

**USING DIGITAL TECHNOLOGY IN EXPATRIATE MANAGEMENT:
BETWEEN ORGANIZATIONAL BENEFITS AND INDIVIDUAL
ACCEPTANCE**

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ABSTRACT

Based on the review of both academic and practitioner-oriented literature as well as media reports on the uses of digital technology in the field of (international) human resource management, this article outlines the reported and potential uses of digital technology in expatriate management, by concentrating on a number of selected areas, such as people analytics, social media and online collaboration technology, as well as artificial intelligence. Furthermore, the benefits and constraints of using digital technology to manage international assignments from an organizational perspective and a model of individual technology acceptance during expatriate assignments are proposed.

Keywords: HR analytics, social media, virtual assignments, collaboration technology, artificial intelligence, digitalization, expatriate assignments, individual technology acceptance

INTRODUCTION

Today, digitalization is often referred to as one of the most important trends experienced by modern businesses (see, for instance, Deloitte, 2018). New types of workplaces reflecting the modern realities of industry 4.0 are becoming commonplace. The related new job design options are characterized as being “more interconnected, digital and flexible” (Federal Ministry of Labour and Social Affairs, 2017, p. 203). These changes of work organization certainly go beyond the area of human resource management (HRM) and pertain equally to the management of international operations and assignments. Indeed, the general development of transportation as well as of information and communications technology (ICT) is expected to have a crucial effect on the future of global talent mobility (PricewaterhouseCoopers, 2010). As a result, it could be predicted that in the near future, technological advancements will build the focus of studies in all the fields of research related to international human resource management (IHRM) including the area of expatriate management.

Recently, there has been a growing body of academic literature (for some reviews see Bondarouk et al., 2017, Gilson et al., 2015) and practitioner reports on the use of digital technology in HRM, including the motivation for using e-HRM tools and general benefits for enterprises (Hawking et al., 2004, Ruël et al., 2004, Parry, 2011, Parry and Tyson, 2011) as well as issues related to implementing digital applications in international operations of multinational corporations (Ruël et al., 2004). However, research on the use of digital applications specifically in expatriate management is still scarce (Zhu et al., 2018).

In order to make a step towards bridging this research gap, this paper seeks to contribute to the development of the area of digital technology use in IHRM by reviewing both the key academic and practitioner literature as well as media reports that cover the main issues and challenges related to the use of digital technology in (I)HRM in general and in the field of expatriate

management in particular. In doing so, this article does not aim at embracing the whole diversity of digital technology that is used or can potentially be utilized in managing expatriation. Instead, it concentrates on three main technology-related trends with respect to HRM identified by Deloitte (2018) in their recent survey: (a) people analytics, (b) social media and online collaboration technology, and (c) artificial intelligence (AI). Subsequently, building mainly on the discussion of the limitations related to the use of the above types of digital technology and the technology acceptance models (Davis, 1989, Venkatesh et al., 2003), we propose a model of an individual acceptance of digital technology during expatriate assignments.

The uses of the above digital technology in expatriate management will be discussed in the following section of this article. Furthermore, limitations related to the use of digital technology in expatriate assignments are highlighted. Finally, an individual technology acceptance model with respect to digitalization of expatriate assignments is proposed, which is followed by a conclusion.

USE OF DIGITAL TECHNOLOGY IN EXPATRIATE ASSIGNMENTS

The discussion on the benefits and incidence of the technology use in HRM has quite a long history (see Bondarouk et al., 2017, for an overview). More than two decades ago, Broderick and Boudreau (1992) showed, for instance, that the majority of the Fortune 500 companies in their sample used human resource information systems (HRIS). Today, these and further digital technology-based applications are widely utilized for a variety of purposes, such as transaction processing, reporting, expert and decision support systems (Broderick and Boudreau, 1992), electronic (e-) recruitment and selection, e-learning, e-compensation or employee self-service systems (ESS) (Stone et al., 2015, Hawking et al., 2004), to name just a few of all possible uses of ICT to manage people in organizations. Recently, the related tools have increasingly been in the focus of investigations in the field of e-HRM, which is defined by Ruël et al. (2004, pp.

365-366) as “a way of implementing HR strategies, policies, and practices in organizations through a conscious and directed support of and/or with the full use of web-technology-based channels”.

The topic of digitalization has been repeatedly reported by HR practitioner organizations and major management consultancies around the world as one of the most important trends in the field of human resource management. For instance, in its recent Global Human Capital Trends survey based on responses of over 11,000 leaders and HR managers, Deloitte (2018) presents three main developments related to the implementation of digital technology in the workplace: (1) people data, (2) hyper-connected workplace, as well as (3) artificial intelligence (AI), robotics and automation. With respect to the first reported trend, the above survey underscores the increasing use of people analytics in HRM. The hyper-connected workplace is mainly associated with the rise in the usage of collaboration platforms and social media. Finally, as far as the last trend is concerned, the increased implementation of AI-based solutions for HR activities, such as recruitment and selection, has been in the center of attention.

