Digital Capabilities

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Abstract Digital technologies are fundamentally changing the way companies operate—so much so that the notions of "digital transformation" and "digital technologies" have become nearly synonymous. Yet, there is another dimension to digital transformation—a human one—that seems to have been largely overlooked despite being of the utmost importance. Whether a company decides to shift to cloud-based software or engage in data-driven decision-making, the success of implementing the new technologies will ultimately depend on how rapidly the employees can learn to work well with them. Leading organizations are becoming increasingly aware of the fact that merely introducing new digital tools and instruments will not be sufficient for a successful digital transformation unless people inside the organization feel empowered to use them. The question then becomes: what are the core employee competences and skills that a company should nurture and develop to exploit the potential of digital technologies to the fullest? Can these competences be developed internally or should companies attract them from outside? How do companies identify employees who are willing to change and inspire others to engage with technology? In this chapter, we will shed some light on how digital technologies are reshaping work as we know it as well as look at how the Italian energy conglomerate Enel SpA is revolutionizing its approach to building the digital competences of its employees.

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1   Digital Technology Trends

The tremendous explosion of digital technologies has created a demand for new competences and skills that were previously unheard of. Think about Chief Marketing Officers (CMOs). Gone are the days when marketers reached out to a consumer through TV, radio or press ad campaigns and then measured their effectiveness based on sales figures. The advent of new digital communication mediums, including mobile apps, web and social media, along with the availability of large amounts of highly detailed customer data have changed the very core of what a marketing professional does. Nowadays, successful marketing experts master an entirely different mix of skills, from creating engaging social media content to advanced analytics techniques.

Now think about Chief Information Officers (CIOs). Today, as more and more companies move their IT-related services to the cloud, the role of CIO within an organization gradually shifts from one of a service provider to one of an important strategy and technology partner. Today's successful CIOs are strong business-savvy IT leaders who rely on their solid technical knowledge to address business needs and drive digital innovation. In their new role, CIOs are at the forefront in understanding how emerging technologies can be applied to their companies' offerings and how to develop innovative customer solutions. This new role requires a highly diversified skill set that would allow CIOs to intermediate skillfully between business and technical teams within an organization and understand the language and dynamics of both worlds.

What are the technologies that change the way we work? Most organizations are already experiencing disruptions in their daily operations caused by mobile, big data and cloud computing. Still, when it comes to more recent digital technologies such as internet of things (IoT) and artificial intelligence (AI), many "traditional" companies outside the field of information technology still tend to think of them as part of some unrealistic science fiction scenario. Even though one would need a sort of crystal ball to predict with certainty the direction in which these technologies are going to evolve, the following five technological developments are believed to have become emblematic of the new digital world:

- Mobile
- Big data
- Cloud computing
- Internet of Things
- Artificial Intelligence.

Mobile technology is an umbrella term used for technologies that run on portable "mobile" devices such as smartphones, tablets and wearables. Mobile devices are sometimes referred to as "pocketsize computers" as they provide their users with functionality and connectivity at the levels comparable to those of traditional desktop PCs while at the same time being much smaller, lighter and more convenient to carry around. With the introduction of high-speed mobile internet, more

and more consumers are starting to use their smartphones as a one stop source for web browsing, communication, entertainment, shopping and payment.

As our society becomes more mobile-centric, companies need to adapt to the changing patterns of consumer behavior and progressively shift towards mobile communication channels. In times when customers are used to having instantaneous access to any information anywhere and anytime, developing a mobile app becomes an imperative for companies that want to keep their customers engaged with their product or service. When it comes to workplace, mobile technologies have enabled employees to access information and communicate with co-workers outside regular working hours and off-premises. Today's professionals expect a great deal of flexibility when it comes to when and where they work: they may start their day by checking emails from their personal tablet while still at home, edit a file on their smart phone during their morning commute and then continue working on the same file on their office laptop. Efficiency-oriented companies are thus challenging the conventional assumptions about how office workflow should be arranged and are considering new approaches to work organization that would better exploit the potential of "employee-facing" mobile technologies.

Big data is a term used to define massive volumes of data coming from various sources within and outside an organization. Although traditional business intelligence input (e.g., transactional data on sales value and volume) counts as a part of big data, a much larger chunk of the data that actually makes it "big" comes from the variety of digital sources such as web, mobile and social media. The power of big data, however, does not reside in its volume but in the speed and quality of its decision-making processes. As companies get access to more data, the whole principle of business analytics gradually changes from a descriptive analysis based on historical figures to making informed decisions based on real-time predictive analytics. Put simply, big data analytics help companies to gain insight on why a certain pattern is observed and what can they do about it.

One example of a company that has improved its operational performance through intelligent use of big data in the energy sector is Enel. With more than 80% of its infrastructure digitalized, the company integrates historical performance data on its power stations with real-time sensor-based information on their operating conditions. Applying predictive analytics methods to the data has allowed Enel to timely identify potential issues and prevent failures based on what happened in the past to this same (or similar) infrastructure object under the same (or similar) operating conditions (Hirtenstein 2015).

Storing and processing the unprecedented amounts of data would have been impossible without *cloud computing* or, as it is frequently referred to, "the cloud". Cloud technology has allowed companies to access and manage terabytes of data over the Internet through third-party service providers, such as Amazon Web Services (AWS), without incurring large up-front capital investments into their own on-premise IT server infrastructure. Cloud-based infrastructure services (IaaS) are typically delivered on-demand on a pay-per-use basis, thus driving the operating expenditures down and making cloud computing resources accessible to large and small businesses alike. In addition to cloud-based data storage, businesses get

access to cloud-based applications—or software as a service (SaaS)—that completely eliminate the need for installing, updating and maintaining software. Instead of installing software on a single physical machine, a user subscribes to a service online and enjoys full-time access to cloud-based applications remotely through web interface from any connected device. Furthermore, platform as a service (PaaS) allows customers to develop, test and deploy applications in the cloud without having to invest into software, web hosting and server infrastructure.

Though at first glance "the cloud" seems to be an entirely IT-related matter, it affects all employees across the organization as the technology allows them to access their work-related information from any device. The work becomes more transparent and co-workers can collaborate in real time from different geographical locations. Employees no longer need to worry about losing their data as backup happens automatically and files are easily recovered. Yet, even though accessing data and enterprise applications from personal devices undoubtedly increases employee engagement and helps them to get things done quicker and more efficiently, doing so may expose employers to numerous security threats. Even digital-savvy device users sometimes remain unaware of the risks that, say, irresponsible usage of third-party technologies may potentially entail and what needs to be done to prevent them.

As more organizations progressively move their software and infrastructure systems to the cloud, CIOs are expected to guide organizations through this transition and bring to the table their solid understanding of cloud computing technologies. They are required to restructure IT-related operations and gradually abandon legacy IT systems in favor of new technologies. As more business applications will be provided by third-party partners, assisting businesses in reviewing technical proposals and making technical due diligence will become invaluable. Moreover, even if migrating to the cloud reduces the workload that was previously related to operating server infrastructure and maintaining the software, the focus of IT shifts towards cybersecurity, disaster recovery, data storage and backup.

