



Navigating the New Workplace: Technology, Millennials, and Accelerating HR Innovation

Julio C. Canedo

University of Houston Downtown, USA
canedosotoj@uhd.edu

George Graen

University of Illinois Urbana-Champaign, USA

Miriam Grace

The Boeing Company, USA

Richard D. Johnson

University of Albany, USA

Abstract:

This paper brings together the latest thinking in research and practice on workplace change and the information technology tools and technologies that enable, and, in some cases, drive that change. We address the shifts in global business that focus leadership on innovation, the changing demographics of employee populations, and how these changes impact talent management and emerging methods and tools that enable HR professionals to be more effective and bring new value to their business enterprises. We detail emergent scientific research on how the millennial generation has transformed the workplace. We describe effective methods, tools, and technologies from actual workplace practice to provide practical insights that one can immediately use in a human resource management context. We also present new hypotheses and recommendations for how to leverage the various change scenarios.

Keywords: Millennials, Information Technology, Human Resources, Workplace Change, Innovation, Talent Strategy, Changing Demographics

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1 Introduction

One of the major challenges facing organizations today is how to transform their culture to meet new business realities and employees with changing values (Graen & Grace, 2015a). Organizations that can successfully complete this cultural transformation and who can best leverage employees' knowledge, skills, and abilities will have a great advantage over those that cannot. For example, previous research has found that those companies in the US with the best people practices (e.g., the top 100 best places to work) have outperformed Wall Street's Alpha companies by 3.5 percent annually over 25 years (Edmans, 2011), and those with stronger design-oriented practices outperformed organizations listed in Standard and Poor's 500 by 228 percent (DMI Dialog, 2014). Much of this value comes from the increasing importance of organizations' human resources.

Even so, many organizations that seek to transform their cultures often fail to realize their goals. One potential reason for why is that employees' motivations, needs, and interests can differ based on the generation in which they were born (Twenge, Campbell, Hoffman, & Lance, 2010). Thus, a key question facing organizations is how to create a deeply engaging and high-performing organizational culture that integrates the strengths of multiple generations and offers them an opportunity to use their many talents and skills (Blattner & Walter, 2015). These generations include baby boomers (born 1946-1964), generation X (born 1965-1981), and generation Y (or millennials, born 1982-1999) (Twenge et al., 2010).

Each of these generations came of age in a specific timeframe, and their lives were shaped by shared cultural and historical experiences and the evolution of technology. For example, boomers experienced the Vietnam War, the moon landing, and were raised by members of the silent generation (born 1925-1945) that stressed individual achievement and work above family. Generation Xs experienced the economic boom and consumer growth of the 1980s and 1990s, a "latch-key" childhood due to dual-career families, high divorce rates, and the introduction of the personal computer. Finally, millennials experienced structured and programmed childhood activities, the increased inclusion of diverse members of the population, and rapidly changing technology such as the Internet and mobile devices.

In this paper, we pay particular attention to the millennial generation for several reasons. First, millennials have become the dominant force in the U.S. labor market with over 53.3 million workers and will represent the majority of employees in coming years (Pew Research Center, 2015). Second, millennials have values that differ from those of baby boomers and generation Xs. For instance, they are more likely to leave their organizations for better opportunities when they arise or to hop from job to job than their counterparts (Twenge & Campbell, 2008). Third, millennials are entering the workforce at a time of great technological change and transformation. For example, advances in the Internet and mobile technology are dramatically changing how we communicate, shop, and work. In particular, globally, there are now over seven billion mobile devices in use, and over 70 percent of employees expect to be able to use these devices at work (Boren, 2014). Through technology, organizations are creating a new workplace experience (NWX) for employees that are mobile, social in nature, and visual by design as companies follow the globalization trends (Cisco, 2013; Gruber, de Leon, George, & Thompson, 2015). Fourth, software vendors are rethinking how HR services are delivered and consumed in order to help organizations meet their HR goals of attracting, motivating, and retaining talented employees. Specifically, software vendors are developing human resource information systems (HRIS) with models that emphasize geographic dispersal, deployment, access, and management (Newcomer, 2015) and electronic human resource management (eHRM) processes and practices that streamline recruitment, selection, training, performance, motivation, retention, and compensation (Stone, Deadrick, Lukaszewski, & Johnson, 2015). Individuals are also increasingly using mobile devices including smart phones, smart watches, and tablet computers (Wilson, 2013). In fact, many of these new mobile devices have arisen due to millennials' desires, skills, and needs.

Given the rise in the number of millennials who are joining the workforce, organizations need to develop a better understanding of how they can attract and retain these new employees. We believe, as do others (e.g., Hershatter & Epstein, 2010; Twenge et al., 2010), that organizations can use new forms of technology (e.g., eHRM, mobile computing, Web 2.0, and e-learning) to meet the needs and values of the millennial generation. In addition, we believe that, for organizations to meet the challenge of the new business realities and to create a deeply engaging and high-performing organizational culture, technology can be an extremely useful tool for attracting, motivating, and retaining members of the new workforce (Graen & Grace, 2015a).

