrison, 2007). However, some of these attributes are less central to or not unique for Internet-based work in general. Based on the definition of the Internet as a global system of interconnected computer systems, we consider the following characteristics of Internet-based work as most central and distinct from traditional work forms: accessibility, interactivity, reprocessability, automatization, and boundary crossing.
Accessibility of information. Connecting billions of autonomous computers throughout the world (with numbers still growing), the Internet provides easy and often un-delayed access to myriads of data both within organizational networks and beyond. In addition to increasing speed and amount of information available for work processes and decisions, high accessibility of information also supports the mobility of work because information (and people as information carriers) is neither restricted to certain locations nor to certain hours or days. Working “anywhere and anytime” has been made possible by this high level of information accessibility. However, this development has also increased the expectation that workers are accessible regardless of time or location. In fact, ubiquity has emerged as a major stressor at work, blurring traditional forms of separation between occupational and private life (e.g., Derks, Bakker, Peters, & van Wingerden, 2016). Moreover, high information accessibility comes with many ethical and legal issues about data ownership and data privacy, for instance, when organizations recruit and select new employees.

Interactivity of communication. A second major characteristic of interconnected computer systems is the opportunity to directly interact with other users regardless of where they are. Individuals can not only passively retrieve information or contact other persons, but can also send or post information and reply to others, enabling multidirectional exchange and collaboration. This high degree of potential interactivity is the backbone of many collaborative processes at work today. Users of Internet-based technologies can share and exchange information with other workers (e.g., in virtual teams) or with organization representatives (e.g., during recruitment processes) regardless whether or not the others are currently co-present. Whereas interactivity was mainly text-based and asynchronous in the early years of the Internet, the rapid development of technologies now includes synchronous audio and visual communication (e.g., web conferencing), and even digital exchange of physical products (e.g., three-dimensional [3D] printing).

Reprocessability of information. The mediated nature of working via Internet enables automatic storage of many working steps. As a consequence, related information can be retrieved and reprocessed on demand. Such documentation and reprocessability of work (Dennis, Fuller, & Valacich, 2008) has many advantages, such as reducing the risk of misunderstandings in complex (e.g., international) collaborations, or reducing the need for trust in virtual teams (e.g., Breuer, Hüffmeier, & Hertel, 2016). However, the fact that automatic storage and reprocessability makes “forgetting” considerably more difficult can also cause problems, such as information overload, stigmatization of individuals due to past behavior or rumors about past behavior (“cyber-mobbing”), and data protection issues. In light of the constantly increasing data volumes accessible for individuals and organizations, developing intelligent algorithms for handling “big data” (e.g., George, Haas, & Pentland, 2014; George, Osinga, Lavie, & Scott, 2016) and for “intentional forgetting” (e.g., Niederee, Kanhabua, Gallo & Logie, 2015) are important challenges for future knowledge management at work.

Automatization. A fourth core characteristic of interconnected computer systems is the potential to automatize processes in these networks, for instance, by using computer routines to send information at certain pre-programmed times, to scan (billions of) websites for information, or to monitor and control workers or machines from a distance (GPS monitoring). Automatization has the potential to disburden the individual at work in many respects, freeing resources for other tasks. Moreover, automatization in computer networks highly increases the opportunities for information seeking and control.
However, Internet-based automatization can also create undesired costs (e.g., unsolicited and undesired “spam” emails). Although automatization is also used in other work forms, its potential is greatly increased in interconnected computer networks. 

**Boundary crossing.** High boundary-crossing capabilities are suggested as a fifth core characteristic of the Internet at work. In interconnected computer systems, information and products are communicated in a standardized “language” that not only connects different work processes at different geographic or organizational locations (e.g., cross-company collaboration in automotive industries) but can also integrate non-work domains (e.g., usage of social media networks at work; e.g., van Iddekinge, Lanivich, Roth, & Junco, 2016). Moreover, individuals not only collaborate remotely with others but also with machines (“manufacturing 2.0,” “industry 4.0”), and machines can directly communicate with other machines (“Internet-of-Things”). The more pervasive computer technology becomes in our (work) lives, the higher the potential interconnections of these computers will grow. This boundary-crossing potential can dissolve work structures such as hierarchies or demarcations of knowledge exchange within organizations. Moreover, required competencies for knowledge management, communication, and leadership are changing due to the boundary-crossing capabilities of the Internet.