The advances in cloud computing have enabled the networks of connected physical devices to exchange data over the Internet—a phenomenon known as *the Internet of Things* (IoT). Such smart "things" are embedded with sensors and are uniquely identifiable through an individual IP address. This "connectivity" allows them to receive, register and transmit sensor-based information and, in some instances, perform an action remotely induced by an incoming signal. The idea behind it is not entirely new. Companies have used embedded sensors and wireless device communication (e.g., RFID, NFC) for more than a decade now, but the recent development of the underlying technologies such as cloud computing, mobile internet and miniaturization of sensors has brought what was known as machine-to-machine interaction (M2M) to a whole new level (Burris 2014).

The real value of the Internet of Things comes from the large amounts of data that these objects generate. This makes objects not only connected, but intelligent. Analogously to how a human brain learns from life experiences, artificially intelligent systems rely on *machine learning* techniques to automatically detect patterns

in the data. The more observations are fed into the learning algorithm, the better the system gets at predicting a particular outcome. Think about Enel using machine learning for its predictive infrastructure maintenance. By processing a rich volume of historical sensor-based data on equipment failures and environmental conditions, it became possible to "train" the system on predicting power generation asset outages and to improve its accuracy over time. Similar principles of machine learning are used for fine-tuning speech and image recognition software, for training software bots to assist people in performing computerized tasks and for helping self-driving cars to navigate in controlled environments.

The aforementioned technology trends are not separate—they all build upon and reinforce one another. Working with these technologies requires new sets of IT skills and advanced technical knowledge in several domains. Take the example of big data jobs. While some of the skills required for big data roles—such as statistics, math and programming—are not necessarily new, these jobs do require a certain degree of familiarity with novel applications that allow storing, processing and manipulating large sets of data. If a job requires machine learning expertise on top of that, then experience with simulations, computational modelling, neural networks and learning models is highly desirable as well. Likewise, as mobile and software are "eating the world", the demand increases for mobile developers, software engineers and UI/UX experts (Gerber 2016b). As more mobile "things" get connected between themselves, the market need for experts with knowledge of device networking standards, electrical engineering and network security will continue to grow.

Does this mean that only highly specialized technical skills are in demand in a digital world? Not necessarily. As new technologies continue to emerge, today's "hot" tech skills will eventually become mainstream. If this happens, individuals will acquire the ability to learn new skills, problem-solve and logically reason what will help them to stay ahead. People with technical backgrounds may have an advantage in this regard as they develop a so-called "coding mindset"—an ability to break a problem down into small parts without losing the holistic picture of how these parts should work together as a whole.

But while the "coding mindset" quality is invaluable for tech roles, it may not be as important for other positions. Let us return to the Enel example. When assessing the digital competence levels of its employees, the company did not measure everyone according to the same standard. Instead, Enel combined tech and non-tech evaluation criteria, identified best performers for each criterion and developed personalized learning and development paths to reinforce employee strengths and help them to meet their professional aspirations. This made sense: a brilliant coder may not necessarily have an entrepreneurial spirit and out-of-the-box thinking, just as creative personalities might not always have the patience to spend hours trying to find a bug in a code. The key take-away from this example is that companies wishing to augment their in-house digital talent need to customize their learning programs to strengthen individual employee profiles and build a solid foundation for the continuous learning of new skills, once the current ones become obsolete.

2   Digital Workforce Outlook

Digital technologies have important implications for modern society and workforce as they redefine the way work is currently organized in most organizations. As companies continue on their digital transformation journey, they are becoming increasingly aware of the skills deficit they need to address in order to move forward (Manpower Group 2015). Consequently, organizations are experimenting with new ways of building digital competences in-house and are trying out alternative models for sourcing digital talent from outside. Digital technologies are driving societal and cultural changes, too. Many companies are gradually coming to the realization that traditional work arrangements based on full-time employment, office co-location and fixed working hours may no longer reflect the needs of their employees and their business in general. A new digital worker requires a more open, collaborative and dynamic work environment designed to unleash his or her full innovative and creative potential. Moreover, advances in cloud computing, high-speed mobile internet and connected IoT systems have jointly contributed to the development of sophisticated artificial intelligence algorithms that can outperform humans at certain tasks. With digital technologies progressing so fast, what will the workforce of the future be like? We have identified four tech-driven workforce trends that have already started to appearing many companies as they embrace digital technologies. We believe that the workforce of the future will be characterized as mobile, multi-skilled, on-demand and augmented.

2.1   Mobile and Distributed Workforce

As mobile connectivity and cloud technologies become commonplace, employees can access enterprise applications and data from anywhere, and the need for their physical presence in the office is reduced. Although remote work is not feasible in all organizations due to the nature of certain jobs (e.g., nursing, delivery), it has a greater potential for office jobs. For these jobs, employees can eventually be valued and rewarded based on the quality of output they have produced, regardless of the amount of time spent in the office.

Team work is facilitated since online collaboration tools and enterprise social platforms allow for interacting and soliciting advice from other team members. The boundaries of organizations expand because team composition is no longer limited to those present in a given location. Companies can access different skills and optimize their workforce at a low cost.

Information flows are becoming more transparent both within and between different functional teams. Previously, information flows were organized in a top-down fashion—to know what was happening in a different functional area of an organization, employees needed to wait for an update from their superiors. Now, the progress of other teams is traceable online and lateral communication between

different functions is facilitated. Similarly, newly added members of a team are able to see the history of all prior project-related communications in a shared folder in an enterprise repository.

To sustain a distributed workforce model, workers need a certain skill set that allows them to operate and share ideas in a virtual world. The basic ICT skills, such as being comfortable at operating different hardware devices and interacting with business applications through user interfaces, are must-haves even for entry-level jobs. Since corporate content becomes accessible through personal devices, employees need to use their devices in a responsible manner and take active measures to protect one's device (e.g., regularly update anti-virus software, password-protect applications, automatically lock device when not in use, avoid insecure internet connections).

Employees must be familiar with the additional functionality of the remote collaboration tools that allow them to edit and synchronize files, set up video conferences, share screens and customize access settings. Digital technologies make work processes more transparent, make it easier to track the real-time progress and reduce the incentives to shirk. It does not mean, however, that team members are in "free flow". To manage workflow effectively, employees need to make use of online project management tools that allow them to set and communicate priorities, track latest versions of files and "flag" the tasks that have been completed. Doing so will make work more effective and ensure that members of a team are in tune with recent updates.

In addition to hard skills that make virtual collaboration run smoothly, employees need to be aware of behavioral consequences in a digital environment. In some cases, virtual co-workers never even meet each other face-to-face, and the online reputation that one creates becomes the sole basis for how one is perceived by his or her co-workers in a digital environment. Creating and managing one's own digital identity professionally (or maintaining several digital identities simultaneously) starts with controlling the type of personal information that is shared with the public. Employees are thus advised to customize their privacy settings, keep track of their digital footprint as well as respect other people's privacy.

Finally, following the established digital etiquette becomes essential for creating a positive work environment. Although much of how a person interacts online stems from the personal communication style he or she uses in "the real world", there are certain rules of business conduct online that one should adhere to. Some of these rules are common knowledge while others are more subtle. For example, when using an email for business communication, employees are advised to double-check the list of recipients before sending an email, write clear and concise subject lines, use bullet-points when sending a long body of text and make use of "out-of-office" notifications. Similarly, when using instant messaging, employees are invited to avoid long discussions, be mindful of their coworkers' availability statuses and respond in a timely fashion. Making employees aware of these simple rules of digital communication will make online work efficient and productive.