Despite the key importance of digitalization as a major trend related to HRM internationally, the growing literature body on electronic HRM and the use of technology in managing human resources (for an overview see Stone et al., 2015), academic research related to the international aspects of implementing digital applications in HRM is still quite limited. Based on their comprehensive literature review on e-HRM from a cross-national perspective, Ruël and Bondarouk (2018) conclude: “Truly international comparative e-HRM research is scarce... The comparative studies available are basically atheoretical and do not refer to cultural or national contextual aspects as an explanatory factor” (p. 347).

This scarcity of the related academic research in the field of IHRM is especially prominent with respect to investigations specifically dedicated to the use of technology in expatriate

assignments (Farndale et al., 2017, Zhu et al., 2018). However, the current literature on the uses of digital technology throughout foreign operations of multinational enterprises (MNEs) could potentially inform the studies on expatriate management as well. For instance, the role of language standardization in facilitating the use of e-HRM in MNEs, which was investigated by Heikkilä and Smale (2011), could be linked to the research dedicated to the role of expatriates as ‘language nodes’ (Marschan-Piekkari et al., 1999). Another example is the research dedicated to the role of expatriates in standardization of HRM practices in MNEs, which could be informed by the evidence that MNEs use e-HRM for the purpose of global standardization (Ruël et al., 2004).

Moreover, there is a broad consensus in the current literature in the field of IHRM that many technological developments have “eliminated physical and time barriers” (Bondarouk and Brewster, 2016, p. 2653) and thus have important implications for global mobility in general and especially for alternative forms of expatriate assignments (Collings et al., 2007), such as virtual expatriation (Welch et al., 2003). While the latter topic is closely related to research on global virtual teams, which is a comparably well-researched area of studies (Gilson et al., 2015, Jarvenpaa and Leidner, 1999, Klitmøller and Lauring, 2013), a number of investigations in the area of traditional expatriate assignments have indirectly provided evidence of the increasing importance of digital technology at different stages and with respect to various aspects of expatriation. For instance, a growing literature body has been dedicated to the use of online social networks by expatriates and their family members, which – as suggested by Crowne et al. (2015) – have a potential positive influence on the expatriates’ well-being, knowledge transfer, adjustment levels and performance. Similar evidence has been provided not only with respect to traditional expatriate assignments but also their alternative forms, as in the example of the use of digital technology to maintain social networks by Portuguese self-initiated expatriates (Pinto and Araújo, 2016).

The practitioner literature reports current or potential areas of digital technology use in expatriate management, which include recruitment, different aspects of expatriate compensation, such as cost-of-living calculations, taxation, social security contribution determination or consideration of exchange rate fluctuations, relocation and adjustment support, and repatriation (Mercer, 2017). An example of such innovations is myMobility application for mobile devices designed by PricewaterhouseCoopers to allow its customers to collect and analyze assignment data and to provide expatriates with updated immigration and tax information (PricewaterhouseCoopers, n. d.). However, according to the above-mentioned report by Mercer (2017), notwithstanding the advantages of digital solutions with respect to managing international assignments, a large proportion of enterprises in their sample do not use any specialized software for expatriate management and mainly rely on Microsoft Office® tools for the related purposes.

In the following subchapters, the uses of digital technology in IHRM and implications for the field of expatriate management related to the three main trends highlighted in the above-mentioned Global Human Capital Trends report by Deloitte (2018) will be discussed: starting with the importance of social media and online collaboration technology during an expatriation and further proceeding with the issues of HR analytics and AI uses in expatriate management. In this review, the academic and practitioner literature is combined to outline the current and potential benefits of the corresponding digital technology for different aspects of expatriate assignments.

Social media and online collaboration technology

The internet has been stated to be the most disruptive technology of the last decades, named number one innovation of the last 30 years in 2009 (Knowledge@Wharton, 2009). Indeed, the impact of internet-based applications on different aspects of expatriate assignments is

impossible to underestimate. Emails, for instance, have become a commonplace and standard form of business and private communication. According to a recent study by the Radicati Group (2018), there were more than 3.8 billion business and private email users in 2018 and this number is expected to further increase by more than 400 million by 2022.