In view of this argument, in this paper, we 1) examine how organizations can use new technological tools, methods, and devices to help them attract, motivate, and retain millennials; 2) identify specific eHRM practices that may especially effectively help organizations meet their human resource management (HRM) goals; 3) present hypotheses to facilitate future research on the topic; and 4) offer directions for practice.

The paper proceeds as follows: in Section 2, we identify millennials' values that differ from those of other generations and consider how organizations can use HRM technologies to meet their needs and values. In Section 3, we discuss how the emergence of millennials provides an opportunity for HRM scholars and practitioners to rethink how technology can support the HR function to more effectively meet millennials' needs. Finally, in Sections 4-6, we propose a synergistic leadership model that enhances our understanding of how organizations can design and create a NWX (Hirschman, 2006; Graen & Grace, 2015a).

2 Millennial Values

Although popular press has labeled the millennial generation as holding materialistic, self-centered, and entitled values (Alsop, 2008; Twenge, Campbell, & Freeman, 2012a), we need to consider the empirical research on the potential differences between members of unique generations. We also need to acknowledge that, although generational differences are important, not every person in a generation will fully reflect its values. In fact, when it comes to generational analyses, there can be more variance in generations than across them (Twenge et al., 2010). Even so, generational differences are meaningful and can help one better understand how organizations might meet the basic needs and values of employees who belong to different generations.

A large number of studies have examined how generations are similar or different in terms of values and needs (Twenge & Campbell, 2008; Twenge et al., 2010; Cennamo & Gardner, 2008). This research has discovered that, over time, personality, work values, and leisure values have changed from generation to generation. For example, research found that values placed on work centrality have decreased but materialistic expectations have increased (Twenge & Kasser, 2013). In other words, millennials value things such as money and fame highly but are less willing to sacrifice their personal lives to obtain them (Twenge et al., 2010).

Research also found several personality differences between baby boomers, generation Xs, and millennials. First, narcissism has risen: millennials show more narcissistic personality traits than other generations (Twenge, Konrath, Foster, Campbell, & Bushman, 2008; Foster, Campbell, & Twenge, 2003; Twenge et al., 2012a). Second, millennials have higher levels of self-esteem and extroversion than previous generations (Twenge, 2009). Third, millennials' confidence is, on average, higher in terms of academic skills, creativity, leadership, public speaking, writing, and achievement drive than their counterparts (Twenge, Campbell, & Gentile, 2012b). Fourth, although millennials have higher self-esteem, they also feel less control over their environment than members of other generations (e.g., a more external locus of control) (Twenge & Campbell 2008). Fifth, millennials are more individualistic than previous generations and often score higher on self-reliance, competitiveness, and preference for working alone than others (Twenge, 2010; Sirias, Karp, & Brotherton, 2007). As a more individualistic generation, intrinsic values such as affiliation and community at work, social approval, and need for work connections do not motivate them as much as other generations (Twenge et al., 2012a). Finally, a critical challenge that millennials face is mental health. Twenge et al. (2012a) and Twenge et al. (2010) have found that millennials are more likely to suffer from anxiety, depression, and poor mental health than previous generations. Millennials are also less likely to trust institutions and other individuals than previous generations (Twenge, Campbell & Carter, 2014). From this research, one can see meaningful personality differences between generations. These differences are likely to impact how millennials approach jobs, compete at work, and interact with their peers.

Research has also found generational differences in work and leisure values. Work values reflect the outcomes that individuals desire and wish to receive through their work (Brief, 1998; Frieze, Olson, & Murrell, 2006). Differences in these values are important because they can affect job preferences, job choice, and employee attitudes (Dose, 1997; Judge & Bretz, 1992). Specifically, millennials place a lower value on work centrality and are less likely to value work for its own sake than members of other generations (Twenge et al, 2010; Twenge, 2010; Smola & Sutton, 2002). In addition, they place a greater value on extrinsic rewards such as money, image, and fame (Twenge et al., 2012a; Twenge & Kasser, 2013) than others, which suggests that millennials may be more likely to seek out jobs and careers that

provide them with prestige and higher income than baby boomers or generation Xs. Interestingly, they also place a greater emphasis on leisure time (Twenge, 2010; Twenge & Campbell, 2008; Twenge et al., 2010) and are more likely to value jobs that provide them with leisure time and the ability to engage in non-work activities than their counterparts. In fact, they are more likely to trade promotion opportunities and additional job responsibilities for more leisure time. Finally, millennials work well in teams, are interested in having an impact in their organizations, and like open and frequent discussion with their supervisors (Myers & Sadaghiani, 2010).

Taken together, the results of research on generational differences suggest that changes in work values imply changes in individuals' work preferences, which may influence their reactions to HRM practices. Managing millennials may present different challenges than those from previous generations (e.g., job satisfaction, retention). In addition, today, work is more geographically dispersed than it was even ten years ago, and the use of technology is likely to affect millennials' job attitudes and behaviors. In other words, millennials are bringing new values to the work context, and organizations need to align their HRM policies and practices with these needs and values (Stone, Stone-Romero, & Lukaszewski, 2007). Thus, we need a new model to understand how to attract and retain these new types of employees and to create the NWX needed to maximize employee and organizational outcomes. This model must consider the value millennials give to technology.