2.2 Multi-skilled Workforce

New technology developments have created the need for a variety of new skills and new roles, and many companies face difficulties in closing the talent gaps and filling new positions (Bessen 2014). An increasing reliance of businesses on real-time data in decision-making has naturally spurred the demand for "hard" skills pertinent to data mining and extraction, database management and analysis. The newly emerged job roles such as data scientist or data analyst have called for professionals with proven experience in and knowledge of large dataset analytics (e.g., RapidMiner), programming languages (e.g., Python, JavaScript, PHP), and computational and statistical software (e.g., R, SAS, SPSS, MatLab). Not only has data availability resulted in the creation of the new roles, but it has also generated the need for technical skills in the areas that have traditionally required soft skills. This is particularly evident for jobs in marketing and PR that used to be more about creativity and artistic expression. Even though soft skills such as "an eye for design," user experience, good writing and visual storytelling skills are still invaluable for digital marketing experts, creation of high-quality digital content requires knowledge of the functionality of technical tools for content production (e.g., Wordpress, Photoshop) and, in some instances, even basic coding skills (e.g., HTML5). At the same time, the marketing profession becomes increasingly about data analytics (Field et al. 2015). Today's marketers are required to identify patterns and trends in large datasets, quantify the return on investment by using web analytics tools (e.g., Google Analytics, Tableau) and experiment with and test creative digital ad campaigns (Gerber 2016a). Doing so requires understanding and applying the principles of statistics and math to be able to collect, transform and analyze data as well as interpret and draw meaningful conclusions from the results.

As data permeates almost every aspect of organizational decision-making, the increasing demand for technical skills comes as no surprise. What is noteworthy, however, is that soft skills become just as important as technical knowledge for IT professionals, especially in leadership roles. Strong expertise in IT is necessary but no longer a sufficient condition for CIOs to succeed: in addition, their roles require skills such as empathy, service orientation, negotiation, communication and team management. A company may develop great technology products but this alone will not help the business to succeed unless the IT executives understand the business environment, are able to put themselves into the shoes of their (possibly) non-tech users, empathize with their problems and clearly communicate the benefits of the solutions their company is proposing. Marrying "art and science", striking the right balance between creative and analytical thinking, having "both sides of the brain"—whatever the terminology, the mix between hard and soft skills lies at the core of most occupations in a digital world (Vozza 2016).

Another important challenge is that the composition of skills required for a particular job position is constantly changing and skills are not always transferable across different companies or industries. For example, according to the Future of Jobs Report, the skill sets required for the "data analyst" job role in financial

services and consumer retail are very similar (World Economic Forum 2016). Conversely, there is very little overlap between what a data scientist is required to do in market research as opposed to energy industries. The mere rate of change and cross-industry differences imply that the reliance on formal job descriptions may be misleading in the digital age, and job titles in the future are likely to be defined as "agglomerations" of skills. Put simply, in times when skills get obsolete so quickly, people should be evaluated more based on what they know and potentially can do, and less based on what they have been doing in the past and what the job title for it was (Golden 2016). Since one's old skills and capabilities may not necessarily be the same that are needed for one's future role, the most valuable employees are those who have the right aptitude, and whose intellectual curiosity pushes them to develop new skills on their own. To solve the skill gap problem, companies thus need to focus on identifying and attracting "versatile" candidates that can adapt to the fast technology pace and are willing to learn continuously.

2.3   On-demand Workforce

Just as companies need to adapt quickly to ever-changing digital realities, so does their workforce. With the pace of technological change so frenetic, however, employees' skills are quickly becoming obsolete and even the fastest learners find it difficult to keep up with the new technologies. As a result, internal skills mismatch becomes an issue for many businesses. According to the survey conducted by Capgemini Consulting, 77% of companies consider the lack of in-house digital talent as a hurdle to successful digital transformation (Capgemini Consulting 2013). Besides, businesses often need to access specialized expertise only for a limited period of time and on an occasional basis. In these instances, a temporal need for a very specific skillset may not fully justify all the time and effort invested in a traditional process of candidate search, selection and recruitment. To find the right talent and gain fast access to rare competences, many enterprises turn to talent crowdsourcing platforms.

There is no exact operational definition for what crowdsourcing actually means. In fact, there is not even a single term to define this phenomenon. Call it crowd-sourcing, or "gig" economy, or contingent, or "liquid" workforce—the core idea behind it is to access and leverage the potential of untapped talent pools outside the company "walls" (Accenture 2016). But if, in the past, crowdsourcing work tended to be associated with attracting low-skilled cheap workforce for executing routine "clickwork", today's freelance crowd on platforms like Upwork or Freelancer.com consists of professional web and mobile developers, web and graphic designers, writers, consultants, marketing experts—that is, highly qualified professionals craving cognitively rewarding and creative tasks (Soffer 2016). Thanks to digital technologies, freelancers were given access to software, tools and educational material to further develop their skills and do their work independently. The

emergence of digital talent platforms made it possible for freelancers to showcase their work and reach out to employers all around the world.

Companies seem to become more aware of online talent platforms, too. According to Workforce (2020) report, 83% of executives around the world rely on non-payroll, contingent workforce in addition to their full-time employees (Workforce 2020 Report 2014). As new technologies are constantly emerging, contractor-staffed work arrangement is becoming a viable solution that allows companies to access specialized skills and deep expertise without incurring the costs of hiring or re-training a full-time employee. The "talent cloud" is especially relevant for startups and small enterprises that have limited financial resources, but it is equally important for the larger enterprises that start "scratching the surface" of new areas of technology and operation where they might not have sufficient in-house competences yet.

Lack of in-house competences is not the only reason companies use talent platforms. More often than not, companies turn to online communities to find new, fresh ideas. Take the example of General Electric. GE's aviation engineering team was struggling with designing a more lightweight metal jet engine bracket without compromising its mechanical properties (Stinson 2014). The team had a general understanding that the solution lies in using 3D additive manufacturing but they could not figure out the exact way to do it. In 2013, GE launched the public challenge of redesigning the engine bracket on GrabCAD, an online community with more than a million members with backgrounds in design and engineering. Several months later, after reviewing more than 1000 submitted proposals and testing the short-listed designs, GE announced the winner. The best solution offered 84% reduction in the weight of a bracket and came from a young Indonesian engineer with zero aviation experience, M Arie Kurniawan. This successful experience set an important precedent for GE's subsequent open innovation initiatives and collaborative projects.

A more recent example comes from the energy sector. In 2015, Enel Green Power (EGP), a subsidiary of Enel Group, launched a series of ideation "challenges" through InnoCentive, an online "marketplace for ideas" that allows corporate organizations to crowdsource solutions from private experts in a wide range of disciplines. With a focus on renewable energy sources, EGP was primarily interested in obtaining early-stage technology solutions and innovative ideas for preventing ice formation on wind turbine blades, assembling solar panels automatically or using drones during construction, and operation and maintenance activities in its power plants (Carmichael 2015). The company obtained more than a hundred different proposals and awarded a prize of €10,000 to each of the seven winners based on the technical feasibility, implementation potential and the idea's originality.[1] And, at the time of writing, Enel Group has three other R&D

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[1]"The seven winners of the Innovation Competition of Enel Green Power", www.enelgreenpower.com, July 27, 2015. Retrieved from: https://www.enelgreenpower.com/en-GB/innovation/innovation/concorso_innovazione/.

challenges under evaluation on the InnoCentive network. By harnessing the "global brainpower" and complementing in-house R&D efforts with innovative thinking from outside, forward-looking companies such as Enel are able to resolve their challenges faster and accomplish better results.