Today, however, online social media represent another internet-based technology that has been rapidly expanding in use both for private and work-related purposes. There are different types of social media, such as “collaborative projects, blogs, content communities, social networking sites, virtual game worlds, and virtual social worlds” (Kaplan and Haenlein, 2010, p. 60) which include applications (e.g., Facebook or Twitter) that have more users than the populations of large national states or even regions. According to the estimations of eMarketer (2017), social media were regularly used by almost 2.5 billion persons in 2017; and this number is expected to grow to over 3 billion users by 2021, which is to a large extent driven by the increased use of smartphones and related mobile applications. The above-mentioned report by Deloitte (2018) showed that 67% of respondents expect the use of work-based social media to increase in the next three to five years, while 44% believe that face-to-face meetings will become less important in the same time period. The primary importance of social media uses in HRM as a major technological trend was also shown by Heikkilä (2013).

Along with the increasing use of social media, there has been a growing attention to collaborative tools ranging from applications such as Skype for Business or Slack (Allison, 2018) to cloud computing services such as Google Drive or Microsoft OneDrive (Qin et al., 2016).

One of the examples of the digitalization’s high potential impact on the expatriation practice is the cultural adjustment of expatriates and their trailing families during international assignments, which has enjoyed close attention of IHRM scholars (Black et al., 1991, Shaffer

and Harrison, 2001). This deep interest in the topic results from the evidence of a link between the expatriates and their family members' level of adjustment to a new environment and the success of expatriate assignments, which represents an important benefit for organizations. The major underlying models – such as the framework of expatriate adjustment proposed by Black et al. (1991) or the model of expatriate spouse adjustment by Shaffer and Harrison (2001) – underscore the importance of individual, interactional and environmental variables for the adjustment process.

Digital applications have a potentially important role in decreasing the cultural novelty level – a notion related to the environmental factors of cultural adjustment. An expatriate employee and his or her family members can effectively get informed about a new destination by using social media. Family support and social networks – as key factors related to interpersonal relationships – are increasingly facilitated not only by phone conversations, which have become much more affordable over the last years, but primarily by the use of internet-based communication – such as voice over internet protocol (VoIP) technology (The Economist, 2015) – and social media applications.

The importance of social media for expatriate assignments is reflected in the growing literature body on this issue that investigates, for instance, the role of blogging (Nardon et al., 2015) or social networks in general (Crowne et al., 2015, Pinto and Araújo, 2016) in expatriate adjustment. For instance, Nardon et al. (2015) showed that blogs play an important role in reducing uncertainty that can be potentially experienced by expatriates during international assignments and serve as an effective replacement of face-to-face contacts.

A topic primarily related to the use of digital technology is the implementation of virtual assignments. Although virtual assignments are not expatriate assignments in the traditional sense, they have been discussed by IHRM scholars as an alternative assignment type, first of

all due to the practical benefits of these compared to traditional expatriate assignments (Welch et al., 2003). Since, by definition, virtual assignments do not involve a physical relocation to a foreign subsidiary of a MNE within a framework of expatriation and the related tasks are fulfilled remotely, assigning companies can avoid problems related to the low acceptance rates of expatriate assignment offers or high costs of expatriation (Collings et al., 2007, Welch et al., 2003).

While the literature body specifically dedicated to expatriate virtual assignments is still relatively small, the academic community can be informed by referring to extensive virtual teams research (Zhang et al., 2018, Gilson et al., 2015), including multinational virtual collaboration (Jarvenpaa and Leidner, 1999, Klitmøller and Luring, 2013). Apart from the developments in (mobile) social media, and their reported positive effects on teamwork (Cristea et al., 2019), video conferencing and other electronic communication tools, it is probably the cloud-based collaboration technology that has significantly facilitated international virtual assignments. Indeed, cloud-based tools ensure collaboration “without worrying about the technology platform, device or location of the user” (Lal, 2016, p. 15).

Such virtual communication and collaboration technology not only makes the pure virtual assignments possible, but also supports many aspects of traditional expatriate assignments. For instance, given the current incidence of various digital platforms, it is expected in this paper that mentoring for expatriates (Zhuang et al., 2013) – especially when provided by parent-country nationals that are separated from their mentees by distance – is to a large extent associated with e-mentoring that relies on internet-based technology such as Skype (Sanyal and Rigby, 2017). Such mentoring plays an important role not only in supporting expatriate adjustment and development in a foreign location (Zhuang et al., 2013), but also in facilitating a smooth re-entry process; whereby the social media-based tools could be used to provide further important support to repatriated employees (Hyder and Lövblad, 2007), such as

enhanced communication and network building with the home-country organization (Lazarova and Caligiuri, 2001).

HR analytics and expatriate management

One of the major trends related to the application of digital technology in modern companies is the use of people or HR analytics, a topic that has enjoyed an increasing academic interest over the last years (for an overview of literature on HR analytics see Marler and Boudreau, 2017). Companies such as Google (Garvin, 2013) have extensively used the data-driven approach to performance management by collecting information about all aspects of employees' traits, behaviors and attitudes. Marler and Boudreau (2017) define HR analytics as an "HR practice enabled by information technology that uses descriptive, visual, and statistical analyses of data related to HR processes, human capital, organizational performance, and external economic benchmarks to establish business impact and enable data-driven decision-making" (p. 15).