These five core characteristics might help to structure research on psychological implications of the Internet at work, enabling more specific and perhaps precise predictions based on psychological theories. We illustrate this idea in the next section with initial examples.

**Psychological Implications of the Internet at Work**

When reviewing the existing literature on psychological implications of the Internet at work, we found that studies often focused on quite different aspects and outcomes, making comparisons of research results and literature summaries difficult. For instance, some research on Internet-based “virtual” teams has focused on the (lack of) synchronicity or interactivity of collaboration, while other studies have focused on difficulties in accessing and reprocessing data, and yet others on cultural diversity (see, for instance Gilson, Maynard, Jones Young, Vartiainen, & Hakonen, 2015, for a review). The suggested core characteristics of Internet-based work might help to structure existing and future research, and to connect technological phenomena with psychological theories. In addition, considering core characteristics of Internet-based work might provide helpful guidance for empirical research, for instance, suggesting appropriate baselines when examining specific effects of Internet-based work.

One of the basic questions in this respect is, which processes and requirements truly change when using the Internet at work, and which processes and requirements remain the same as in traditional work settings. For instance, at the person level, psychological theories related to high information accessibility include dual process models of information processing (e.g., Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986), predicting more systematic information processing of individual workers when more information is accessible. At the same time, theories from cognitive psychology also cover consequences of information overload on workers’ decision accuracy and strain experience (e.g., Speier, Valacich, & Vessey, 1999). At the organizational level, effects of information availability on individual decision processes are complemented by theories
on organizational knowledge management, including the motivation and coordination of knowledge generation, memory, and dissemination as well as decision-making routines. Theoretical approaches relevant for these themes include networking and knowledge transfer theories (e.g., Foss, Husted, & Michailova, 2010) as well as conceptualizations of potential information overload at the organizational level (e.g., Niederee et al., 2015). Finally, at the societal level, high information accessibility due to Internet-based technologies increases opportunities to create new workplaces even in areas with low infrastructure and for workers with reduced mobility. Moreover, high information accessibility about work organizations affect how these organizations are perceived by job applicants or customers, which is described, for example, in theories of trust in organizations (e.g., Fulmer & Gelfand, 2012), employer branding (e.g., Rupp, Ganapathi, Aguilera, & Williams, 2006; Walker, Feild, Giles, Bernerth, & Short, 2011), or customer expectations (e.g., Barley, 2015).

Psychological theories relevant for increased interactivity due to Internet-based work include communication and feedback theories at the level of individual workers (e.g., Kluger & DeNisi, 1996), and theories on motivation for Enterprise Social Networks (e.g., Chin, Evans, & Choo, 2015; Leftheriotis & Giannakos, 2014) as well as social impact and minority influences (e.g., Latané & L’Herrou, 1996) at the level of organizations and societies. In addition, much of the field of electronic human resources depends on the ability of technology to expand communication and interaction opportunities among customers, employers, employees, retirees, and prospective employees (Johnson, Lukaszewski, & Stone, 2016). Reprocessability effects due to Internet-based work can be addressed, for instance, based on communication theories (e.g., Dennis et al., 2008), models of trust (e.g., Mayer, Davis, & Schoorman, 1995) and fairness perceptions (e.g., Colquitt & Zipay, 2015), as well as theories on error management (e.g., Frese & Keith, 2015).

Psychological effects of Internet-based automatization are explained, for instance, by theories on workers’ need for control (e.g., Karasek & Theorell, 1990), highlighting potential resource saving but also aversive and even threatening effects of Internet-based surveillance and monitoring. In addition, the change to automated human resource (HR) systems may evoke psychological reactance among applicants and employees, affecting individuals’ job acceptance rates or attraction to organizations. Internet-based recruiting has the potential to invade personal privacy, and may have an adverse impact on protected group members. As a result, psychological models of reactance (Brehm, 1966), person-organization fit (Chatman, 1989), privacy (Stone & Stone, 1990), and self-efficacy (Bandura, 1986) are relevant to explain the extent to which individuals accept these new systems and feel comfortable to use them. Together with research from sociology, human computer interaction, and information systems, these psychological theories are relevant for how individuals might respond to the replacement of human workers by Internet-based technologies (Hess, Fuller, & Campbell, 2009; Johnson, et al., 2006).