2.4 Augmented Workforce

There has been a heated debate regarding the extent to which the rapid development of advanced digital technologies will lead to displacement of existing jobs and occupations. The fears of those who share a negative view regarding future employment issues are not completely unwarranted. Much like factory assembly line production eliminated a large part of the need for manual and physically demanding labor in manufacturing, now robotics and artificial intelligence systems seem to be posing a similar threat for knowledge workers and "white-collar" employees.

It is partially true. Indeed, most of the simple routine computerized tasks previously done by people (e.g., data entry, filling in forms, sorting email) are already being performed by machines and software bots. What's more, complex but mundane tasks such as data processing, information search and report generation will be increasingly handled by bots in the future. Several reasons explain this phenomenon. First, the sheer amount of available data that employees need to process makes it impossible for a human worker to perform the tasks at the same speed and with the same precision as the bots. Moreover, machines are fully rational when it comes to assessing risks and making decisions. Recent experiments have demonstrated that AI-empowered algorithms are as good as human experts in grading high-school essays and diagnosing eye diseases. But unlike human experts who can overestimate the likelihood of an event based on their most recent experiences or subconsciously favor a certain candidate, an algorithm will not let emotions and cognitive fallacies interfere with its decision-making process. Finally, machine learning—which is at the heart of artificial intelligence—allows software to improve over time and learn from its own mistakes. The human mind uses the same learning principles but it is always bound by an individual's past experiences and situations. Machine learning algorithms rely on large amounts of data and process millions of examples to identify hidden patterns and learn from them. Given this capability, it is not surprising that software has started to outperform humans at certain tasks. In fact, whenever a task can be described by a series of logical "if—then" rules, chances are high it will soon be replaced by an intelligent algorithm.

There is no denying that AI-empowered systems are now permeating knowledge-intensive professions—industries such as law, healthcare, finance and education—that were always thought to be immune to automation and impossible for machines to substitute. However, if we take a more nuanced view of automation in intellectual occupations, it becomes evident that different job tasks are susceptible to automation to a different degree. A recent McKinsey&Company study on

automation technologies shows that very few occupations in fact will be subsumed by machines entirely (Chui et al. 2016). It is not the jobs but the tasks and activities that will be increasingly handled by technology. According to the study, jobs that are most susceptible to automation include large components of predictable physical work, data processing and data collection. That is, bots and machines are predicted to take away all the "boring" work—mundane and tedious tasks that are time-consuming, monotonous and prone to human error. This could include anything from information search and retrieval to appointment scheduling and administrative reporting. By "delegating" these tasks to a software bot, an employee frees up time for more fulfilling high-level work that helps to fully exploit his or her intellectual potential and creativity.

In addition to taking away all the "drudge work", bots can actually assist humans in performing their daily tasks faster and more effectively. According to Gartner research, an individual "pet AI" or, put differently, a virtual personal assistant (VPA) was listed among the top emerging workplace technologies (Pemberton Levy 2015). One of the most prominent examples comes from the legal industry. ROSS Intelligence has developed the first "artificially intelligent lawyer" that uses natural language processing (NLP) to understand and process the spoken questions and requests from its human colleagues (Alba 2015). The AI-powered lawyer saves days or even weeks that a human would waste to query legal databases and locate necessary documents. By taking out time-consuming and tedious components of the legal work, the software bot shifts the focus of a legal employee towards more value-adding tasks.

The applications of AI go beyond information search and retrieval. For example, by drawing on natural language generation (NLG) technologies, Narrative Science has recently introduced new software that is capable of generating a verbal description of a chart or a graph produced by the Tableau data visualization tool (Marr 2016). By generating explanations in a simple-to-understand language, the software facilitates the job of an analyst by gaining important insights from the data and communicating them to non-tech audiences. Artificial intelligence is also making its way into our e-mail services. Boomerang startup has recently launched "Respondable," an e-mail assistant that relies on the power of AI to help workers to write polite, actionable and informative emails (Finley 2016). If an email sounds too plain, or too rude, or uses too much negatively "charged" language, the software notifies a user and makes suggestions on how to improve it. All projects are still in their infancy but are perfect examples of human-machine collaboration in which AI-empowered bots are used either to "augment" user capabilities or to simply make users' life somewhat easier. At the same time, as technology continues to encroach on fairly cognitively demanding tasks, the nature of tasks performed by human knowledge workers will gradually move to a "higher ground" (Davenport and Kirby 2016).

Intelligent automation changes the demand and composition of skill sets required for performing a particular job. As machines start to handle many routine tasks and empower humans with insights and information, employees are expected to leverage their "augmented" capabilities and shift their focus towards the tasks that

machines are incapable of doing. Take the example of customer interaction on social media. Since the early 2000s, brands were traditionally relying on human-to-human communication to engage with their customers on social media platforms. As intelligent bots and chatbots get more sophisticated, they will be the ones that respond to customers' technical questions and provide them with personalized recommendations. As this happens, human workers will need to readjust their skillsets to develop novel ways of engaging with customers and create more immersive user experiences using augmented and virtual reality (Edwards 2016). That is, much of the threat that automation presents is not necessarily about an individual being replaced by technology but about an individual who is not flexible enough to learn the skills that matter in a new digital environment.

A category of jobs that is predicted to be in high demand in the AI-powered environment relates to developing, supervising and maintaining automation software. The necessary skills will include identifying, selecting and optimizing work processes to automate. Moreover, one's ability to parse a complex work process into a series of logical steps and to define exception rules will become invaluable in the future. As intelligent as they are at solving problems that are readily presented to them, there is still a long way ahead until bots will develop the ability to recognize and formulate a problem, to understand the needs of another human being, to innovate and to discover alternative problem solutions—and these are exactly the skills that will be in high demand for the future jobs.

3 Digital Transformation at Enel

There has been a common belief that large incumbent players are facing intense challenges in spotting and exploiting the massive innovation opportunities that digital technologies offer them, and even more so in non-tech, slow-moving industries. The utilities industry is one of the best examples of that. For decades, companies in the utilities and energy industries have been operating as natural monopolies. Due to the nature of the industry itself, their efforts historically have been focused on ensuring service reliability and effective utilization of existing technical infrastructure, with little expectation of innovation.

But what used to be a stable and slow-paced industry is now undergoing fundamental transformation. On the supply side, companies are witnessing the growing importance of renewable energy sources and fast development of new energy storage technologies (Bocca 2016). As the Internet of Things technologies continue to advance, energy companies are being presented with immense opportunities to develop new products and enhance their decision-making thanks to data streaming through grid infrastructure. On the demand side, energy-efficient technologies and onsite energy generation possibilities are shifting energy consumption towards more sustainable and environmentally conscious modes. The entire competitive landscape is changing as well: tech giants such as Apple, Amazon and Google are starting to make inroads into the energy market with the intention to compete with

existing energy companies in selling electricity to wholesale customers (Mulherkar 2016). These new players are aggressively innovating and have sufficient in-house competences to offer new technology-empowered services that the incumbents might find hard to compete with. In this uncertain and fast-paced world that utilities sector has now become, the existing players are pushed to foster the culture of innovation to be able to identify new opportunities and act upon them.

