Role- and Operational Projections of IT Professionals in the Digital Sector: A Case Study of the Dutch High-Tech Industry

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Abstract

The article explores how big data and reality will affect HR professionals' roles and work in the digital sector as new technologies like virtual reality and artificial intelligence has been growing. During somewhat planned discussions with a few CEOs and HR directors of Dutch businesses Research indicates that in the period of five to ten years, IT employees at high-tech companies will face never-before-seen levels of complexity, unpredictability, interconnectivity, and cross-disciplinary engagement in their working. These future projections make it very clear that tech professionals require new abilities and more sophisticated operating procedures in order to become and remain future-proof. This calls for human resources experts who can assist in the continuous professional growth of tech workers and who comprehend the ways in which advanced technology impacts their line of work. This article facilitates the (re)design of roles and procedures in the IT industry, providing HR professionals with practical advice that help tech organizations future-proof their tech workers in the short- and long-term.

Introduction

The digitization of the high-tech sector is known as "Smart Manufacturing," and "Smart Industry," or the fourth industrial revolution. It blends three technological advances: expert digitization of product and process information through the use of sensors and information technology; new technologies such as 3D printing and robotics; and astute integration of production machinery and people across organizational boundaries. Together with affordable data storage, robust analytical software, and quick internet access, these technical advancements generate new innovations such as virtual reality, intricate simulations of industrial processes, and self-sufficient production equipment.

The latest industrial revolution is bringing about change at a faster rate than in previous times, with a more disruptive and wide-ranging impact. What this transformation means for the workforce and work is mostly about which jobs will become obsolete as a result of technology. It is anticipated that new technologies will increase complexity in the workplace and necessitate a highly skilled workforce with the ability to create, deploy, and use cutting-edge technology. There is an increasing need for new skills and competencies as a result of businesses finding new ways to organize and implementing new business models.

The increasing demand for 21st-century skills, lifelong competencies, and key skills in the tech sector is causing a shift in work and required skills. These skills include creativity, innovation, adaptability, and flexibility. Human resource management (HRM) plays a crucial role in optimizing employee and organizational performance. This article aims to answer the research question of how work in the high-tech sector will change due to technological developments in the next five to ten years.

Methodology

A qualitative research approach was used to identify and explain how technological advancements may impact labour in the (high-) tech sector. Chief HR officers and executives of Dutch high-tech companies participated in semi-structured interviews. Twenty participants were from major businesses in the high-tech "Smart Industry" sector, and 34 respondents came from small and medium-sized businesses (SMEs) in the IT, electronics, construction, automation, and installation industries. Based on the technologies used on their production floors, companies were chosen. During the interviews, this selection criterion was applied to expand the pool of potential real-world examples that would demonstrate and elucidate the influence of technology advancements. A total of 141 CEOs and HR directors from 141 different organizations were contacted; this led to a 38% response rate.

This shed light on the technological advancements that respondents had mentioned, improving our comprehension and the reliability of the findings. Respondents were asked to characterize the influence of technical advancements on work in the high-tech sector as precisely as possible by elaborating on these changes with examples. Respondents were also asked to explain how their future employment in the tech sector will differ from their current positions in order to further emphasize the impact.

The interviews were accurately transcribed. Two separate researchers entered the verbatim transcripts into AtlastTI and coded them. Both researchers compared their coding schemes to determine inter-rater reliability, which increased the validity of the results. The final codes were then employed by four academics to ascertain how changes in technology affect operations. Following a group discussion, the researchers decided on five broad advances that would make it clearer how technology will affect future jobs in the IT sector.

RESULT

Five developments that demonstrate how technology is influencing work in the tech sector in the future were discovered based on the analysis of the interview data. These results go beyond the confines of the tech worker's workplace because the respondents also highlighted how technology will impact the tech worker's work environment.

1. Demanding and varied IT jobs will increase in number

The combination of big data, smart machinery, robotics, smart software, and smart machinery means that a tech worker's job will grow more demanding and varied in many ways.