In the field of expatriate management, there is still a lack of academic literature dedicated to uses of HR analytics. However, from the practical standpoint, the implementation of the related tools could represent an effective solution to a number of current problems; whereby, overall, the potential uses of HR analytics could be manifold. For instance, according to a recent report on major trends related to global mobility by Brookfield Global Relocation Services (2016), the majority of surveyed companies indicated that accurate data analytics featured a major challenge to managing expatriate programs, above all, due to the lack of adequate infrastructure. An example of such uses of HR analytics in expatriate assignments is the evaluation of assignment costs. Moreover, according to a recent report published by the SHRM Foundation in cooperation with the Economist Intelligence Unit (2016), one of the most important potential uses of big data is early determination of intentions to leave the company, which would allow the management to design the retention measures. If applied to expatriate management, HR

analytics could thus potentially be used as a tool to identify the dissatisfaction of repatriated assignees and thus to contribute to solving the acute problem of expatriate turnover after the termination of international assignments (for a discussion of the issue of expatriate turnover and the importance of the perceived organizational support, see Lazarova and Caligiuri, 2001).

Beside the practical benefits of using HR analytics, for example, to measure expatriate return on investment (ROI) (McNulty et al., 2009), technological developments allowing to collect accurate data and to perform big data analysis open for an IHRM researcher totally new horizons for exploring different international or intercultural aspects of managing human resources in multinational organizations. This potential benefit could be exemplified by referring to the investigations of national cultures. In 1980, Geert Hofstede published his seminal book, where he proposed four original dimensions that could be used to describe different cultures (Hofstede, 1980). Notwithstanding the criticisms of the study (see, for instance, Chiang, 2005), this work is still used as a basis for multiple pieces of research in the field. Indeed, Hofstede's contribution is difficult to underestimate, especially considering the amount of data collected, processed and analyzed by using the technology of the 1970s: 116,000 attitude survey questionnaires from IBM's 72 country locations were studied for the purpose of this research (Hofstede, 1980). The resulting cultural dimensions were frequently used as cultural measures in the studies in the field of IHRM in general and expatriate research in particular (for an example see Shung et al., 2007).

Definitely, the opportunities offered by today's digital technology are immense compared to tools used by Hofstede. Not only does the statistical analysis software allow to perform sophisticated tests literally at a mouse click, but the increased digitalization of HRM in general and the use of HR analytics in particular create new opportunities for data collection. Instead of using paper-and-pencil questionnaires, such as those that were administered at IBM in the late 1960s and early 1970s and used by Hofstede for his research, modern companies are

increasingly implementing software to collect and evaluate data on various aspects of employee work performance or attitudes, including monitoring their engagement (Angrave et al., 2016). It would be no exaggeration to state that an access to such big data in a large multinational enterprise would allow researchers to explore the cultural differences between nations or ethnic groups by controlling for a plethora of factors such as age, gender, marital status, education level, international experience and so on. Thus, it would be possible to address the call by Kirkman, Lowe and Gibson in their review of research based on Hofstede's work "to look beyond this [Hofstede's] paradigm to break new ground with respect to cross-cultural investigations" (Kirkman et al., 2006, p. 313).

Similar to the benefits for the academic community outlined above, organizations could profit from the understanding of culturally determined attitudes and values based on big data analytics that could be helpful in implementing culturally-sensitive management approaches in line with the leadership preferences of the host-country nationals (Selmer, 1996).

Artificial intelligence

Kaplan and Haenlein (2019) define artificial intelligence as "a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation" (p. 17). The uses of AI in HRM range from selection activities related to advanced application tracking systems (ATS) (Kaplan and Haenlein, 2019) to performance management systems (Nunn, 2018).

Compared to the above-described examples of digital technology use in international assignments, the application of AI in expatriate management seems to be the least researched area. It can be expected, however, that more studies on this topic will follow along with the increasing implementation of this technology to recruit, select, train, develop or appraise expatriates.

One of the areas where AI-related technology has been in the focus of research and can be potentially related to the field of expatriate management is the use of artificial agents in global virtual teams (Gladden, 2014). It is suggested that such artificial agents can be good substitutes for managers of human virtual teams, and that they can be able not only to perform managerial functions but also to adopt culturally sensitive behaviors deemed to be appropriate by different team members with various cultural backgrounds (ibid.).