Finally, boundary-spanning aspects of Internet-based work are related to psychological theories on work-life balance and organizational segmentation norms (e.g., Derks et al., 2016) as well as basic approaches of job design (e.g., Hackman & Oldham, 1980) and job crafting (e.g., Wrzesniewski & Dutton, 2001). Based on these psychological theories, potential benefits and risks of Internet-based work can be derived more precisely. Initial examples are listed in Table 1.1 and Table 1.2.
Table 1.1  Potential benefits of Internet-based work.

<table>
<thead>
<tr>
<th>Core characteristics</th>
<th>Individual worker</th>
<th>Work organization</th>
<th>Society</th>
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<tbody>
<tr>
<td>Accessibility</td>
<td>Breadth of available information</td>
<td>Processing speed</td>
<td>New workplaces in underdeveloped regions</td>
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<tr>
<td></td>
<td>Decision quality</td>
<td>Decision quality</td>
<td>Employability of disadvantaged persons</td>
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<tr>
<td></td>
<td>Flexible work times</td>
<td>Global presence and activities</td>
<td>Global knowledge repositories</td>
</tr>
<tr>
<td>Interactivity</td>
<td>Feelings of agency and voice</td>
<td>Decisions speed and quality</td>
<td>Reduction of cultural distance</td>
</tr>
<tr>
<td></td>
<td>Frequent exchange with colleagues</td>
<td>Speed of product development</td>
<td>Global connection of those with similar interests</td>
</tr>
<tr>
<td>Reprocessability</td>
<td>Perceived transparency and fairness</td>
<td>Reduced risks of process errors</td>
<td>Transparency of business processes</td>
</tr>
<tr>
<td></td>
<td>Reduced risks of misunderstanding</td>
<td>Increased knowledge sharing</td>
<td>Analyses of accidents and error management</td>
</tr>
<tr>
<td>Automatization</td>
<td>Work safety</td>
<td>Cost reduction</td>
<td>Health management</td>
</tr>
<tr>
<td></td>
<td>Strain relief</td>
<td>Breadth of information available</td>
<td>Reduction of business barriers</td>
</tr>
<tr>
<td>Boundary crossing</td>
<td>Job crafting</td>
<td>Breadth of available information</td>
<td>Opportunities for electronic job freelancing</td>
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<td></td>
<td>Work–life balance</td>
<td>Cross-company collaboration</td>
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Table 1.2  Potential risks of Internet-based work.

<table>
<thead>
<tr>
<th>Level of analysis</th>
<th>Individual worker</th>
<th>Work organization</th>
<th>Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core characteristics</td>
<td>Accessibility</td>
<td>Information overload</td>
<td>Data security</td>
</tr>
<tr>
<td></td>
<td>Ubiquitous working</td>
<td>Escalating aggression (&quot;flaming&quot;)</td>
<td></td>
</tr>
<tr>
<td>Interactivity</td>
<td>Challenges to work-life balance</td>
<td>Cyber-loafing</td>
<td>Post-truth thinking and conspiracy beliefs</td>
</tr>
<tr>
<td>Reprocessability</td>
<td>Suability</td>
<td>Challenge to rebuild negative reputation</td>
<td>Ability to interfere with political processes</td>
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<td></td>
<td>Stigmatization</td>
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<td></td>
</tr>
<tr>
<td>Automatization</td>
<td>Monotony</td>
<td>Layoffs and reduction in job opportunities</td>
<td>Loss of workplaces</td>
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<tr>
<td></td>
<td>Lack of control</td>
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<tr>
<td>Boundary crossing</td>
<td>Blurred boundaries between work and non-work</td>
<td>Cyber-loafing</td>
<td>Legal issues</td>
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A Research Agenda for the Psychology of the Internet at Work

Research on the psychological implications of Internet-based technologies at work is still in its infancy. In addition to different foci and conceptualizations of Internet-based implications, published studies span multiple journals, books, conference proceedings, and research communities (see also Cascio & Montealegre, 2016). Often, valuable research is done by academics outside of work and organizational psychology, such as by computer or communication scientists. At the same time, theoretical work on the psychological implications of Internet-based work is still underdeveloped. Consequently, it is difficult to maintain a decent overview about research findings in specific fields of interest, for example, e-leadership, and it is even more difficult to integrate findings from different fields into a more complete picture of the Internet at work. For instance, research on ergonomics, cyber-loafing, Internet-based trust, and virtual teamwork is all relevant when developing models of e-leadership. Recognizing the implications of Internet-based work at different levels and for different processes is important in order to truly understand its psychological effects on experience and behavior at work.