Like any other utility company, Enel was under pressure to transform its business in order to stay competitive in the digital era. A truly global business, Enel is a world-wide power manufacturer and distributor. With a net installed capacity of more than 89 GW and 1.9 million kilometers of grid network, Enel is able to supply electricity and gas to over 60 million customers in 30 countries around Europe, North America, Latin America, Africa and Asia, which makes it the largest energy company in Europe. By combining its unique scale of operations with an ability to pursue new opportunities in a connected world, Enel was determined to reshape the future of energy. The opportunities were there: any digital device needs energy to run, and Enel seemed perfectly positioned to connect the worlds of technology and power. The major challenge, however, was in overcoming the lack of digital "thinking"—the company did not yet have the right mentality to start disrupting traditional ways and reimagining the existing business model. There was a clear need for a culture that would stimulate innovative ideas and create possibilities for their rapid execution.

In 2015, a digital transformation strategy was launched by Francesco Starace, CEO of the Enel Group. The transformational program has three core "grand" objectives. First, to instill the culture of openness and innovation in people. Second, to increase efficiency in operating and managing company assets, generation and distribution networks alike. Finally, to develop innovative services and build a sustainable competitive advantage in new and mature markets. The Group's Head of Global Information and Communication Technology, Carlo Bozzoli, has been leading the part of the transformation aimed at tackling six major challenges of the global ICT:

1. **Optimizing the application portfolio**. As a result of Enel's long history of growth through international acquisitions, the company has a portfolio of over 1800 enterprise applications and almost one hundred different technologies. Given these figures, simplification appears to be an urgent matter—a smaller number of elements would be easier to operate, maintain and keep under control. Today, it is not only important to develop new applications but it is equally critical to simplify the existing application portfolio and reduce the number of technologies Enel relies upon.
2. **Transitioning to the hybrid cloud**. Leveraging cloud technology and adopting cloud-based infrastructure has represented a more robust, more flexible and cost-effective solution for Enel. A complete transition to the cloud, including but not limited to IaaS, is a very complex process whose implications go far beyond moving to a cloud-based platform. It entails an entirely new mindset that changes the way people within the company start perceiving IT, the way they

start developing collaborative DevOps-like approaches to work organization, and the way they start understanding the importance of organizing new processes in a nimble fashion. It leads to a culture that celebrates "continuous development and deployment" that, in turn, speeds up time-to-market and allows for bringing in customer insights at earlier stages of product or service development. The new work paradigm offers massive opportunities for the company's employees to grow professionally and reach their full potential, but it also requires new skills and extensive training for Enel's leadership team to make it work.

3. **Engaging with suppliers**. As a general trend, companies will be shifting from buying products to buying services. In response, Enel has been developing a new sourcing model that would better reflect the evolving style of client-supplier relationship and redefine the way suppliers are selected, evaluated and retained. As this trend continues, suppliers are expected to support the company during the entire product life cycle. The role of suppliers is changing from a passive task executor or technology provider to one of an important technology partner committed to results and highly motivated to making a positive impact during and after Enel's digital transformation.

4. **Developing ICT operating and service models**. To effectively promote and manage innovation, Enel has established a 'focal point'—a unit specifically dedicated to observing and identifying relevant technological trends. The unit needs to assess the degree of consistency of the selected technologies with the Group's strategy, their applicability and feasibility of implementation. On the internal side, Enel is actively working to digitalize end-user services and create a better user experience for its employees in their daily activities. For example, a unique IT service portal has been created alongside a series of digitally-enabled initiatives such as Global Service Catalogue, Self Help—Self Service, multi-device access, and multi-contact communication channels (chat, web-based tools, etc.). The company seeks to facilitate the adoption of innovative services by engaging and empowering Enel people.

5. **Fostering digitalization and innovation**. As digital technologies are permeating every aspect of people's lives, Enel is using digital tools on a massive scale to engage with its customers and make the most of in-house data. Enel has three priority concepts to make sure that digital services are truly adding value: "Think and act digital", "Communicate digital" and "Be digital". "Thinking and acting digital" means being able to use digital technology to improve the way employees work on a daily basis and reinvent legacy business processes. The idea behind "Communicate digital" is to put in place new tools for smooth and efficient communication—new intranet, web-based platforms and social media —to keep up with the most recent office communication technologies. Finally, the motto of the "Be digital" concept is "Technology is ready—but are people ready, too?" and it seeks to assess the ability of people within the company to become digital ambassadors within their areas of influence.

6. **Evaluating digital competences**. Enel has quickly come to realize that it makes little sense to invest in digital technologies if people are not ready to use them. But different people have different degrees of "readiness" depending on their personal experience with technology, their willingness to try out and learn new things, and their attitudes towards change and digital technology in general. To evaluate the extent to which people at Enel were prepared for a digital transformation and whether they could manage traditional and digital business models at the same time, Enel developed a competence assessment program. The program was named 6Digital and included multiple evaluation stages. The assessment starts with identifying "evangelists" throughout the world within the Enel Group. These are employees demonstrating strong digital skills as well as the desire to share knowledge and a creative view of the future. "Evangelists" are early adopters of technology that are particularly enthusiastic and knowledgeable about new digital tools. As their opinions and recommendations are generally respected among their peers, there is a greater chance that "evangelists'" positive feedback may encourage "technology laggards" to get out of their comfort zone and embrace change. The process identifies multiple types of evangelists, which are then asked to participate in Hackathons and reverse mentoring.

When talking about the transformation program, Enel's Head of ICT Carlo Bozzoli compares his team's taskto that of a "GPS navigator" that helps the business to find the way through the maze of potential opportunities and directs it towards the right ones. In Bozzoli's own words: "*We are trying to understand which processes and skills must be built internally and retained within the company, and which ones can be sourced from outside, using new mechanisms that were not available to us in the past such as crowdsourcing platforms, partnering with start-ups, universities, research centers,* etc. *We are currently also undertaking a process of "transformation factory" which provides, compared to the past, for strategic platforms, the insourcing of key competencies to better oversee the introduction, adoption and development of technologies*".

The new mission of Enel's ICT is to enable the company to develop new business models and seize the opportunities offered by digital technologies. Nowadays, IT remains instrumental in creating the new culture of innovation and its role within Enel has been changing dramatically. Prior to the transformation, IT at Enel was a service provider, detached from the business-end and having little influence on the company's strategy and business development. Now, IT people at Enel work hand in hand with business colleagues at all levels. IT is actively involved in strategy discussions on equal footing with business executives. IT is a crucial member of any team working on the development of new business opportunities. In fact, when asked about the future of IT within the company, Carlo Bozzoli said he believes that the boundaries between IT and business will be getting more blurred until IT "dissolves itself" into business entirely. It represents a fundamental cultural shift within the company and the solid basis for the subsequent innovation. Indeed, one of Enel's first commitments was to entrench a belief in

colleagues that every service of the company relies on solutions and technologies of which employees themselves are the primary users.