The above-described issue of cultural awareness is even more crucial with respect to traditional expatriate assignments, first of all with respect to recruitment and selection, pre-departure and on-site training as well as adjustment. For instance, language fluency – as an important individual-level factor of adjustment (Shaffer and Harrison, 2001) – can be increasingly facilitated by the use of modern language learning solutions, including those related to AI. An example thereof is the Google Translate application that offers an opportunity for users to translate sentences spoken in a foreign language (Barney, 2019). Google Translate app for mobile devices is just one of the tools currently available on the market that can not only translate written text, but can also recognize and translate speech and scanned characters (Samiljan, 2018). Thus, the reported problem of expatriates' cultural adjustment, especially in culturally distant countries with non-Latin script languages, like Cyrillic, Arabic, Chinese or Japanese, can be to a large extent mitigated by using such applications. AI-based tools not only ensure the necessary language support and training, but can also be used to provide intercultural awareness training as well, for instance, by using animated pedagogical agents (Johnson and Lester, 2016).

Another potential use of AI-based tools in managing expatriate assignments is the selection of expatriates for international assignments. Software such as the one utilized by Unilever (Feloni, 2017) could be effectively used to select among expatriate candidates by considering the whole array of criteria relevant for the success of international assignments (Caligiuri et al., 2009) and

by targeting applicants around the globe (e.g. to recruit and select expatriates from third countries).

However, it is important to consider not only the potential benefits of using digital technology in managing expatriate assignments but also possible problems and limitations as presented in Table I below and discussed in the subsequent section of this paper .

< Place Table I about here >

The benefits of using digital technology presented in the above table represent solutions to the typical problems related to the management of expatriate assignments. As such, they could be also linked to the benefits of implementing e-HRM discussed in the previous literature (Ruël et al., 2004, Parry, 2011, Parry and Tyson, 2011). For instance, the increased implementation of virtual assignments or facilitation of the family adjustment, which is expected to contribute to reducing the likelihood of expatriate failure, would ultimately result in a significant cost reduction – probably, the most frequently discussed outcome of adopting e-HRM (ibid.).

Limitations of technology use in expatriate assignments

Notwithstanding the above-described benefits of digital technology use in expatriate assignments, there are appeals that the importance of technological developments related to HRM should not be overestimated, as in the case of HR analytics that can be considered to be a new management fad (Rasmussen and Ulrich, 2015). Such critique results not only from the lack of evidence of the value added of digital technology applications, but is also associated with the limitations of the use of such technology in HRM. For instance, Stone et al. (2015, p. 216) describe a number of those limitations, such as digital applications being “impersonal and passive, [...] not always allow[ing] for interpersonal interaction, and [...] often creat[ing] an artificial distance between individuals and organization”. This could be shown on the example of performance management: Bondarouk and Brewster (2016, p. 2660) point out that the use of

digital technology to manage employee performance to may lead to “overlook[ing] crucial outcomes like commitment, intention to leave, or social behaviour of employees”.

Moreover, concerning the technology use in expatriate assignments, it is possible to provide examples of limitations related both to the practical implementation and academic research. Virtual assignments represent a frequently addressed example of practical limitations of digital technology. For instance, Holtbrugge and Schillo (2008) suggest that virtual assignments and the associated lack of face-to-face interaction exacerbate intercultural management problems, which could be mitigated by designing and implementing special intercultural training programs. Indeed, Cappellen and Janssens (2010) showed that all of the global managers from their study sample stated that face-to-face contacts were necessary to complement virtual communication. Here, an additional aspect of difficulties related to trust-building in global virtual teams (Jarvenpaa and Leidner, 1999) should be underscored. It is the need to build trust in virtual teams that makes almost entirely virtual companies like the US-American web-developing corporation Automattic organize annual meetings for all their internationally dispersed staff (Automattic, 2019), which results, in the words of Handy (1995, p. 45), in a paradox: “the more virtual an organization becomes, the more its people need to meet in person”. In addition to the superior efficiency of face-to-face communication in some situations, Klitmøller and Lauring (2013) also emphasize the potential negative impact of cultural and linguistic specifics on communication in virtual team settings.

Further potential limitations are related to the restrictions on the use of social media that might be imposed by the governments of some countries (Routley, 2017) as well as large variations in internet availability and connectivity among the countries. For instance, many developing countries such as Yemen, Paraguay or Gabon are reported to fall far behind the leading countries such as South Korea, Norway or Sweden in terms of average connection speed (Akamai, 2017). In their overview of cross-national studies on e-HRM, Ruël and Bondarouk

(2018) showed that a number of studies provided evidence of the primary importance of the telecommunications infrastructure as a key determinant of e-HRM adoption. As the use of social media and online collaborative tools becomes increasingly commonplace, and expatriates and their families rely on this technology, the lack of availability of such services might be a considerable concern that needs to be addressed in the preparation and organization of expatriate assignments.