3 Millennials, Technology, and the Need to Change HRM Practices

Even more today than in previous generations, organizations need to consider their employees' knowledge, skills, and abilities and how to leverage them to maximize individual and organizational outcomes. Researchers have suggested that taking a holistic, "talent management" (TM) approach to managing employees will lead to competitive advantage (e.g., Collings & Mellahi, 2009; Tarique & Schuler, 2010). TM concerns the "identification, development, engagement, retention, and deployment of talent" (Warren, 2006, p. 26) and should be tackled as a part of an overall talent strategy in which both economic and noneconomic value should be considered at the individual, organizational, and societal levels (Thunnissen, Boselie, & Fruytier, 2013). Basically, TM is the heart of any effective strategic HR practice that aligns employee goals and outcomes with those of the organization.

Today, more than ever before, technology is central to any effective HR initiative. Essentially, almost all large organizations have adopted integrated HRIS to support their HR functions and processes, and many small and medium-sized businesses have also begun to adopt them as well (Johnson & Diman, 2016). An HRIS is an information system "used to acquire, store, manipulate, analyze, retrieve, and distribute information regarding an organization's human resources to support HRM and managerial decisions" (Kavanagh, Thite, & Johnson, 2015, p. 17). HRIS have become the main mechanism through which applicants and employees communicate and develop relationships with organizations and how they receive HR services and support (Johnson, Lukaszewski, & Stone, 2016a; Johnson, Thatcher, & Bursleson, 2016b; Wirtky, Laumer, Eckhardt, & Weitzel, 2016). Similarly, an eHRM system "allows managers, applicants, and employees access to human resource related information and services through the Internet or an organization's intranet or web portal" (Stone et al., 2015, p. 217).

But organizations need more than effective HRIS and eHRM services to ensure that they develop NWX. Instead, new talent strategies focus broadly on hiring and retaining new professional knowledge workers (NPKW) (Drucker et al., 2008) who will help organizations develop new products and services that will sustain their firms (PwC, 2013, 2014, 2015). Graen and Grace (2015a) suggest three approaches to transform an organization's old workplace culture into one compatible with the millennials' needs: 1) an unfolding approach, 2) the development of innovative design tools, and 3) collaborative design tools (see Figure 1).



Figure 1. Designing an Employee-retaining Organization (From Graen & Grace, 2015a)

The first approach calls for investigating the various unfolding paths that eventually lead employees to terminate their career positions early (e.g., before two years). The second approach involves developing teams of committed partners charged with innovating talent strategies that can be supported in technologically feasible tools. Finally, the third approach uses emergent design theory and practice to design a new TM-focused organizational paradigm that makes old models obsolete. The model focuses on being “millennial friendly” and on delivering immediate and long-term business value by encouraging behaviors that will serve as the foundation to a culture of innovation. In other words, “Design thinking drives the identification of alternative frames, which allows for the identification of alternative solutions” (Beckman & Barry, 2015, p. 68).

4 Unfolding Approach

The NWX model focuses on:

Organizational design and related incentives and management procedures; the task and associated business process design; the support tools and information services that enable the execution of the task; the physical and virtual environment in which the task takes place; the internal interactions between employees within a business or organizational function, as well as between functions and the extended enterprise and its partners and customers; and the organizational culture and communications and human resource support programs. (Gruber et al., 2015, p. 4)

The first step in the process focuses on how to align HR practices and policies with millennial values and goals. Graen and Grace (2015a) define this step as the unfolding approach. Research has indicated that millennial professionals’ career expectations are incongruent with their career experiences (Graen & Grace, 2015b). We believe that this incongruence results in part due to the misalignment of HR practices with millennials’ needs and desires. For example, as we noted above, millennials often place more value on leisure time than commitment to work, but organizational rewards may emphasize commitment to work over personal time. Thus, there may be a disconnect between HR rewards and practices that an organization uses and millennials’ values, which may occur at multiple stages of the employee-employer relationship such as recruitment, selection, mentoring, learning, and performance management.