This edited title is the first international handbook that integrates the various sources and fields of evidence-based psychological research on the Internet at work in one volume. As such, the handbook provides useful information for researchers and practitioners alike. The handbook is structured in three parts, reflecting the micro, meso, and macro perspectives referred to in the introduction to this chapter. Although the different chapters are sorted into these three parts according to their predominant perspective, most chapters are not restricted to only one perspective but cover various levels of analysis. Together, the chapters combine what are currently the most important findings, conceptual frameworks, and practices related to the psychology of the Internet at work.

Part I: Micro-level implications

The first part of the handbook addresses implications of Internet-based work at the level of the individual person (micro perspective). The aim of this part is to present theoretical concepts and empirical literature on individual reactions to Internet-based work, including both positive and negative consequences. In addition to individuals’ motivation and performance, this part covers implications of Internet-based work for health and wellbeing as well as deriving implications for individual competencies.

The first two chapters of this part set the stage by presenting more general frameworks in this field. In Chapter 2, Nicole C. Krämer and Stephan Winter provide a comprehensive overview of theoretical frameworks on communication with digital technologies from a social science perspective. Given that Internet-based work usually includes some kind of mediated communication, the described constructs and mechanisms are at the heart of many of the following chapters, for instance, when considering required competencies or leadership strategies. Moreover, the chapter also includes excellent examples of psychological theories relevant for core characteristics of Internet-based work. The authors review both classic theories of computer-mediated communication, for instance, of the selection of specific communication tools, as well as more recent developments, such as communication in enterprise social media networks. In doing so, the chapter provides both illustrative description of existing concepts as well as promising new directions for future work.

Complementing the social science perspective of Chapter 2, Chapter 3 introduces a more technical perspective and presents the general principles of the ergonomics of
human–computer interaction. Summarizing the wealth of findings in this very active and creative community could easily fill a full volume instead of only a single chapter. Therefore, Benjamin V. Hanrahan and John M. Carroll focus on more general processes of ergonomic analyses of requirements and implications of Internet-based technologies at work. Rather than reviewing micro issues in ergonomics (e.g., usability, human–machine interface), this chapter takes a macro approach in viewing how Internet-based technologies are embedded within broader work practices, how they impact how work is conducted, how power is structured in organizations, and how relationships are maintained. Moreover, the authors provide instructional case examples at different levels, including motivational implications of ergonomics in web-based customer service centers, online social networks in organizations, and Internet-based crowdworking. Thus, well in line with the general approach of this handbook, the authors demonstrate that in addition to individual-level effects, principles of human–computer interaction are also relevant for the meso and macro levels of Internet-based work.

Following and building on the introduction of basic concepts, Chapter 4 derives specific affordances for individuals during Internet-based work. Stefan Krumm and Julian Schulze review new research on competencies for Internet-based work, finding only low convergence among existing studies to date, despite many individual competencies having been proposed in the literature. Moreover, existing taxonomies provide few explicit links to specific challenges of Internet-based work, illustrating the already mentioned lack of theoretical connections between core characteristics of Internet-based technologies and existing psychological theories. In addition to a closer analysis of discrete task specifics, the authors argue for more rigorous empirical tests of whether assumed competencies are truly unique for Internet-based work. In their chapter, the authors provide initial examples of this quest. Moreover, the authors inspect existing theories on digital communication and virtual collaboration in order to derive potentially overlooked competencies. Together, this chapter sets the stage for more fine-grained theories of work competencies that integrate different aspects of task, organizational context, and mediating technology.

Switching from competencies to individual experience, in Chapter 5 Meinald T. Thielsch and Jörg Niesenhaus review the emerging literature on the impact of user experience in Internet-based work and its effects on motivation, learning, and performance. In doing so, the authors particularly address gamification as an increasingly popular aspect of the user experience. Building on general concepts of human–computer interaction, the authors summarize empirically established design principles and provide informative research examples. Moreover, they also discuss best practices for practical applications, and provide instructive cases for motivating design. In general, the individual experience of Internet-based technologies has been shown to considerably affect motivation and performance at work. At the same time, more integrative theories are needed that particularly consider mediating psychological mechanisms in this respect, such as attention, cognition, or emotion.