A further important limitation of the use of digital technology in managing expatriation could be privacy concerns related to the utilization of HR analytics (Berman-Gorvine, 2015) and country-specific data protection legislation. Indeed, Ruël et al. (2004) provided evidence of related constraints – e.g. in the form of privacy legislation in Belgium or as related to the role of Works Councils in Germany – on the implementation of eHRM by MNEs. In a similar vein, (Harris et al., 2003) showed the differences in expectations towards privacy in Belgium and the USA and concluded: “These cross-cultural differences reflect the prevailing laws about privacy in their respective countries” (p. 234).

Moreover, using AI in managing expatriate assignments could be potentially fraught with problems and concerns as well. For instance, the related software can develop bias against certain employee groups as in the case of AI-based hiring application at Amazon (Dastin, 2018).

Finally, a potential practical problem and a limitation related to digital technology use in managing expatriate assignments is a possible communication overload, for instance, associated with the utilization of social media or online collaboration tools (Allison, 2018).

INDIVIDUAL ACCEPTANCE OF DIGITAL TECHNOLOGY DURING EXPATRIATE ASSIGNMENTS

To achieve the benefits of the use of technology posited above, organizations have to consider the related limitations stated in Table I and described in the previous chapter. While the

potential advantages of using ICT in expatriate assignments are expected to ultimately result in positive outcomes for organizations, the constraints to such a usage would mainly affect the users themselves, in this case expatriates and their trailing family members. Thus, the benefits of implementing the related technology for MNEs are dependent on the individual usage behavior. A number of theoretical approaches have been proposed to investigate technology use (for an overview cf. Venkatesh et al., 2003), probably the most prominent of which is the technology acceptance model (TAM) by Davis (1989), which was extended by Venkatesh et al. (2003). Given the importance of this model, we propose that it could serve as a basis of an analytical framework to explain the individual acceptance of technology during expatriate assignments.

This original TAM framework suggests that the user acceptance of technology can be predicted mainly by two variables: perceived usefulness and perceived ease of use of the related applications (Davis, 1989). Later on, it has been further developed to include a number of further predictors and moderators, with the most extensive elaboration being probably the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003), that built on a number of models explaining individual acceptance of technology: theory of reasoned action (TRA), technology acceptance model (TAM), motivational model (MM), theory of planned behavior (TPB), combined TAM and TPB model, model of PC utilization (MPCU), innovation diffusion theory (IDT) and social cognitive theory (SCT). The resulting comprehensive model presented in Figure I was frequently used to investigate the intention to use and actual usage of a number of digital applications in organizations, including e-HRM.

< Place Figure I about here >

The definitions of the constructs included in the model are stated in Table II.

< Place Table II about here >

An example of the utilization of this theoretical framework to explain organizational practices in MNEs is the study by Heikkilä and Smale (2011), who used UTAUT as a basis for their model of language standardization effects on the e-HRM use.

Proposed model of technology acceptance during expatriate assignments

Our proposed model of individual acceptance of technology during expatriate assignments is shown in Figure II and includes the constructs described below.

< Place Figure II about here >

Performance expectancy, effort expectancy and social influence

The core determinants of the intention to use digital technology – ‘performance expectancy’, ‘effort expectancy’, and ‘social influence’ – are directly adopted from the UTAUT model as defined in Table II above. Proposed examples of easy-to-use digital applications (with respect to the variable ‘effort expectancy’) that could be utilized by expatriates or their family members could be online blogs or social media applications. Professional collaboration or performance management tools could be considered as more complex examples of technology. With respect to performance expectancy concerning the use of technology during expatriate assignments, AI-based translation applications could serve as examples of technology that might be perceived as being particularly helpful in performing in a foreign country, especially in culturally distant settings.

An example of ‘social influence’ could be the utilization of social media during expatriate assignments, which could be facilitated by the expectations of the extended family members or friends in the home country, or other expatriates or their trailing family members in the host country, that the related applications should be regularly used to maintain the social contacts.

Perceived personal risk

Here, the perceived personal risk could include a person's perceptions concerning data security and other risk areas as described above.

Organizational support

Organizational support is related to the support provided by MNEs with respect to technology use, mainly the technical infrastructure. This construct would correspond to the variable 'facilitating conditions' in UTAUT (Venkatesh et al., 2003), as defined in Table II.

Digital infrastructure in the host country

This variable is proposed to reflect the overall digital context of a given country, including the availability of a high speed internet or freedom of access to the internet or social media sites.

Legal context

This variable is related to the existence of privacy laws, in particular, related to data security, which moderate the effect of 'perceived personal risk' on the use of technology. For instance, Ruël et al. (2004) described the individual concerns that employees have in relation to entering their personal data in eHRM-tools. We expect that these concerns are less prominent if employees know that their personal data are protected by law.

Age

In their talent mobility report published in 2010, PricewaterhouseCoopers predicted that the employment of millennials – who are expected to make the majority of expatriates in the next few years to come – will be associated with “a fundamental change in the assignment duration, package type, and value” (PricewaterhouseCoopers, 2010, p. 13).