4.1 E-recruitment

Organizations are increasingly using technology to recruit employees (Chapman & Webster, 2003). From online recruitment websites to social media and virtual worlds such as Second Life, companies are reaching out to prospective candidates and using technology to motivate them to apply for positions in their firm. Thus, we need to ask how one might more effectively recruit employees through these systems. First, given the centrality that technology and mobile devices have for millennials, organizations should use e-recruitment systems that support multiple channels of contact (e.g., desktops and mobiles). For example, organizations such as Dominoes, Uber, and the U.S. Department of Defense are using mobile apps to attract candidates (Fliplet, 2016). Second, millennials can focus on themselves more (Twenge et al., 2012a) and have more confidence than previous generations (Twenge et al., 2012b), which suggests that organizations might consider using realistic job previews on their recruitment websites. Realistic job previews provide potential applicants with information on both a job’s positive and negative aspects (Premack & Wanous, 1985). Researchers argue that they are particularly effective when candidates are overconfident (Cascio, 2016). Third, given millennials’ values (e.g., higher materialistic and leisure values and lower work centrality compared to previous generations), the recruiting portals that organizations use should clearly communicate how their values align with millennials’ values (Dineen, Ling, Ash, & DelVecchio, 2007). For example, if organizations show how they define and assess performance goals and link them to rewards, millennial workers might feel attracted by knowing that the organization will weigh their performance and compensate them accordingly. In addition, millennials may feel attracted to those businesses that offer them the possibility of defining their own working schedule and leisure time as long as they deliver the expected performance and results. Researchers have argued that millennials not only want to know what an organization’s values are but also will be more likely to leave that organization if their values do not fit with the company’s values (Moritz, 2014). Fourth, millennials have embraced social media and are more likely to consume recruiting content over social media. As a result, organizations can use applications (apps) such as Twitter, Instagram, and Snapchat to communicate and develop relationships with millennials. Thus, we propose the following hypotheses:

- H1a:** Organizations that allow applicants to use mobile recruiting devices are more likely to attract millennial applicants than those that do not allow applicants to use them.
- H1b:** Organizations that provide realistic job previews are more likely to attract millennial applicants than those that do not provide realistic job previews.
- H1c:** Organizations that provide realistic job previews are more likely to retain millennial applicants than those that do not provide realistic job previews.
- H1d:** Organizations that design content that shows an alignment between their own and millennials' values attract more millennial applicants than those that do not show this alignment.
- H1e:** Organizations that use social media in recruiting will attract more millennial applicants than those that do not use social media in recruiting.

4.2 E-selection

Employee selection represents the second area of HR where technology can enhance an organization's attractiveness to millennials. Employee selection focuses on identifying candidates who have the strongest knowledge, skills, and abilities and who will best fit a specific position. Specifically, millennials should find organizations that use e-selection more attractive than those that use traditional selection methods for several reasons. First, millennials should find unproctored Internet testing (UIT) more attractive to them than traditional on-site proctored tests. With UIT, an applicant can take a selection test in any place at any time. Although researchers have raised questions about UIT's validity and security (Pearlman, 2009), they can allow applicants to control where and when they will take a test. In addition, one can take the test on many different devices. Given the value millennials give to leisure time, organizations that use UIT should have a positive effect on how millennials view them. In addition, e-selection can provide applicants with immediate analysis and rapid feedback. Given that millennials often immerse themselves in technology, the receipt of immediate feedback about their test scores should have a positive impact on how they view an organization. Of course, organizations might have concerns about UIT's validity given they do not have control over the application process. If so, they could start by giving UIT to assess fit at the values/culture level. Trained individuals could review these tests' results to decide whether they want to conduct interviews (by phone, Skype, or face to face) to validate them. Subsequently, candidates who move up in the process could take proctored testing to assess their job fit (competencies). Thus, we propose the following hypotheses:

- H2a:** Organizations that use e-selection are more attractive to millennial candidates than organizations that use more traditional selection techniques.
- H2b:** Organizations that use e-selection methods that provide immediate feedback about test scores are more attractive to millennials than selection methods that do not provide immediate feedback about test scores.

4.3 E-mentoring, Career Planning, and Engagement

As we note above, millennials will likely need much higher levels of mentoring and personal attention than previous generations. Interestingly, Millennials seem to want much less supervision and value individualism yet, at the same time, feel less control and need more organizational support than previous generations (Twenge & Campbell, 2008). In addition, one of the biggest challenges that faces organizations is employee engagement; some sources have estimated that as few as 13 percent of employees are engaged at work (Crabtree, 2013). The cost of reduced engagement can be higher than half a billion dollars annually (Sorenson & Garman, 2013). Therefore, organizations need to connect and engage with employees. Some organizations have looked at co-mentoring programs with millennials in which senior executives and seasoned employees mentor newly hired millennials on their business and professional skills. Conversely, millennials may mentor senior executives on how to use social media and other technologies to reach customers or new employees (Meister & Willyerd, 2010).

The use of digital communications opens the possibility to broader mentoring relationships because incumbents' interests can be matched to organizational needs and strategies. This way, stakeholders can establish specific career paths and negotiate new connections. Once one has identified a career path, one could use frequent feedback, mentoring, and support to meet millennials' needs (Deal & Levenson, 2016).

E-mentoring, a form of mentoring where technology mediates the content and relationship (Bierema & Merriam, 2002), can be an excellent way of connecting mentor and mentee when they are not co-located. Given that millennials need more thorough mentoring and they are comfortable using computer-mediated communications and social media tools, we believe that organizations that offer e-mentoring will be more attractive organizations and will have better-engaged employees. Thus, we propose the following hypothesis:

- H3:** Organizations that implement an e-mentoring system that allows mentors to provide their mentees (millennials) with frequent feedback, mentoring, career planning, and support enhance levels of millennials' work engagement more than those organizations that do not.