Chapter 6 also addresses motivational processes, focusing on trust and distrust as a consequence of Internet-based work. Indeed, difficulties to build and maintain trust are among the most prominent topics in the existing literature on Internet-based collaboration, and can be related to different core characteristics such as accessibility or reprocessability of information. Sirkka L. Jarvenpaa, Celeste Cantu, and Shi Ying Lim start with a comprehensive review of different conceptualizations of trust in the literature, before applying different trust models to the contexts of electronic commerce and virtual teamwork. Interestingly, trust in Internet-based context not only refers to other persons but also to larger entities such as teams, organizations, or brands. Moreover, trust
can refer to specific technologies and even to the Internet per se. Thus, even though psychologists usually consider trust as a state experienced by individuals, multilevel modeling of its determinants is required. Finally, the authors address important findings on the development, maintenance, and repair of trust in Internet-based contexts, considering current technologies and potential future developments.

Further exploring motivational implications of Internet-based work, Chapter 7 addresses potential counterproductive behavior summarized under the term of “cyber-deviance.” In their review, Steven D. Charlier, Gary W. Giumetti, Cody J. Reeves, and Lindsey Greco structure the existing research on cyber-deviance into behaviors that are intrapersonally focused (e.g., visiting Internet-based entertainment or shopping sites during work hours), interpersonally focused (e.g., using digital resources to harass others), and organizationally focused (e.g., posting defamatory comments about a company in publicly available Internet sites). The authors summarize both antecedents and consequences of cyber-deviant behaviors as well as potential countermeasures. Interestingly, not all cyber-deviant behaviors are intentional, some might be rather based on carelessness and inattention, and some deviant behaviors can even have positive consequences in the long term.

The following two chapters address consequences of Internet-based work for health and wellbeing, implications that are particularly related to high accessibility and boundary-crossing aspects of the technologies. Research on this topic has strongly grown in the past years as a consequence of increased complains of strain due to ubiquity expectations at work. Although this certainly is a concern for organizations as a whole, the psychological processes of strain reactions and wellbeing are located at the level of individual persons. In Chapter 8, Nico W. Van Yperen and Burkhard Wörtler present the research on “blended working,” a relatively new concept describing the opportunities for more flexibility at work due to Internet-based technologies. When discussing both potential benefits and risks of blended working, the authors stress that these consequences are not automatically given but depend on specific moderating factors, such as workers’ personality, type of task, and organizational policies.

In Chapter 9, Ronald E. Rice focuses on the implications of Internet-based flexible work on work–life balance and related outcomes. This chapter provides an excellent example of the need to integrate findings from disparate research streams into a cohesive framework. The author draws on research from communications, health, information systems, management, and psychology as he reviews and integrates the work on communication technologies, flexwork, and work–life balance. Specifically, he develops a theoretically driven model to shape research on flexwork and work–life balance to inform those researching in this area.

Today, a large portion of Internet traffic is driven by mobile devices, increasing accessibility as core characteristic of Internet-based work even further. This can have profound implications for how work is conducted and how employees connect and interact with each other and with organizational resources. Despite the centrality of mobile computing to work practices, only limited research has begun to investigate its employee and organizational implications. In Chapter 10, Humayun Zafar first discusses the evolution of the use of mobile computing in organizations. He then reviews the research on both the positive and negative implications of mobile computing in organizations, and provides guidance for future researchers. Finally, he discusses how mobile computing and the “Internet-of-Things” will potentially transform the workplace of the future. Similar to other topics in this handbook, research on mobile computing is in an early stage and there are opportunities for scholars from various domains to use their theories to contribute to this phenomenon.
Part II: Meso-level implications

Part II addresses implications of the Internet at work at the organizational level, covering typical topics of “electronic human resource management” (e.g., Stone, Deadrick, Lukaszewski, & Johnson, 2015). The different chapters review the current literature on how organizations (can) use the Internet for the management of their employees, including recruiting and assessment, leadership, teamwork, and personnel development.