It can be suggested that the generational change also has important implications for the use – and thus impact – of technology on international assignments, first of all, due to the technical savviness of the new generation of expatriates (Rossier, n. d.). Parry and Tyson (2011) showed that familiarity with technology was among the most important factors affecting the achievement of organizational goals while implementing e-HRM applications. For millennials, the technological innovations of the last decades, such as the internet, represent a normality that they have been using since their early years (Gilson et al., 2015). As a result, there are reported differences between older and younger generations in using digital technology. For instance, the study by Warner-Søderholm et al. (2018) provides evidence that age has a significant impact on how social media are perceived by their users, with younger employees being more likely to trust the information received through social media. Moreover, previous studies have shown that the age of employees has an impact on different aspects of expatriate adjustment (Selmer, 2001). Thus, given the fact that young people are expected to be more familiar with different types of digital technology and spend more time using it – as in the case of social media (GlobalWebIndex, 2018) - we propose that the variable age will moderate several relationships similar to the moderating effect of this variable in the UTAUT model.

Limitations of the model

While it is proposed that the expatriate technology acceptance model presented in Figure II can serve as a useful framework for an empirical study, there are a number of potential limitations of the model.

First of all, there are a number of variables and effects that are not included in the model. For instance, the UTAUT model included a moderating variable ‘experience’ (cf. Figure I). In our case, given that the new generation is expected to be generally more experienced with ICT, this variable was not included due to a potential positive correlation with the moderating variable

‘age’. On the other hand, given the variety of digital applications that can be potentially used during expatriate assignments, we admit that older employees could be expected to have more experience with specialized professional applications.

Furthermore, the moderating variable ‘gender’ in the original UTAUT model was not included in our framework. Although the majority of expatriates are currently men (Brookfield Global Relocation Services, 2016), there is a growing number of female and other so-called ‘non-traditional expatriates’ (McNulty and Hutchings, 2016). However, given the specifics of the roles of expatriate female breadwinners and the sheer diversity of non-traditional assignments, we propose that the moderating role of gender needs more supporting evidence and future research, similar to the call by Venkatesh et al. (2003). Instead, since our model pertains to both expatriates and their trailing family members, the moderating role of ‘employment status’ might have been included. The rationale for including this variable is the evidence of the negative effect of spousal unemployment on their adjustment to foreign cultures (Shaffer and Harrison, 2001). However, such a moderator might not be relevant to the uses of work-related digital technology such as professional collaboration tools.

Moreover, given the above described evidence of the limited use of specialized digital technology in expatriate assignments by MNEs, we also have not included the moderating variable ‘voluntariness of use’, which was proposed in the UTAUT model.

The inclusion of variables ‘digital infrastructure in the host country’, ‘perceived personal risk’ and ‘legal context’ into our proposed model is motivated by the expectation that these constructs are relevant for different types of technology. However, we admit that for the analysis of specific types of technology, an inclusion of further variables related to potential limitations of the use of digital technology during expatriate assignments summarized in Table I – such as trust – would be useful.

An important limitation of this model is its purely conceptual nature. Consequently, some of the proposed effects might not be valid. For instance, it is suggested in this article that organizational support has a direct effect on the actual usage behavior. However, it could be as well assumed that the organizational support might moderate the impact of the host-country digital infrastructure on the technology use. For instance, in countries with low internet connectivity rates, companies can offer expatriates and their family additional support in securing high-quality internet or alternative solutions to non-accessible social media sites.

CONCLUSION

The use of digital technology in expatriate assignments is a promising research area reflecting the growing importance of digitalization in today's business world. This article outlined key current and potential areas, where digital technology can be used to facilitate expatriate management, as well as challenges associated with such use. The latter limitations related to technology usage were subsequently used in proposing a model of individual technology acceptance during international assignments. Certainly, this overview is far from being complete. For instance, there are a number of examples of further uses of technology in HRM management that can be applied to expatriate management, such as virtual reality-based training and different HR activities that build on gamification approaches (for examples of uses of the above-mentioned and further technology see Landers, 2019). However, the present review represents a first step towards a comprehensive analysis of the uses and role of digital technology in expatriate management. In a similar vein, although the proposed model of technology acceptance during expatriate assignments definitely needs empirical validation, this framework could serve as a basis of a quantitative study aiming at testing corresponding hypotheses.

Overall, it is proposed that investigations in this area should include more evidence-based research to enlighten both the academic and practitioner communities on the trends and current development in expatriate management practice. Furthermore, interdisciplinary studies including fields of (I)HRM, social media communication, information systems and human-machine interaction are required, in order to embrace the new complexity of the digital technology-related trends in managing international assignees globally. This would also potentially imply the need to combine existing theories applied in expatriate research with approaches and models from the area of technology research beyond technology acceptance models, for instance, task-technology fit perspective (Zhang et al., 2018) or media richness theory (Daft and Lengel, 1986).