4.4 E-learning

To create the innovative NWX, organizations will increasingly need to rely on training to ensure that they keep employees' knowledge and skills current and, as a consequence, have a competitive advantage. Mentoring represents one way to do so. An even stronger approach involves using e-learning, specifically mobile learning (m-learning). M-learning refers to training that one delivers through portable or mobile devices such as tablets or smartphones (Johnson & Brown, 2017). With m-learning, trainees can access training at their own convenience (e.g., 24/7/365), share files, annotate and find annotations to files, and quickly search for relevant training based on keywords (Chao & Chen, 2009; Zhang, Zhao, Zhou & Nunamaker, 2004).

Millennials are already adept at using mobile technologies. In addition, their self-focused and narcissistic nature suggests that they will be interested in gaining skills that can give them higher materialistic outcomes. Further, the need for both organizations and employees to have timely access to training suggests that millennials will desire m-learning over traditional training approaches. When an organization provides m-learning as a training option, it should increase an employee's belief that the organization is committed to them and their career development, which, in turn, may increase their organizational commitment (Tannenbaum, Mathieu, Salas, & Cannon-Bowers, 1991). Thus, we propose the following hypothesis:

- H4:** Organizations that provide millennials with m-learning tools that help them develop specific competencies have more committed employees than those that do not.

4.5 E-performance Management

Performance management (PM) is a process by which managers provide feedback to employees about their performance and work with them to ensure that they meet organizational standards and goals (Cascio, 2016). PM will be more challenging for organizations with the growth of millennials in the workplace for several reasons. First, millennials tend to have an inflated sense of self and skills and may be less aware of their weaknesses (e.g., the perception they have of their own performance is much more positive than others' perceptions) (Twenge & Campbell, 2008). Therefore, millennials' self-evaluations about performance may have less value than previous generations' self-evaluations about performance (Twenge & Campbell, 2008). Two other factors may also affect performance appraisals and PM. First, millennials may be more likely to question goals and managers if they do not see how performance standards benefit them personally. Second, millennials have a higher need for praise, which can make providing negative feedback much more challenging for managers. For example, research has suggested that millennials may be more likely than others to expect high performance evaluations for simply trying hard (Twenge, 2009). In addition, with the growth in narcissistic personality traits, millennials' performance levels may fluctuate more (Chatterjee & Hambrick, 2007) and Millennials who receive poor performance evaluations may lash out or blame others for their poor performance (Bushman & Baumeister, 1998).

Technology can play a role at helping PM become more effective with millennials. First, electronic performance management (e-PM) should allow organizations to collect data about performance in a streamlined manner, which will enable supervisors to provide more frequent feedback and have more conversations with employees. Millennials should find these types of performance conversations attractive because they value high-touch (face to face), regular feedback, and authentic conversations. In addition, research has found that employees trust and respond more positively to feedback that a computer provides rather than a manager (Earley, 1988; Kluger & Adler, 1993) partly because they may perceive data from a system to be more objective than feedback from a manager. Millennials are likely accustomed to receiving feedback electronically over apps on their phone or wearable devices. Compared to previous

generations, they might be more likely to prefer receiving feedback from computers. Overall, technology can enhance performance appraisal and feedback processes by allowing the automated collection of data, which can, in turn, support more active and purposeful conversations between supervisors and millennials. Thus, we propose the following hypotheses:

H5a: Millennials view organizations that use performance management systems that automatically collect performance data and generate feedback regularly more positively than those that use traditional performance management systems.

H5b: Millennials are more likely to accept organizations that implement performance management systems that automatically collect performance data and generate feedback regularly than those that use traditional performance management systems.

5 Development of Innovation Design Tools

Graen and Grace's (2015a) second approach involves using technology to support innovation (e.g., developing innovation design tools). For organizations to succeed and profit, they must innovate (Pisano, 2014). Innovation and innovative ideas come from employees and need to be supported by HRM and organizational practices. Innovation is not something that one can mandate or order. It takes educated dreamers who work in close collaboration and who trust each other in a leadership-sharing paradigm, and it takes a work culture that fosters and rewards creativity. As such, approaches that tend to institutionalize innovation across a work culture will have higher business value than approaches that focus on lone innovators.

Research has suggested that the strongest approach to institutionalize innovation involves developing teams of committed partners charged with innovating strategies in the context of a NWX (Gruber et al., 2015). For innovation teams to drive innovation and organizational culture, an organization needs to link organizational design principles and innovation (Graen & Grace, 2015b). Thus, rather than looking for a big innovative breakthrough, organizations and HRM should look to shift employees' mindsets. They can do so by helping employees discern the big picture and the business need for innovation (Boudreau & Rice, 2015).