To further strengthen their agile and innovative mentality, Enel has been investing a lot of effort into developing the culture of open innovation within the company. Because the company has increased its reliance on external sources for ideas and talent, it developed a strategy for Open Innovation and devised new governance mechanisms to put it into action. The strategy is overseen by the Innovation and Sustainability function—a unit that has been specifically created at a Group level to manage activities related to open innovation globally. Innovation Committee was set up to track the progress of open innovation initiatives within the company; its monthly meetings are chaired by the Group's CEO and moderated by the company's Chief Innovation Officer (CINO). One of their most recent initiatives was setting up an Innovation Hub in Tel Aviv, Israel—a startup accelerator that provides industrial support and business mentoring to young entrepreneurs working on projects that "marry" technology and energy. In addition, an Innovation "In & Out" program was developed with the purpose to build and sustain collaboration with companies, universities, research laboratories, startup incubators and to "funnel out" the most promising partnerships.

Another new unit that was created to accommodate the company's needs during the transformation is called Digital Business Enabler. The unit's mission is to promote the development of digital business solutions within the Group, as well as to manage the relationships with partners and suppliers, when related to digital projects. The Digital Business Enabler unit prioritizes the initiatives, evaluates new opportunities of collaboration with other relevant units at Group level, and supports project managers assigned to the digital projects. The unit's activity falls into three major domains: Digital Services, Digital Communication and Digital People. The goal of the first one, Digital Services, is to ensure the smooth implementation and reliable operation of technological platforms on which the company's services are running. The second one, Digital Communication, aims at leveraging cutting-edge technologies and mobile solutions available on the market to enhance employees' internal and external communications. Finally, activities related to Digital People are focused on enhancing the digital skills of Enel employees.

Developing in-house digital competences continues to be of paramount importance for Enel. To remain competitive, Enel needed to become proficient in gaining insights from the large amounts of data that its infrastructure objects and customers are generating. Many business initiatives that Enel has recently launched are, in fact, relying on big data analytics. With the support of professional consultants and research labs, Enel has implemented predictive maintenance models for its generation power plants, renewable energy assets and its distribution network. Furthermore, Enel has partnered with innovative tech startups to develop analytical models for understanding behaviors and attitudes of "socially responsible" consumers. And even though collaborating with others has been extremely fruitful, Enel has always been aware that the partnering strategy alone is not sustainable in

the long run if the company's internal digital capabilities are not being built at the same time. To successfully compete in the world of digital, Enel needed to combine external sourcing with building its own capabilities in-house.

4 Digital Competence Development at Enel

"Digital culture should be promoted and sustained from inside"—this was the central idea behind the 6Digital project launched at Enel Italy in summer 2015. This experimental project, aimed at fostering the digital culture within the company, initially involved Communication, Market, ICT and Innovation functions and, after Italy, was rolled out sequentially to Spain, Eastern Europe and Latin America. As the lack of "buy-in" from employees often stands in the way of any transformation, the primary purpose of the project was to identify employees with above-average digital skills so that later they could "evangelize" digital culture among their less technologically advanced peers. The project had also several positive "collateral effects" besides the officially stated purpose. First, conducting company-wide digital skill assessment provided an overview of the current level of digital competences within Enel and helped in identifying areas for improvement. Second, running such a large-scale initiative meant communicating to all employees that the company was committed to its digital course and was taking the change very seriously. Third, the project increased the awareness of the topic of "digital" within Enel and spurred the interest in those that had been previously doubtful about new technologies. Finally, the company was sending a clear message to potential hires outside. When it comes to choosing an employer, many highly-trained technical professionals prefer fast-moving technology-services companies to large enterprises in non-tech industries as they believe the latter cannot offer much in terms of professional growth and development. By investing in the digital competences of its people, Enel was signaling to the talent crowd beyond its "walls" that it was doing new, interesting things with technology and was offering promising career opportunities, *on par* with "young" technology-software companies.

Company leadership played an important role in making the 6Digital initiative happen. Even though the project leveraged the power of the crowds in promoting "digital thinking" within the company, it would have been impossible to accomplish without the top-down involvement of the company's leadership. Prior to launching the project, Enel's management first needed to have a clear understanding of what competences the company needed to move forward with the transformation. The type of competences required depended a lot on which digital technologies the company considered most relevant for its business and which of them had the most innovative potential in the mid- and long-term. In Enel's case there was, as the company's Head of ICT Carlo Bozzoli put it, "a triplet of digital technologies"—big data, cloud and mobile—that mattered the most as they have

made the development and implementation of the Internet of Things possible (Teruzzi 2016). Hence, getting access to the technical skills such as computer programming, data analytics, cloud computing and cybersecurity have become a priority for Enel.

There are several ways to access those skills. A company might start scouting for new skills outside and partner with companies and people who have already mastered them. Too much reliance on external knowledge, however, puts the company at risk of not developing and not accumulating in-house knowledge fast enough to be able to spot emerging opportunities for innovation. Thus, partnering strategy must be complemented with internal efforts aimed at building one's own capabilities. Finding and recruiting those specialized skills is a viable solution that, however, can be time-consuming and expensive. On the other hand, knowing and understanding the competence level of the existing employees can increase the chances of finding a suitable candidate internally, even though his or her current job might not have required those skills in the first place. 6Digital program at Enel was developed to identify digital talent within the company.

The program envisioned a company-wide skill assessment that involved the entire staff of Enel. Putting the program in action was no small task since more than 70,000 people—employees of all levels, white collars and operational staff alike—were to take part in the survey. 6Digital project was first tested at Enel Italy and then was gradually rolled out to other locations. In essence, the project included three stages:

- *Digital Champions Assessment*. The first stage of the project aimed at identifying so-called "digital champions" across the organization through a survey. The survey, based on a proprietary model developed by a third party, consisted of two parts: digital readiness and a lateral thinking assessment. Based on the results of the assessment, all participants were divided into clusters based on their individual levels of technical expertise and creative potential.
- *Hackday*. Employees that scored highest on the digital readiness assessment were invited to a two-day coding marathon—Hackday. During the event, the participants were simulating a start-up: they were divided into teams and were expected to develop a mock-up version of a web- or mobile application based on the ideas that were proposed to them.
- *Digital Engagement Program*. After digital champions had been identified and their skills tested during Hackday, they were invited to participate in an 8-week engagement program. During the program, the participants deepened their knowledge in more advanced areas, learned how to effectively share their skills with other colleagues and contribute to building a strong digital community within the company.

We will now review each of the stages in more detail.

4.1 Digital Champions Assessment

The project started with an individual Digital Readiness Assessment (DRA) which was made via an online survey tool. The core idea behind DRA was that at the time of the assessment any employee may already have a good starting level of digital skills and the right attitude. Indeed, in some cases employees might have developed specific expertise as technology amateurs: for example, by engaging in activities such as blogging, programming, or managing online communities in their personal time. In other cases, employees may have a solid professional background in technology but simply have not been given an opportunity to apply their knowledge in their current role. The assessment thus allowed identifying those talented individuals.

Four criteria were used to evaluate to which extent an employee was "ready" to work closely with technology:

- Personal technology equipment
- Frequency of use
- Willingness to share knowledge and information
- Aptitude towards entrepreneurship.