In Chapter 11, Derek S. Chapman and Anna F. Gödöllei focus on Internet-based recruiting, and describe how technology has dramatically altered the recruitment process in the past decades, modifying employer practices and applicant expectations. With respect to the introduced core characteristics of Internet-based technologies, e-recruiting particularly benefits from high accessibility of information and interactivity of communication technologies. Moreover, automatization of data collection and analyses increasingly plays a role. Discussing different strategies of e-recruiting, the authors not only consider finding and attracting job applicants but also how to keep them interested during the selection process. In addition to reflecting both potential benefits and risks of using e-recruiting in organizations, the authors review the existing theories and empirical research on the topic and introduce a new model of e-recruiting with interesting new directions for future research.

In Chapter 12, Kimberly M. Lukaszewski and Andrew F. Johnson consider the advantages and disadvantages of using information from social network sites and search engines in the employment decision-making process (e.g., selection, termination). They argue that organizations are using these sites to determine whether individuals have the knowledge, skills, and abilities to perform the job, and ensure that they are trustworthy and conscientious. In spite of the increased use of social network sites and search engines, the authors maintain that many individuals believe that the use of these sites in the employment process is unfair. One reason for this is that social network sites were designed for communication with friends and family, and were not meant to be viewed by employers. The authors begin their chapter with a review of literature on individuals’ reactions to using social network sites and search engines. Next, they apply a model of organizational justice and Leventhal’s fairness principles to understand the factors affecting individuals’ perceptions of unfairness. Finally, the authors offer interesting directions for future research on these issues.

David N. Dickter, Victor Jockin, and Tanya Delany present a review of the literature on e-selection in Chapter 13, describing the current state of research and its applicability to organizations. Similar to e-recruiting, main core aspects of Internet technologies relevant for e-selection are the high accessibility of information, the opportunity of interactive communication despite geographic distance, as well as automatization in data acquisition and analyses. The chapter begins by highlighting the problems and solutions associated with e-selection including deployment, data security, test equivalence, and the use of unproctored (unsupervised) tests. Next the authors discuss the landscape of e-selection tests and assessments and offer some considerations involved in their development and use. They describe issues associated with the implementation and emphasize that multiple stakeholders are involved in the e-selection process (e.g., applicants, employees, managerial decision makers). They also consider contextual factors affecting the e-selection process including international laws, policies and data-privacy standards that apply to all candidates as well as protected groups, delivering tests under unproctored conditions, and communicating and training. Finally, the authors offer suggestions for areas for future research in this rapidly-evolving field.

Switching from recruitment and selection to the management of workers, Surinder Kahai, Bruce J. Avolio, and John J. Sosik argue in Chapter 14 that the spread of
information technology has influenced how leadership is transmitted and received in organizational contexts. In this context, all five core characteristics of Internet-based work are involved. E-leadership is defined as the “social influence process embedded in ... multiple contexts and mediated by advanced information technology (AIT), that produces changes in attitudes, feelings ... behavior, and performance (Avolio, Sosik, Kahai, & Baker, 2014, p. 107). In their chapter, the authors consider the various themes related to e-leadership in the literature, and discuss whether information technology changes leadership in three different contexts: media context, virtual teams, and social media. In doing so, the authors describe the different dynamics between information technologies and leadership, especially how information technologies change leadership, how leadership might change information technologies, and how leaders must be aware of these changes in the new sociotechnical context. The authors end by offering instructive directions for future research.

Also focusing on the management of Internet-based work, Chapter 15 provides a review on the vibrant literature on virtual teams. After summarizing the existing theoretical work and methodological paradigms, Travis Maynard, Lucy L. Gilson, Nicole C. Jones Young, and Matti Vartiainen move forward and outline promising future research perspectives, including longitudinal designs and network analyses in existing teams, as well as mobile devices for data collection. While discussing the different conceptualizations of team virtuality in the literature, the authors argue for a more fine-grained examination of the different dimensions of team virtuality (e.g., geographic dispersion, technology usage), a call that fits well to the overall perspective taken also in the current chapter. Finally, the authors present a comprehensive overview of empirical research findings on the different determinants of virtual team effectiveness.