Organizations can train new professional knowledge workers in innovation design teams to develop partnerships by helping them to: 1) have confidence in one another's ideas, 2) help one another cooperatively towards common goals, 3) have respect for one another's capabilities, 4) have trust in one another's dependability, 5) have an excellent working relationship, and 6) have confidence in one another's work (Grace, 2014; Graen & Grace, 2015a; Graen & Grace, 2015b). Several meta-analyses have found support for these six behaviors (Dulebohn, Bommer, Liden, Brouer, & Ferris, 2012; Gerstner & Day, 1997; Ilies, Nahgong, & Morgeson, 2007; Rockstuhl, Dulebohn, & Shore, 2012). When both parties agree on each behavior independently, they form a partnership. We believe that millennials, given their needs to engage in meaningful work and to feel important and valued, will embrace such a shared-leadership environment. The use of innovation teams "may be a first step in modifying the culture of the entire organization to value employees as highly as customers" (Graen & Grace, 2015a, p. 15).

Juniper Networks represents a company that has developed and used innovation teams well (Boudreau & Rice, 2015). Rather than chase "best HR practices" to innovate, Juniper Networks focused on the network of relationships in the organization and discovered that a major barrier to innovation was a "lack of sufficient collaboration across units and functions" (Boudreau & Rice, 2015, p. 76). In conjunction with HR, they analyzed the organization to uncover how Juniper's work teams' silo nature robbed the whole network of insights critical to solving problems.

From studying the company, Boudreau and Rice (2015) concluded that organizations must purposefully build HR innovations rather than using "best practices" because it allows them to capitalize on their unique HR and employee strengths. Leadership must span organizational silos and boundaries to help these strengths become opportunities for innovation (Boudreau & Rice, 2015) and must look for ways to bring employees together across boundaries. This mindset shift can serve as a base for future innovation and can eventually lead to organizational-wide innovation. Organizations will know they have "struck the right balance when...[their] HR programs start to look less like...[their] competitors' and contribute more and more to...[their own] competitive distinction—when every year makes...[them] more different by design" (Boudreau & Rice, 2015, p. 78).

To maximize innovation capabilities, organizations need to stretch geographic, time, and generational boundaries. For example, research has suggested that millennials are more individualistic and have less of a need for affiliation (Twenge et al., 2008; Twenge et al., 2012a). Previous research has also illustrated several differences between millennials and other generations in work values, leisure values, and personality (Twenge et al., 2012a; Twenge & Campbell, 2008). These differences suggest that creating innovation-oriented teams will require close communication, much of which may require teams to communicate across temporal and geographic boundaries. They also suggest that this communication and connection may not come as natural to millennials despite their technological savvy. Given that millennials score higher on agentic, outcome-oriented values than others do (Twenge et al., 2012b), organizational leaders may have to provide guidance for how to effectively navigate this environment. It is one thing to know what tools to use and how to use them, but it is entirely different to use these tools as part of a functioning and innovative team.

Organizations can empower employees by providing effective information and communication technologies (Malhotra & Majchrzak, 2014). They can use both desktop and mobile tools to manage projects (e.g., Podio, Asana, and Flow), schedule and manage meetings (e.g., Assistant.to, Boomerang Calendar, Doodle, and TimeBridge), conduct video and high-end video conferences (e.g., Skype, Zoom, Facebook, and Google Hangouts), support individual and group messaging (e.g., WhatsApp, Facebook Messenger, QQ Mobile, and We Chat), and support the storing and sharing of documents (e.g., Dropbox, Google Drive, OneDrive, and iCloud). Millennials should be particularly well prepared to use these tools and to do so to connect and communicate with team members given that they highly use mobile and social tools. In addition, as we note above, they can mentor individuals from other generations on how to use these tools to maximize effective communication and innovation. In turn, generation Xs and baby boomers can pass their institutional and technical knowledge to millennials to create more innovative ideas. Thus, we propose the following hypothesis:

H6: Organizations that initiate teams that include NPKW and design efforts using a combination of collaborative, cross-functional, participative, multi-generational meetings, and open selection of IT tools will produce more innovations than those organizations that do not engage in these practices.

Shared leadership should improve how software implementation teams function (Hoch & Dulebohn, 2013). The main reasons for such improvement are that shared leadership allows 1) flexibility in decision making; 2) participants to assume leadership roles; 3) information technology (IT) and functional experts to collaborate; and 4) coordination, knowledge sharing, and communication (Hoch & Dulebohn, 2013). Therefore, teams should learn how to communicate and develop shared leadership to participate in decision making and problem solving. If teams are to work virtually, they need a shared context and communication base even more so than if they do not (Markus, 1994; Zack & McKenney, 1995). Leaders need to provide a clear and engaging direction along with specific individual goals. In addition, they need to closely monitor virtual teams to understand each member's environmental conditions (Bell & Kozlowski, 2002). Thus, teams need to be able to use technology to support a shared knowledge base and context for work. In addition, leaders need to develop the skills for leveraging the technology to help individuals share ideas and innovate. Thus, we propose the following hypothesis:

H7: Teams of NPKW who are more effective in using IT to create a shared context and shared leadership will be more effective than teams who are less effective in using IT.

6 Collaborative Design Tools

Finally, Graen and Grace (2015a) suggest that organizations should create “a workplace culture that deeply engages employees in the most challenging problems faced by business today—how to differentiate their company in the marketplace” (Graen & Grace, 2015a, p. 16). Unlike other areas of business such as supply chain management that organizations have completely overhauled with technology for speed and efficiency, they have not overhauled management practices and people policies for an environment that must focus on innovation (Hamel & Tennant, 2015). Just as supply chain has benefited from technology, so too must organizational people practices embrace technology (Johnson et al., 2016a).