- The respondents predicted that technological advancements would result in an increase in "customized" goods and services as well as a sharp rise in the number of new product innovations. This implies that computer employees should be better able to evaluate their work on a daily, or even hourly, basis. It also requires tech employees to be able to quickly transition between various work demands, use a diversity of knowledge and abilities, and adapt to shifting task requirements.

- The need for intelligent human-technology collaboration will increase. To give an example, traditional process operators now have to work in tandem with increasingly sophisticated robots and systems due to technological advancements. This implies that in the near future, process operators ought to be able to configure robots and program machines. The difficulty of the operator's task is anticipated to lessen somewhat later on, when the complicated technology can be (re)programmed using augmented reality or a user-friendly tablet computer. Most respondents emphasize that they have already noticed a slight trend in high-tech production toward a reduction in complexity.

- The growth of tech professionals will become increasingly crucial because machinery and technology are always evolving. New technical breakthroughs will be presented at a speed that the world is not yet acclimated to, according to respondents, particularly those from SMEs. Many of the responders emphasized that in order for IT workers to use the newest equipment and technology, they must stay current. Additionally, tech professionals ought to be more capable of handling erratic and unplanned circumstances.

The respondents believe that these developments have significant practical ramifications: about 50% of them assert that tech positions demand workers with a higher degree of formal education. The other half of the firms, on the other hand, say that workplace learning and more comprehensive, long-term, company-specific educational programs should equip tech professionals for demands on the job going forward.

2. Workplaces and team configurations will drastically alter:

Tech professionals' work conditions and team compositions are drastically changing as a result of technological advancements. The need for Just-In-Time customization and the growing integration of value chain operations are to blame for this. This calls for interdisciplinary project teams that frequently span divisions and organizations to facilitate communication between co-workers, clients, and suppliers.

3. Automation and automation of work will increase:

Routine jobs are already being replaced by automation and automation in factories. SMEs anticipate this to occur soon, with supplier and business-to-business client demands supporting automation. Improved machine and system communication through advanced software will enable machines to adapt to one another. Automation and automation require technologists with expertise in data interpretation, analysis, and optimization, especially in larger enterprises.

4. New product-market combinations encourage worker adaptability and job unpredictability:

The larger organizations claim that technological advancements result in various product-market combinations, business models, and organizational structures. One respondent gives an example of a new factory where clients may log in, use the equipment, and get their personalized product the same day. Operator influence is reduced during that process, and new issues with supply chain management, data security, and production planning come up. Many CEOs of SMEs and larger companies emphasize how an organization's agility is forced by the mounting push from technology. This suggests that IT professionals ought to be more adept at working in groups that are able to respond swiftly and with more autonomy to changes in the market. Furthermore, the majority of participants who worked for larger companies stated that possibilities to create new business models are created by technological advancements. It was also noted that the shift from traditional production to service provisions being driven by the clever use of massive volumes of (machine) data.

Conclusions

This investigation represents a step in the right direction towards understanding the (imminent) shifts in tech labour brought about by a rapid pace of technological advancements. Organizations are getting ready for technology advancements that will drastically alter tech labour in the future industrial reality. These organizations outline the following trends: (1) tech employment will become more demanding and diverse; (2) work environments and team compositions will undergo dramatic changes; (3) work will become more automated and robotized; and (4) worker adaptation and job instability will be driven by new product-market combinations. This study shows that larger firms are not the only ones that benefit from the newly discovered technical advancements. According to the study's SME respondents, these technological advancements would undoubtedly have a significant impact on their tech-related occupations as well. It's not a matter of if, but rather when these important shifts will take place.

This study supports the conclusions of earlier research that elucidate the three primary features of labor in the industry, as outlined by Levy and Murmane (2005): (1) resolving unstructured issues; (2) utilizing fresh data; and (3) doing non-routine manual tasks. The ability to work in tandem or supplement with emerging technologies, such as augmented reality, sophisticated machinery, and (collaborative) robots, is a crucial fifth dimension that this research contributes. Because of the five newly revealed technical advancements, tech labor will grow increasingly difficult, requiring tech workers to continuously improve them.

Compared to the ongoing debate regarding the effects of automation on labor, insights into how technological advancements affect tech work—as reported by the study's respondents—are revolutionary (Scheele, 1999). The reason for this, according to the respondents, is because technologies like sensor technology, big data, and smart equipment have advanced to the point where they are now inexpensive and useful for businesses of all sizes, even SMEs. The implications for others that fall behind are so great that a "winner takes all" market is more likely to emerge once one corporation makes the initial move. Moreover, the technologies are combining to create novel business ideas like "smart factories" and sophisticated (software) systems that go beyond the confines of individual companies.

At some point the results demonstrate how technological advancements coupled with IT-related advancements become more affordable, intelligent, and broadly applicable. The daily operations of tech companies are being increasingly impacted by these potent technologies, which, according to respondents, are causing changes in organizational structures, business models, and (production) processes. These changes will have a significant and quick impact on the jobs and work environments of tech workers. However, technology is having an impact on more than only tech workers' future careers. The following effects of the aforementioned advancements are also difficult for HR practitioners:

From Organizational Design Expertise to Human Resource Management:

Human resources professionals should create positions that constantly push workers to pick up new skills and adjust to changing technology. Tech workers frequently don't have enough time for formal training, and their companies don't push them constantly. HR specialists should forecast how technology advancements will impact work and occupations, specifying the knowledge and abilities that will be required. In order to challenge tech personnel, they can collaborate with line managers to modify job content and production methods. This necessitates a departure from the traditional HR strategy, which concentrates on employee satisfaction or legal requirements. HR professionals should place a high priority on creating positions and production procedures that support learning and growth in order to increase the workforce's attraction to tech firms.

The Human Resources Expert as an Educator:

Human resources experts should provide creative, multidisciplinary development programs in addition to better, more stimulating work. They need to look beyond the conventional, formal training programs because previous studies show that typical personal development plans and soft-skills training from outside trainers can discourage tech workers from participating in personal development activities. Tech workers want their employers to give them lots of leeway to try new things, push them to collaborate actively on the manufacturing floor, and provide them with a boss who mentors them and can be flexible when needed. A development program that integrates (line) management may encompass the subsequent elements:

- Group meetings with participants from both within and outside the team, where the state-of-the-art in technology is discussed and tech workers are challenged with tasks to develop their "soft skills," which include collaborating with other disciplines and giving and receiving feedback from peers.

- Sessions with vendors and tech industry experts about upcoming equipment, machinery, systems, and procedures, along with assignments about how these advancements might affect the tech worker's existing position and the way his work is organized. Together, these assignments will teach tech professionals how personal expertise and organizational knowledge and abilities are related, as well as how to get ready for the new technology and its implications. Building Bridges: learning communities and abilities are connected to individual expertise and strategies for becoming ready for the new technology and its implications.

Developing Bridges: skill research facilities and educational communities;

Not to mention, it's critical that HR specialists take part in local organization-to-organization collaboration to support the development of IT workers. Not every business has the resources or experience to fully appreciate the practical implications outlined above.

Owing to this limitation, a number of academic institutions, governmental organizations, and (bigger) businesses are working together in the Netherlands through initiatives such as "skills labs," "learning communities," and "field labs." These programs create real-world learning settings. Businesses make a contribution by bringing cutting edge expertise and practical technologies to the table. Government financing is available, and education contributes to the development of vocationally sound and appropriate curriculum.

These learning environments create chances for companies, learners, and academic institutions to collaborate together to future-proof the tech worker. It is crucial that the learning environment be: (1) started by a group of companies; (2) captures the current state-of-the-art and vision and follows long-term developments; (3) can be used Just-In-Time and in-company by participating companies; (4) has short-term modules; (5) can be tailored to specific target groups; and (6) uses tools, such as simulations, technology, or other equipment, that make it lifelike and recognizable (real) for people working in such organizations. These requirements will help create a learning environment that will challenge today's tech workers. However, because of the close collaboration with educational institutions, these environments present HR professionals and organizations with a unique opportunity to pool their strengths and learn from each other's best practices, which could result in powerful learning environments that help recruit and train enough new tech workers.

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