Based on these criteria, participants were grouped into six categories:

- Analog native—these individuals are skeptical about the use of technology and are reluctant to any change in general. They exhibit very critical attitudes towards new tools, are unwilling to learn and prefer "good old ways that work". They may be difficult to influence and are unlikely to use new digital tools until they are forced to.
- Networker—people who fall into the "networker" category use technology in their professional lives but are followers by nature. They recognize the advantages of technology but are rarely passionate about it. They are often unaware of the potential of technology and use the basic functionality of digital tools that are offered to them.
- Digital star—"stars" are smart users of technology who believe that new tools simplify their life a lot. They use technology extensively both in their personal and professional lives for communication, information search and entertainment. They are well aware of both the opportunities and risks that come with new technologies and moderately experiment with the new tools to discover new features.
- Digital guru—for "gurus", technology is hobby and passion. They enjoy working with technology and have fun with it. Digital gurus are the ones that might learn a new programming language or open their own YouTube channel just out curiosity. They proactively search for new tools available on the market but are able to critically assess their quality and distinguish between good and mediocre products.
- Startupper—those classified as "startuppers" take technology very seriously and perceive it is a job. They are passionate about technology but are equally curious

about the business aspect of it. It is not enough for them to passively consume what the market offers—they feel the need to become experts in certain questions and propose their own new solutions.

- Hacker—what distinguishes a "hacker" from all other categories is his or her advanced coding skills. They are likely to master several programming languages and have experience with a suite of tools needed for developing user applications. These skills are obtained either through professional education or extensive self-training and are often verified by virtual communities of practice.

After the profiles of the "digitally ready" employees had been determined via DRA, Lateral Thinking Assessment (LTA) was conducted for those participants who demonstrated positive attitudes towards technology use. As the name suggests, LTA was aimed at evaluating an employee's problem-solving skills and his or her ability to think outside the box. Contrary to DRA, which put a lot of emphasis on technical expertise and hard skills, LTA was more focused on soft skills applied in a digital world. For example, the participants were evaluated based on their ability to construct non-obvious mental associations and propose creative solutions, their proclivity to experiment and take risks, their ability to write an original story and to use visual metaphors. Based on the survey results, participants were classified into four types depending on which personal qualities they manifested the most:

- Pragmatist—these individuals put a lot of emphasis on the practical application of ideas. They judge the quality of an idea based on whether it is applicable in real life and reject purely theoretical ideas as useless. Pragmatists rely a lot on their past practical experience in their decision-making; they like to take risks and act fast. Rather than spending a lot of time wondering about "what would have been", they test the idea in practice, observe the results and immediately act upon them.
- Specialist—those classified as specialists have a mind wired towards logic and analytics. They see value in experimentation, but make decisions only after all possible alternatives have been thoroughly analyzed. Specialists are great problem solvers: they invest a lot of effort in understanding the nature of the problem, gathering all relevant information and analyzing each possible solution in great depth.
- Methodologist—if "specialists" are great problem solvers, methodologists are great problem identifiers. They are very skilled at conceptualizing the phenomenon they have observed in the real life, spotting the patterns and developing abstract models and theories based on them. Their ability to represent any process as a series of steps makes them excellent planners.
- Creative—these are people with vivid imaginations that are able to think outside the box. They spend considerable amounts of time contemplating reality and making observations that go unnoticed by most people. Their ability to challenge the conventional ways of thinking increases their chances of coming up with a radically innovative idea. Patience and meticulousness might not be their strongest points but they make up for it with their creative energy, original thinking and artistic expression.

Employees with the most representative profiles were identified as Digital Champions. Once both assessment tests were completed and employee profiles were obtained, the project entered its next stage.

4.2   Hackday

Those employees that were identified as Hackers and Digital Gurus received an invitation to take part in a two-day coding marathon—the Hackday. The main goal of this event was to recreate the startup environment and boost interest in experimentation and collaborative approaches to developing new products and services. Hackday was organized as a team competition: the participants were divided in teams of six to eight people and were expected to develop a working prototype of a web platform or an application for one of the announced topics. For example, the teams of 6 digital Hackday in Milan in 2015 were assigned to one of the three categories. The first one, "Enhancing the daily life of Enel's employees", invited new digital solutions to simplify the way Enel employees perform their tasks at work. The second one, "Transforming energy use", called for creative ideas using digital technologies to change the way energy is consumed. Finally, the third one, "Consumer utilities daily life", encouraged the development of applications for consumer everyday use.[2] By the end of the second day, the teams needed to submit a working prototype, even if it was not 100% complete. Only mock-up projects with a functional front-end were considered and evaluated, whereas projects containing a simple idea description with PowerPoint slides were not admitted. The evaluation criteria included the project's compliance with the assigned topic; the quality of user interface and its visual design; technical feasibility of the project; technical functionality and completeness of a prototype. The winners for each category were selected by a jury.

At first glance, Hackday is a part of Enel's overall open innovation agenda. Indeed, the initiative was largely focused on sourcing ideas and solutions to company challenges from within and unleashing the creative potential of the employee "crowd". Undoubtedly, Hackday participants generated many fresh ideas that might have inspired the company's leadership to develop them further. However, the benefits of the Hackday go far beyond that. If digital readiness assessment has elicited Hackers and Gurus with above-average technical skills, the Hackday was the perfect environment to test if people can apply these skills to creating actual workable digital tools. The participants needed to demonstrate their knowledge of one or more programming languages and their familiarity with

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[2]"Alla Scoperta del 6 Digital hackday di Enel". Enelsharing, November 11, 2015. Retrieved from: http://enelsharing.enel.com/innovazione-area/scoperta-6digital-hackday-enel/.

development tools. Furthermore, Hackday was an important step toward building a digital community: gathering people with a similar "coding mindset" who share a common interest for programming in the same place increased their willingness to exchange ideas and continuously learn from each other.

4.3 Digital Engagement Program

The final phase of the 6digital program—Digital Engagement—served a long-term goal of creating a global digital community of people who were willing to advocate for new technology use within Enel. To that end, Hackers, Gurus and Digital Champions were invited to participate in an 8-week Digital Engagement program. The program included intensive training to familiarize participants with new technology-driven trends (e.g., ecommerce, Internet of Things) as well as enhance their soft skills for effective management, communication and mentoring in virtual environments (e.g., reverse mentoring, Lean Start up). The program was also aimed at encouraging collaborative spirit between the participants and increase their willingness to share skills and knowledge with their less technologically advanced peers. The "graduates" of the Digital Engagement program were expected to evangelize and reinforce the digital culture through informal communication and networking.

5 Lessons Learned

Enel is good example to how a company in a non-tech industry approaches the challenge of upskilling its workforce in a digital age. It should be particularly inspirational for other large companies in traditional, non-tech industries that may still be under the false impression that the digital revolution does not concern them. Large, established companies have the most important asset for succeeding in leading transformational change: their people. What these companies need to do though is to retrain them and prepare them for the challenges of the future, and here are some guidelines based how Enel has managed to do it:

- **Define strategic priorities first**. A company's leadership needs to have a clear idea of which technologies will create value for the business. The type of skills and knowledge required will depend on what things a company wants to do with technology.
- **Identify, test and upskill the digital champions**. Employees differ in their skills, knowledge and attitudes towards technology. Skills assessments help to identify high-potential candidates who have enough base knowledge and are willing to learn more about digital. Internal "start-up" competitions work well for testing their skills in practice and crowdsourcing ideas for company challenges.

- **Nurture the culture of sharing and collaboration**. Digital champions should not be perceived as an "elite club" within the company. Instead, they should share their skills with those that are less adept at using new tools and lead people by their own example.
- **Kindle the interest in those that are change-resistant**. People are more likely to try out new tools if they see value in it for themselves. Illuminating less digitally-aware employees about the benefits of technology and "taking them by the hand" in using new tools increases the chance of people actually adopting them.
- **Partner with experts**. Developing internal talent is important but not all the best people are already working for the company. Working with smart people from outside always brings in a fresh perspective and provides opportunities for knowledge exchange.