Ultimately, the design of the new team-based organizations, and the management practices that sustain them, must begin with building a flexible organization that can adapt and innovate more quickly in response to rapidly changing market conditions. This includes tailoring jobs, teams, and organizational

culture for new innovators as they advance through the organization. But this work is not easy. Barriers to overcome include:

Functional silos, rigid ideas about roles and responsibilities, calcified processes, outdated compensation structures and technology infrastructures that were not designed to support the kinds of open and agile customer- [and employee-] engaging systems required today. (HBR Analytic Services, 2016, p. 1)

Traditional strategic planning systems and problem solving approaches may not be adequate for the multi-dimensional complexity that today's problems involve because:

Traditional methods require a clear and accepted problem definition.... They rely substantially on "feedback"—learning from experience and analyzing actual performance in relation to planned performance.... Disruptive business models and wicked problems have de-linked the future from the past, making traditional systems inadequate. (Camillus, 2015, pp. 53-54)

HRM professionals are uniquely positioned to inspire and lead this culture transformation because they know about organizational culture and how to support employees. This transformation can shift the strategy from patching-up the old design to building a new one for the future. Through collaborative design, one can transform organizational cultures by fundamentally changing the structure of work and the environments in which individuals perform it. The practices of ethnographic empathy, deep collaboration, engagement of multiple perspectives, and encouragement of divergent insights shifts mindsets, habits, and attitudes in work teams (Graen & Grace, 2015b).

A design approach includes a multidisciplinary set of principles and methods for gaining insight about people and their needs, building strategic foresight, discovering new opportunities, generating creative possibilities, inventing novel solutions of value, and delivering them into the world (Wasserman, 2013). In addition, a design approach seeks to teach the art of participative discourse, a skill long neglected and sorely needed in this complex and increasingly dangerous world, that develops knowledge that serves purposeful action. Also, a design approach is engaging, fun, and serious. Finally, a design approach encourages iterative experimentation and enables a culture of innovation. Millennials should find a design approach particularly interesting and valuable for several reasons. First, it engages them in determining the values and purpose of their organizations moving forward. As Moritz (2014) notes, millennials want their organizations' purposes to align with their values, and they are likely to leave if they do not perceive that they do. In addition, millennials can feel entitled and have inflated career expectations (Twenge & Campbell, 2008). Furthermore, research has shown millennials to score lower on work centrality than other generations (Twenge, 2010). Thus, collaborative design initiatives should be attractive to Millennials and valuable for organizations. Second, collaborative design allows millennials to shape the purpose of their organizations and potentially find ways to align their values with them. In addition, millennials' involvement in collaborative design should help them feel more connected to their organizations and cause their organizations to value them, which, in turn, should increase millennials' identification and desire to remain with their organizations. Thus, we propose the following hypotheses:

- H8a:** Companies that incorporate design methods to innovate at work attract millennials more than companies that do not.
- H8b:** Companies that incorporate design methods to innovate at work motivate millennials more than companies that do not.
- H8c:** Companies that incorporate design methods to innovate at work engage millennials more than companies that do not.
- H8d:** Companies that incorporate design methods to innovate at work retain millennials more than companies that do not.

One maximizes the value of collaborative design when one leverages HRM and IT to allow employees to collaborate, and it can help create an innovative and flexible management system that one can tune to balance innovation and operational excellence (Graen & Grace, 2015a). Collaborative design puts the focus on a business problem or opportunity that generates the business case for HRM and IT to work together. Decision support tools and analytics can be powerful mechanisms to drive innovation and information about the effectiveness of HR and organizational policies at multiple levels of organizational functioning (Dulebohn & Johnson, 2013). Analytics allow organizations to use sophisticated statistical

models and methods to understand productivity, engagement, retention, and turnover (Davenport, Harris, & Shapiro, 2010; Harris, Craig, & Light, 2011).

Today's technology provides the opportunity to combine both the quantitative tools of analytics (linear/logical thinking) with the qualitative tools of design (non-linear/creative thinking). The potential exists to create a virtuous feedback cycle tailor made for an innovative thinking that includes and engages an organization's people, processes, structures, information, and technology to enable a leadership perspective that considers the whole system (holistic thinking). When one combines design methods with the latest collaborative IT tools, one could increase the power of both, which the convergence of design methods with analytics tools exemplifies. Predictive analytics promises that one can use data from the past to "predict the future behavior of individuals in order to drive better decisions" (Siegel, 2013, p. 11). As our ability to model human behavior continues to evolve and advance and with the ability to "see through" vast datasets (e.g., visual analytics) to the structures, themes, and patterns that influence problems or opportunities, organizations can gain breakthrough insights to inform decision making and innovation.