Moreover, given the diversity of digital applications and a variety of existing and potential problems related to expatriate assignments, a number of further topics and avenues for future research could be suggested. For instance, one of the practically and academically relevant research questions is the impact of digital technology-related risks – such as privacy violations or cybercrime – on the incidence of expatriate failure (Harzing and Christensen, 2004).

Finally, we propose that special attention should be paid to the problem of the so-called ‘virtuality trap’ (Yamin and Sinkovics, 2006), which in case of expatriate assignments would mean the potential problem of overemphasizing the importance of digital technology that supports traditional or alternative expatriate assignments, while underestimating the value of physical presence or face-to-face interactions as well as the knowledge and experience obtained during such personal contacts.

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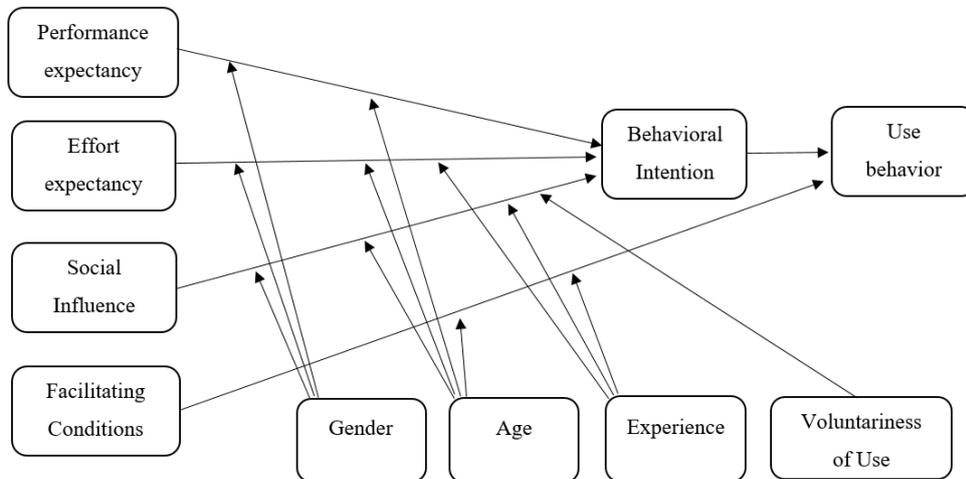
Table I. Benefits and limitations of digital technology use in managing expatriate assignments

Digital technology type	Examples of solutions to expatriate management problems	Potential limitations
Social media and online collaboration technology	<ul style="list-style-type: none"> - Use of social networking tools: <ul style="list-style-type: none"> • to support expatriate and family adjustment in a foreign county (e.g. through enhanced family support and online mentoring) • to facilitate a smooth repatriation process for expatriates and their families • to facilitate virtual assignments - Use of online collaboration technology: <ul style="list-style-type: none"> • to support virtual collaboration during virtual and traditional expatriate assignments 	<ul style="list-style-type: none"> - Social media censorship in some destination countries - Privacy concerns and cybercrime - Internet availability / connectivity problems - Lack of trust and increased potential for intercultural conflicts due to the absence of face-to-face contact - Communication overload
HR analytics	<p>Could be potentially used to:</p> <ul style="list-style-type: none"> • analyse country-specific attitudes, values and behaviours to design selection, training and development and performance management practices and tools for expatriates assigned to corresponding host countries • perform expatriate ROI analysis 	<ul style="list-style-type: none"> - Privacy and legal concerns - Lack of individual consideration of employee characteristics and behaviours
Artificial intelligence:	<ul style="list-style-type: none"> - Use of AI-based tools to recruit and select expatriates - Use of AI-based training tools (e.g. pedagogical agents) for intercultural trainings for expatriates and their families - Use of virtual agents to support virtual expatriate assignments - Use of AI-based language instruction and translation tools to facilitate expatriate and family adjustment, especially in countries with novel or distant cultures 	<ul style="list-style-type: none"> - Potential risk that AI-tools may “learn” to make biased decisions - Lack of individual consideration of employee characteristics and behaviours

Table II. Core determinants of intention and use in the UTAUT model

Construct	Definition
Performance expectancy	“the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003, p. 447)
Effort expectancy	“defined as the degree of ease associated with the use of the system” (Venkatesh et al., 2003, p. 450)
Social influence	“the degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh et al., 2003, p. 451)
Facilitating conditions	“the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh et al., 2003, p. 453)

Source: Venkatesh et al., 2003, pp. 447-453.

Figure I. UTAUT Research Model

Source: Venkatesh et al., 2003, p. 447.

Figure II. Model of technology acceptance during expatriate assignments