The last two chapters of Part II are devoted to personnel development. In Chapter 16, Bernad Batinic and Carrie Kovacs maintain that the use of Internet-based technology has been widely used to conduct and report the results of employee surveys in organizations. These processes are particularly related to faster and more economic access to information and to documentation and reprocessability of communication. Internet-based technologies are used not only to plan surveys, collect and analyze data, and communicate the results, but also to implement and evaluate new programs. In the beginning of the chapter, the authors argue that this new technology offers many advantages (e.g., ease, speed of use) while presenting several challenges. Next, the authors explore the technology applied to using the Internet throughout the survey process, for example, project management, use of online employee surveys, and electronic reporting of results. In doing so, they also discuss specific issues associated with using electronic surveys, including data quality, response rates, survey design, and benchmarking. Finally, the authors discuss the risks and opportunities of using online employee surveys, and offer directions for future research.

Chapter 17 provides a comprehensive review on the wide and vibrant field of e-learning at work. High accessibility, increasing interactivity and boundary-crossing aspects of technologies are central in this field. Richard D. Johnson and Kenneth G. Brown argue that technology has transformed how training and education are delivered in organizations, and summarize the considerable research on effectiveness and acceptance of e-learning processes at work. They contend that research has consistently revealed that a well-designed e-learning program can be as effective as face-to-face programs. After reviewing and discussing several e-learning frameworks, the authors present a new integrative framework to guide research on the topic. Based on a review of the literature from multiple disciplines (e.g., management, education, psychology) they also offer suggestions for how to design effective e-learning initiatives, and consider directions for research to move the field forward.
Part III: Societal-level implications

The third section further broadens the scope of analysis to the societal level. Indeed, the introduction of Internet-based technologies has allowed changes at the macro-level of work with both positive and negative implications. On the one hand, the Internet has ignited many new powerful business ideas, creating new job perspectives and wealth. Many of the newly created products and services facilitate our lives (e.g., e-commerce), protect the environment (e.g., decreased commuting due to flexwork and blended working) and our health (e.g., tele-medicine), and increase our knowledge (e.g., free online encyclopedias) and wellbeing (e.g., Internet-based entertainment). On the other hand, the Internet has changed the way work is distributed among social groups, and new forms of work organizations have negatively affected workers’ rights and social security. In addition, digitalization and automatization of work, along with a general transition from manufacturing to knowledge and service economies in many industrialized countries, have resulted in the displacement and unemployment of many workers. These developments may also have political implications because alienation and a lack of occupational perspectives contribute to feelings of social exclusion, political radicalization, and xenophobia.

Part III addresses this complex field in three exemplary chapters that focus on psychological implications of automatization at work, on potential conflicts between social groups due to different access to the Internet, and on potential age-related opportunities and conflicts at work. The fourth and final chapter concludes this part, summarizing more general opportunities and visions based on the current development of the Internet, creating new ways of working and organizing work.

In Chapter 18, Jochen J. Steil and Günter W. Maier focus particularly on automatization and boundary-crossing aspects of Internet-based technologies, and review the current research on robots in digitalized industries, including the implications for human workers having to interact with robots. Particularly in light of more recent technological trends known as “manufacturing 2.0,” “cyber-physical systems,” and “Internet-of-Things,” potential qualitative shifts in the interaction and decision-making power between human workers and machines have become an important issue, for example, who is taking the lead in the work process. The authors first describe standard as well as novel and advanced robot technology that are particularly relevant to the interaction with human workers. This is followed by an in-depth discussion of implications both from the user and the developer/system designer perspective. Although these considerations are mostly applied in the field of industrialized production where the prevalence of robots is highest to date, the authors also discuss potential usages of digital robot technologies in other work contexts.

In Chapter 19, Dianna L. Stone, Dianna Krueger, and Stephen Takach focus on social conflicts that might occur as unintended consequences of the growing use of the Internet at work. In doing so, they particularly address potential implications of different access to information as well as boundary-crossing aspects of Internet-based technologies. In the first part of the chapter, the authors outline potential disparities between social groups (gender, ethnic groups, etc.) in the access to the Internet and/or differences in the usage of Internet-based technologies that might lead to discrimination in job opportunities, career, and socio-economic status. Understanding the psychological dynamics that uphold such negative processes is important for developing effective countermeasures. Next, the authors discuss potential privacy invasion (and perceptions thereof) as another important source of conflicts during Internet-based work. They introduce a psychological model of privacy perception, and review the existing empirical research in light of this framework.
Moreover, the authors compare the obtained central factors with international privacy laws and suggest instructional directions for future research as well as guidelines for organizations and legislators to develop sound privacy protection policies.

Also addressing potential inequalities between social groups when adopting Internet-based technologies, Gabriela Burlacu, Donald M. Truxillo, and Talya N. Bauer discuss in Chapter 20 potential implications of chronological age for Internet-based work. The chapter starts with a review of empirical research on age differences at work, followed by a more general review of age-related changes in cognition, personality, motivation, and societal context, as well as age differences in Internet use overall. Based on this foundation, the authors develop specific predictions for age differences in the various domains of electronic HR management, such as e-recruiting and e-selection, e-leadership, virtual teamwork, and e-learning. In light of the current lack of empirical research here, these sound theoretical predictions help to structure this emerging field, and might already provide initial guidance for age-differentiated management of Internet-based work facing an increasingly age-diverse workforce in many countries today.

Finally, in the concluding Chapter 21, Stela Lupushor and Alex Fradera outline rich and fascinating visions for the future of Internet-based work. In doing so, the authors consider all five core characteristics of Internet-based work, and categorize their anticipated developments into three major trends: “datafication,” describing the conversion of work-related activities, interactions, and relationships into a common language that facilitates new forms of analytics of workflow and work dynamics; “digitization” describing the transformation of working activities and even the workplace itself through the use of digital media and devices, providing new opportunities to integrate physical and digital aspects of work; and “disintermediation,” describing the decomposition of work value chains and the removal of intermediaries, which reconfigures work more closely around the consumer’s experience. The authors illustrate these processes in various work contexts, including data analytics, automatization and robotics, block-chain technology, and virtual reality applications and show how drastically the Internet and related technologies can change the world of work as well as impacting the wider society. In their outlook of potential future developments, the authors stress both bright and dark aspects, underlining again the need for continuous research to support the positive and prevent the negative consequences of the Internet at work.

Together, the different parts and chapters of this handbook cover the most prominent research topics of psychological implications of the Internet at work. Of course, this selection is not conclusive. Some potential topics currently lack the critical mass of empirical studies required for a literature review. Other topics are at least partly addressed, for instance, e-commerce and electronic bargaining is discussed in Chapter 6. The large amount of research on online communities and online knowledge management is partly addressed in Chapter 3. The emerging field of virtual coaching and mentoring is covered in another volume of this handbook series (see Ghods & Boyce, 2012).

We hope that this handbook will be a useful resource for postgraduate researchers, students, and academics looking for a comprehensive review of the literature as a starting point for their own research. In addition to stimulating research in the different fields, the collection of topics and the cross-references between the chapters might also ignite new perspectives, connecting different fields and levels of analysis for a more complete understanding of the Internet at work. Last but not least, scientist-practitioners might gain a fuller understanding of the depth and scope of the literature in their area of interest, finding innovative ideas and guidelines for their practical work.
Conclusion

Editing a handbook is probably the best way to obtain a decent overview about a research field. These are the conclusions we have taken from this fascinating and insightful process: without doubt, more research by work and organizational psychologists is needed in this rapidly evolving field. In addition to established topics (e.g., e-recruiting, e-leadership, e-learning) and tools (e.g., email communication), more consideration of current technological trends is required. As noted by Gilson and colleagues, “research appears not to be keeping up with practice” (Gilson et al., 2015, p. 14). Notably, the ongoing technological innovations also provide fascinating new tools for doing research, i.e., collecting continuous and rich data from work processes that still have to be better integrated (e.g., George et al., 2016; Kozlowski, 2015). In addition, theoretical frameworks are central to connecting technological features with specific psychological mechanisms. This not only provides a better understanding of different effects of technologies, but might also enable psychologists to take the lead in future technological developments to design both effective and healthy work conditions. Indeed, adapting technological developments to human needs is a still growing occupational field where psychologists not only benefit from sound theories and methods, but also from social and communicative skills when taking the role of a mediator, translator, or knowledge broker in interdisciplinary research groups. In light of these prospects, and given the wide and ever-increasing prevalence of Internet-based technologies in nearly all aspects of work today, psychological implications of the Internet at work should receive more acknowledgment in the regular teaching curricula of work and organizational psychology, in addition to the classic issues of human factors and human–computer interaction. We hope that the current handbook provides useful insights and material for all of these processes.

References


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