Note that data itself should not drive decisions but also organizations' needs (Carlson & Kavanagh, 2015). Further, analytics promise organizations the ability to look into the future for opportunities that can benefit them (Basu, 2013). The combination of collaborative design, innovation and communication tools, and analytics brings opportunities for innovation that previously did not exist. In addition, from a strategic, TM standpoint, this combination can help in identifying and understanding how to most effectively communicate and design innovative HR and organizational practices that align with millennials' values and goals. Thus, we propose the following hypotheses:

- H9a:** Companies that conduct big data analyses to understand millennials' behavior and leverage the results to inform organizational design outperform organizations that do not.
- H9b:** Companies that use data analytics tools and combine them with design thinking methods produce more innovations than companies that do not.

7 Conclusion

Millennials are entering the workplace at a time of dramatic industry and technological change. Also, compared to previous generations, they have many different personality traits and values about work, leisure, and life. Therefore, millennials' entering the workforce provides an opportunity for organizations to rethink how they will hire, manage, and encourage innovation in their workforce. Millennials can be on the leading edge of a renaissance in workplace behavior that ushers in human-centered principles that change what it means to work and, ultimately, what it means to be successful from both an individual and organizational perspective. The millennial generation is the first generation to think and operate from a global mindset. Millennials experience their lives as part of a global virtual social network where they can communicate with someone from Uganda as easily as with someone from their hometown. The constraints of time, space, and physicality that governed previous generations through their development do not exist for millennials in the same way. In this paper, we bring focus to the methods, tools, and technologies that operate to facilitate the flow of this new workplace and how organizations can leverage millennials' knowledge, skills, and abilities by using technology so that we can fundamentally change the nature of work from a machine-centered to a human-centered model and do so in a way that does not suboptimize near-term requirements for business success.

Further, we describe a transformational set of methods, tools, and technologies that can together assist HRM professionals with their efforts to attract, process, educate, empower, engage, and retain the new generation of knowledge workers that will push the boundaries of business and innovation in the new millennium. Leveraging the mindset, methods, and tools we discuss in this paper will enable the collaborative work that is ahead to ensure the NWX meets the expectations of the NPKW.

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About the Authors

Julio Canedo is an assistant professor of management at the Davies College of Business of the University of Houston Downtown. He earned a PhD degree in Organization and Management Studies from the University of Texas at San Antonio. He is certified in coaching, HRM, and ethics. An HRM practitioner for nine years and consultant in HRM for over 15 years. Also, he served in student affairs for six years. Finally, he was a computer systems developer for one year. His research interests include cross-cultural issues in HRM, eHRM, and OB, strategic HRM, leadership, performance, and social issues in OB, HRM, and eHRM. He has published articles in the *Journal of Managerial Psychology*, the *Business Journal of Hispanic Research*, and *Oxford University Press*. As a consultant, he is focused on strategic HRM and services companies in Latin America. He founded the consulting company Results Alignment (<http://www.resultsalignment.com>).

George Graen, Organizational Psychology PhD University of Minnesota, has more than 50 years of experience in “people operations” globally. He is well known internationally for his work discovering, refining, and validating the leader-member exchange (LMX) theory of role making for team performance. Retiring from the University of Illinois, Champaign-Urbana, he stepped up his record of ground breaking discoveries of research-based, innovative best HR practices. He also continues to share his research-derived knowledge of people operations with Human Resources, *Industrial-Organization Psychology* and *Academy of Management* researchers and practitioners without any fee. In 1976, he was made an *American Psychological Association Research Fellow*. His preferred slogan reads: “Employees should be valued for their contributions as much as customers for their coin”.

Miriam Grace is Senior Systems Architect and thought leader at Boeing for the synthesis of design and systems disciplines with Lean+ and other productivity enhancement technologies. Certified Business Architect enabling focus on value delivery across an extended global enterprise. Frequent contributor to scholarly journals and publications addressing professional design opportunities and challenges and their relationship to leadership directions for the 21st Century. Master’s degree in Whole Systems Design and PhD in Design Leadership.

Richard D. Johnson is an Associate Professor of Management, Department Chair, and Director of the Human Resource Information Systems (HRIS) program at the University at Albany, State University of New York. He received his PhD from the University of Maryland, College Park. His research interests focus on electronic human resource management, the psychological impacts of computing, training and e-learning, and issues surrounding the digital divide. His research has been published in outlets such as *Information Systems Research*, *Journal of the Association for Information Systems*, *Human Resource Management Review*, and the *International Journal of Human Computer Studies*. He is the Past Chair of Association for Information Systems Special Interest Group on Human Computer Interaction and is a Senior Editor at *Data Base* and an Associate Editor at *Association for Information Systems Transactions on Human-Computer Interaction*. He is also co-editor of the textbook *Human Resource Information Systems: Basics, Applications & Future Directions*.

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2007-2008: Weiyin Hong	2008-2009: Eleanor Loiacono	2009-2010: Khawaja Saeed	2010-2011: Dezhi Wu
2011-2012: Dianne Cyr	2012-2013: Soussan Djamasbi	2013-2015: Na Li	2015-2016: Miguel Aguirre-Urreta
2016-2017: Jack Jiang	2017-2018: Gabe Lee	2018-2019: Gregory D. Moody	