Such talent transformation endeavors are not easy and, in part, much of their success depends on execution. Indeed, HR and other dedicated units play an important role in pushing such initiatives forward. But most importantly, the success depends on whether the company gets a general direction of change efforts right, and this is when the CIO becomes key. One of the opening lines of this chapter was that today's CIOs need to complement their tech expertise with business knowledge. But if one zooms into what makes a true *digital leader*, it becomes clear that it takes a much broader mix of skills, knowledge and attitudes to succeed. Great digital leaders ask the right questions. They stay abreast of the latest emerging technologies and are able to distinguish between temporary hype and the game-changing trends. Digital leaders are highly knowledgeable about the specifics of their business, their customers and their industry and hence are able to confirm if a particular digital initiative applies to their company or not. They are audacious enough to inject innovative tools and to disrupt the established routines but they are risk-conscious and do not expose their company's employees, data and customers to unnecessary security threats. Finally, true digital leaders understand the importance of people in making digital transformation happen. They experiment with new approaches to work organization, give autonomy to their employees and invest a lot of effort in addressing competency gaps. And these investments in human capital generally pay off manyfold because—to quote the motto of Enel's digital transformation—"there is no digital strategy without digital people".

References

Accenture (2016) Liquid workforce: building the workforce for today's digital demands. Retrieved from: https://www.accenture.com/us-en/insight-liquid-workforce-planning

Alba D (2015) Your lawyer may soon ask this AI-powered app for legal help. Retrieved from: https://www.wired.com/2015/08/voice-powered-app-lawyers-can-ask-legal-help/

Bessen J (2014) Employers aren't just whining: the 'skills gap' is real. Harvard Business Review. Retrieved from: https://hbr.org/2014/08/employers-arent-just-whining-the-skills-gap-is-real

Bocca R (2016) 3 trends transforming the energy sector. World Economic Forum, March 2, 2016. Retrieved from: https://www.weforum.org/agenda/2016/03/3-trends-transforming-the-energy-sector/

Burris D (2014) The internet of things is far bigger than anyone realizes. Wired, November 2014. Retrieved from: http://www.wired.com/insights/2014/11/the-internet-of-things-bigger/

Capgemini Consulting (2013) The digital talent gap developing skills for today's digital organizations. Retrieved from: https://www.capgemini.com/resource-file-access/resource/pdf/the_digital_talent_gap27-09_0.pdf

Carmichael S (2015) Five challenges to drive innovations in renewable energy. InnoCentive Blog, September 8, 2015. Retrieved from: http://blog.innocentive.com/2015/09/08/five-challenges-to-drive-innovations-in-renewable-energy

Chui M, Manyika J, Miremadi M (2016) Where machines could replace humans—and where they can't (yet). McKinsey Quarterly, July 2016. Retrieved from: http://www.mckinsey.com/business-functions/business-technology/our-insights/Where-machines-could-replace-humans-and-where-they-cant-yet?xid=nl_daily

Davenport TH, Kirby J (2016) Just how smart are smart machines? MIT Sloan Management Review 57(3):21. Retrieved from: http://sloanreview.mit.edu/article/just-how-smart-are-smart-machines/

Edwards C (2016) Why and how chatbots will dominate social media. TechCrunch, July 20, 2016. Retrieved from: https://techcrunch.com/2016/07/20/why-and-how-chatbots-will-dominate-social-media/

Field D, Visser J, De Bellefonds N (2015) The talent revolution in digital marketing. BCG perspectives, September 25, 2015. Retrieved from: https://www.bcgperspectives.com/content/articles/marketing-technology-organization-talent-revolution-in-digital-marketing/

Finley K (2016) AI is here to help you write emails people will actually read. Wired, August 23, 2016. Retrieved from: https://www.wired.com/2016/08/boomerang-using-ai-help-send-better-email/#slide-1

Gerber S (2016a) 15 essential skills all digital marketing hires must have. Mashable.com, March 8, 2016a. Retrieved from: http://mashable.com/2016/03/08/15-skills-digital-marketers/#NSXXx7sH.uqR

Gerber S (2016b) Web developers, data scientists, AI experts: the 15 top tech roles of 2016. Mashable.com, January 20, 2016b. Retrieved from: http://mashable.com/2016/01/20/technical-hires/#r2ggklCa5kqE

Golden G (2016) Why LinkedIn should kill the résumé and replace it with the experience graph. TechCrunch, August 14, 2016. Retrieved from: https://techcrunch.com/2016/08/14/why-linkedin-should-kill-the-resume-and-replace-it-with-the-experience-graph/

Hirtenstein A (2015) Big data squeezing more power from wind signals next investments. Bloomberg, October 12, 2015. Retrieved from: http://www.bloomberg.com/news/articles/2015-10-12/big-data-squeezing-more-power-from-wind-signals-next-investments

Manpower Group (2015) Talent shortage survey. Retrieved from: http://www.manpowergroup.com/wps/wcm/connect/db23c560-08b6-485f-9bf6-f5f38a43c76a/2015_Talent_Shortage_Survey_US-lo_res.pdf?MOD=AJPERES

Marr B (2016) How automated narratives are now helping tableau users gain more insights from data visualizations. Forbes, September 2, 2016. Retrieved from: http://www.forbes.com/sites/bernardmarr/2016/09/02/how-automated-narratives-are-now-helping-tableau-users-gain-more-insights-from-data-visualizations/2/#6a7f09da7d2f

Mulherkar A (2016) Google, Amazon and Apple are forging the future of corporate energy management. Greentechmedia, July 8, 2016. Retrieved from: http://www.greentechmedia.com/articles/read/What-Google-Amazon-and-Apples-Recent-Moves-Reveal-About-the-Future-of-Cor

Pemberton Levy H (2015) Top 12 emerging digital workplace technologies. Gartner, October 8, 2015. Retrieved from: http://www.gartner.com/smarterwithgartner/top-12-emerging-digital-workplace-technologies/

Soffer P (2016) Understanding the economy of the crowd. TechCrunch, September 4, 2016. Retrieved from: https://techcrunch.com/2016/09/04/understand-the-economy-of-the-crowd/

Stinson L (2014) How GE plans to act like a startup and crowdsource breakthrough ideas. Wired, November 4, 2014. Retrieved from: https://www.wired.com/2014/04/how-ge-plans-to-act-like-a-startup-and-crowdsource-great-ideas/

Teruzzi E (2016) IT life: Per Bozzoli (Enel) l'IT deve diluirsi nel business. TechWeekEurope, April 28, 2016. Retrieved from: http://www.techweekeurope.it/projects/bozzoli-enel-cio-94168

Vozza S (2016) Why 2016 is the year of the hybrid job. FastCompany, March 15, 2016. Retrieved from: http://www.fastcompany.com/3057619/the-future-of-work/why-2016-is-the-year-of-the-hybrid-job

Workforce (2020) Building a strategic workforce for the future. Research results presentation by Ed Cone, Oxford Economics at SAP Success Factors, September 18, 2014. Retrieved from: https://youtu.be/a35BtvzS-CA

World Economic Forum (2016) The future of jobs: employment, skills and workforce strategy for the fourth industrial revolution, January, 2016. Retrieved from: http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf