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Technology, Work & Skills
The Impact of Technology on Employees

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KEMMY BUSINESS SCHOOL
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A Review of Literature and Analysis of Results from the FSU Working Conditions Survey

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Contents

Table of Tables

Table of Figures

Introduction

The future of work and the impact of new technology on jobs and organisations has gained increased attention in recent times. Eurofound has defined the 'digital revolution' as "a general acceleration in the pace of technical change in the economy, driven by mass expansion of our capacity to store, process and communicate information using electronic devices"[1]. There are many implications of increasing digitalization and technological change, in particular, "tasks and occupations and conditions of work are two aspects … where the effect of technological change is direct and immediate"[2]. The aim of this report is to examine how technology is affecting the nature of work and the conditions of work particularly in financial services. The report is based on a wide-ranging review of international research on workplace technology and digitalization, and on an analysis of the FSU Working Conditions Survey 2019.

Section 1 of the report reviews the significant debate over the automation of jobs and various estimates on the impact of technological progress on the future of employment. Quantitative forecasts are problematic as technologies are continually developing and human tasks, which were previously considered impossible to replicate, have been displaced through technology[3]. In regard to the conditions of work, early predictions such as from Karl Marx and John Meynard Keynes were that advancements in technology would enhance workers lives, lifting them from toil and drudgery. However, later commentators argued that such predictions did not come to pass and indeed there has been debate about whether or not workplace technology ushered in "the age of electronically-sweated labour"[4]. Rather than technology resulting in increased free time for workers, there are concerns about employers using technology to intensify work. Section 2 of the report will explore the multifaceted relationship between technology and working time, in particular time spent performing prescribed tasks outside of regular working hours and the impact of this on employees' work-life balance. Section 3 explores the increasing pervasiveness of technology in monitoring employees' work and behaviours and the potential positive and negative consequences of employee surveillance. Section 4 considers research on worker attitudes to digitalization. Some people view advances in technology in a positive light whilst others are much more fearful and concerned about the potential impact that technology may have on their lives and their work. Hochschild et al. capture this narrative in distinguishing people into two categories - technology optimists or technology pessimists[5]. Section 5 highlights the importance of employers investing in upskilling and reskilling of workers to maximise their employability and skills utilisation. Section 6 provides examples of how trade unions internationally are engaging in the challenges raised for workers from technology through negotiation and litigation. Section 7 presents the results of the technology-related questions in the FSU survey. The survey provides an exploratory overview of developments in workplace technology across financial services. Lastly, Section 8 outlines the conclusion incorporating a number of recommendations and lines of inquiry for further research.

1.0 Is Technology Being Used To Replace Jobs?

Many observers believe that Europe is at the beginning of a new industrial revolution, considered to be the fourth such leap forward and hence labelled Industry 4.0.[6]

The pace of change in technological developments is faster now than at any other time. Some of the key technological developments include:

- Developments in digital capabilities
- Biological technology
- Robotics
- Machine learning
- The importance of 'Big Data'

While some extol the benefits of technology and its ability to make work lives better by for example automating menial and repetitive tasks, there is also a sense of fear for some that technology will replace jobs and potentially lead to job losses. It is sometimes difficult to predict what work will be available in the future to workers whose jobs have been automated or displaced by technology. Chang and Phu[7] writing for the International Labour Organisation (ILO) suggest that the "world is experiencing an unprecedented acceleration in technological advancement and implementation" and that "profound shifts are taking place – entire sectors are accommodating these innovations, rendering several human-performed occupations redundant. In the near future, these positions may be eliminated entirely".

From sophisticated artificial intelligence (AI) and machine learning developments to simply the extensive range of mobile phone apps available, there are numerous examples of technology replacing jobs or parts of jobs, particularly manual tasks in recent decades. In sectors such as retail and banking, many of the tasks previously carried out by workers are now either automated or completed by the customer, assisted by technology through self-service techniques.

1.1 Drivers of Change in the Financial Services Sector

In Financial Services, rapid changes in the sector have been facilitated or driven by developments in technology including:

- Online banking and investments
- Closures of physical branches
- Declining role of the bank teller
- Expanding competition

International research predicts major changes and challenges to the way work is organised in many sectors due to the impact of automation.

Table 1: International Research on Automation

Country / Region	Estimate of Automation Risk of Jobs
United States	47% of workers are at risk of having their jobs replaced by automation[8].
Southeast Asia	56% of all employment has a high risk of automation over the next 20 years[9].
Ireland	2 out of every 5 jobs in Ireland are at high-risk of automation[10]

However estimates of the extent of automation of jobs vary significantly. A study of OECD countries in 2016[11] suggested an average of 9 per cent of jobs were at high risk of automation. Researchers for that study caution against the assumption that whole occupations rather than single job-tasks are, or will be, automated by technology. This assumption, they argue, leads to risks of overestimating the extent to which jobs may be automated.

Occupations still contain a substantial share of tasks that are hard to automate and human centred tasks that require social intelligence such as persuading and negotiating are likely to remain genuinely human even in the long term.

There are indications that while jobs will not be entirely replaced, substantial elements will be impacted by automation. The way in which jobs operate and tasks are carried out will continue to be transformed. A study by the World Economic Forum[12] on the future of jobs suggests that a number of drivers of change will have an acute impact within specific industries. This study notes that developments in processing power and 'Big Data' will have an especially strong impact on Financial Services as will mobile internet and cloud technology. Developments in technology will also accompany other changes in society such as new consumer concerns around ethics and privacy especially as data analysis and cloud technology become commonplace. This has led to discussions about how technology can incorporate ethical principles. In addition, there is greater recognition of need for skills in specialized sales and customer roles as new business products will need to be explained to customers[13].

1.2 What is Skills Disruption?

Skills disruption refers to the extent to which skills currently identified as important to complete jobs and tasks in specific sectors will still be considered important at a set point in the future.

The report by the World Economic Forum outlines how technological disruptions rather than "completely replacing existing occupations and job categories are likely to substitute specific tasks previously carried out as part of these jobs, freeing workers up to focus on new tasks and leading to rapidly changing core skill sets in these occupations"[14]. It is predicted that the largest amount of skills disruption is expected to occur in the Financial Services and Investors industry compared to other sectors. Predictions are that there will be major job growth for computer and mathematical roles such as data analysts, information security analysts, database and network professionals and

a reduction in consumer facing roles, jobs involving manual data entry and back-office functions, accountants and bank tellers[15]. While traditional call-centre roles will decline, new customer service roles are expected to be created. Jobs that require the ability to analyse complex data and make data-based decisions are expected to increase in Financial Services.

2.0 Technology and Working Hours

Technology-Assisted Supplemental Work (TASW)

TASW is defined as the performance of role prescribed job tasks by full-time employees with the aid of advanced information and telecommunications technology at home or when away from home while on holiday.

Early research on technology and working time presumed a largely direct relationship between technology, productivity and working-time, the general thrust of which argued that the spread of automation should reduce both paid and unpaid working-time.[16] However, it has since been recognised that technological innovations generate unintended consequences and unanticipated (and often contradictory) effects[17]. Claims that technology would bring a "leisure revolution" to industrial society have been replaced with contemporary debate regarding with "time poverty" and the paucity of leisure. For example, it has been argued that new technologies do not simply use time and displace existing activities, rather, the emergence of new technologies generate new kinds of time, and unpredictable change[18]. Some commentators argue this can have the effect of changing the nature and meaning of tasks and work activities, as well as creating new material and cultural practices[19].

The interaction between technology, working time and organisational practices is worthy of consideration from a Marxist perspective. Time is of central importance from a Marxist perspective, which views capitalism as attempting to extract greater value from labour in one of two ways[20]. Firstly, by lengthening the working day. Alternatively, by intensifying the pace or rate of labour production in the existing time available. Since physiological and psychological factors have the effect of diminishing returns on the lengthening of the working day, employers have often favored the latter option. One of the forms through which employers attempt to derive maximum productivity from workers[21] is by 'time compression'. These include practices associated with Taylorism and Fordism including the introduction of machines and re-organizing the sequencing and order of tasks. More contemporaneously, other forms include using peaks and troughs more effectively[22], and by eliminating all unproductive times from the process (just-in-time production).

While the practices outlined above have had significant impacts on the organisation of work, from the late 1990's onwards contemporary forms of information communication technology have altered working practices for knowledge workers in particular. For example, technological advances means that work is no longer wholly defined by conventional boundaries of space and time; resultantly, for many people, normal working hours have become something of an anachronism[23]. Similarly, others argue that particularly for white collar workers and professionals, paid employment is no longer confined to designated hours carried out in a specified place.[24] Enhanced technological capabilities enables work to be carried out wherever workers happen to be at the time the work need arises[25]. The advent of the smartphone is especially significant, as increasingly workers engage such devices to

routinely perform workplace duties in their own time, blurring the division of work and personal life[26]. It has also been argued that while on the one hand such technology can increase employee autonomy, it is also associated with increased expectations to be available outside regular work hours[27] , resulting is what now commonly termed in the vernacular as an "always on" culture of working. Furthermore, the insidious impacts of "always on" organisational cultures can remain disguised as benefits for workers in the form of increased convenience, higher autonomy or control over work-life boundaries. In contrast, research finds that flexible work boundaries often have the effect of creating "work without boundaries" or indeed compromising health and well-being of the individual and their family[28]. Since the borders between home and work are more blurred, work pressures spill-over into non-work life, workers can display an inability to 'switch off' or encounter difficulty in unwinding at the end of the working day[29].

Eurofound and the ILO define telework or information communications technology mobile work (T/ICTM) as the use of ICT – such as smartphones, tablets, laptops and desktop computers – for the purposes of work outside the employer's premises. As technology allows work to be conducted remotely to an employer's premises, this creates opportunities for both more flexible and longer working hours. Eurofound and the ILO differentiate between information communications technology as a substitute for, or supplement to, traditional office work[30]. While substitution means substituting time spent in the office conducting work with work conducted remotely, supplementation refers to the undertaking of additional work. Eurofound and the ILO point out that for workers the distinction between the two is often blurred and can lead to individuals working longer hours overall. They refer to data from the European Working Conditions Survey 2015 which shows that the share of employees working long hours – defined as more than 48 per week – is higher among workers using technology and mobile ICT than for other employees, including regular home-based teleworkers. This was found to be is case for both men and women, though men were found to be more likely to work longer hours at the place of work.

Information Communications Technology Mobile Work (ICTM): Substitution and Supplementation

Substitution

Substitution means substituting time spent in the office conducting work with work conducted remotely

Supplemental

Supplemental working is where technology facilitates the undertaking or completion of additional or supplemental work beyond the office.

2.1 What is Work Extension?

Work extension is broadly defined as the encroachment of work on private time through ever-present connectivity

The impact of ICT on work practices it has been argued takes the form of work extension, which can be conceptualized and measured in different ways, for example in regards to the extent that it impacts workers' sense of time pressure or commitments to activities outside of work. Work extension is broadly defined by as the encroachment of work on private time through ubiquitous connectivity, "entailing work that occurs beyond a fixed work-place (typically at home) at times outside of normal working hours (typically in the mornings before and/or evenings after the main period of work)" [31]. In a recent longitudinal analysis of work extension it was found that in 2000, 5 per cent of employed individuals aged 16–64 reported work extension but this had increased to 8 per cent by 2015. Findings were higher for professionals and managers than for other occupation groups. Interestingly, work extension is not linked to balancing the demands of work and family. Therefore the findings which are substantively small lend some though not complete credence to "the clichéd image…. of the frenetic, technologically tethered, iPhone-addicted citizen, inhabiting a digital ecology of constant connectivity"[32]. Professionals and managers the study showed spend about half of their work time using a device, however, the effect of work extension is not as great as popular sentiment would suggest. It is argued that this may be due to the fact that mobile devices can facilitate immediate notification or checking of work-related communications but may not lead to a sustained period of extra work time. In other words, the tendency to check on workplace communications while not actually executing any associated work tasks. This however still allows for work-related stresses spilling over into non-work time and contributing to an increased general sense of time pressure for individuals[33]. ICT also extends work time into commuting time. Data from the Central Statistics Office (CSO) reveals that the average commute to work rose in 2016 to 28.2 minutes from 26.6 minutes in 2011 while 11 per cent of commuters travelled for more than one hour to work[34]. There is significant variation across the country with counties bordering Dublin (Wicklow, Meath and Kildare) having the longest average commuting times[35]. Since some workers can avail of commuting periods to conduct work-related tasks, arguments have been made for the commute period to be counted as working time[36].

2.2 Technology, Time, and Work-Life Balance

Time is becoming an ever more critical issue in relation to both quality of work, and work-life balance (WLB). The nature of technological acceleration has meant that for many people, rather that time becoming abundant, it seems to be increasingly scarce[37]. One major potential advantage for workers (enabled by modern technology) is the scope to work more flexibly, and that for those with family or other additional responsibilities, having such autonomy can be highly valued when trying to achieve a satisfactory WLB[38]. Eurofound and the ILO (2017) found evidence (for example from Belgium) that significant numbers of teleworkers (45%) carry out small errands or domestic chores in between work activities gearing work towards family needs. However, as aspects of work are integrated within the home or personal domain, so the boundary which separates them essentially becomes permeable. The result of constant connectivity from devices has contributed to the assumption that the pace of life is accelerating[39]. While technology can give people greater choice over where and when they work, it can also increase pressure and reduce autonomy when used (or overused) in the wrong way[40].

The emergence of organisational cultures which either demand or institutionalise (for example through rewards) the use of technology to remain engaged with work outside of working hours erode the advantages that technology creates in relation to WLB. Furthermore, in order to consistently perform at optimum levels, physical distance and psychological detachment from work is vitally important yet technology can make this substantially more difficult to achieve[41]. Even while present at work, natural breaks in work are more difficult to achieve and work interruptions have increased according to the American Psychological Association (APA). Indeed, this can result in undermining productivity rather than enhancing it with individuals compensating for lost productivity outside of the workplace[42]. Findings from 2013 reveal that 53 per cent of Americans worked over the weekend, 52 per cent worked outside designated work hours, and 54 per cent worked even when sick[43]. In the Irish context, this has significance particularly for those in technology or financial services organisations where US multinationals are dominant employers and US work cultures are arguably replicated. Such is the extent of the emerging phenomenon of technology addiction[44] that it has given rise to campaigns and regulations. For example, former employees of Google and Facebook have spoken out against the "addictive nature of products which they helped to create"[45]. In France, a new employment law was introduced in 2017 which requires companies with 50 employees or more to negotiate with employee representatives over the use of electronic communication tools with a view to inhibiting encroachment of work on personal time. Significant fines were introduced for employers who fail to establish so-called "right to disconnect" rules[46].

3.0 Technology and Employee Surveillance

What is workplace surveillance?

"Management's ability to monitor, record and track employee performance, behaviours and personal characteristics in real time or as part of broader organisational processes" [47]. Organisations can also use information to establish discipline amongst employees [48].

Employers have always engaged in some form of surveillance of employee activities but its scale and intensity has increased which is associated with becoming more technological and more pervasive[49]. Technology has become increasingly prevalent in the surveillance of all aspects of work including productivity, attendance, and the frequency and content of employees' online activity.

Factors that have facilitated the increased use of technological surveillance include:

- advancements in technology
- falling costs
- greater accuracy of technology
- greater social acceptability
- more interest by decision makers[50].

Electronic monitoring of employees activities can take the form of:

- email and internet monitoring
- phone tapping
- GPS tracking

- radio frequency identification
- monitoring of computer keystrokes and time spent at keyboards
- reviewing computer files
- monitoring of blogs and social media sites[51].

More recently, there has been a growth in the use of biometrics in workplaces often to replace card-based identification systems.

What are biometrics?

"Measurable physiological and/or behavioural characteristics that are innate and unique to the individual and which can be used to verify their identity"52. Physiological characteristics include fingerprints and facial features and behavioural characteristics include keystrokes and handwriting.

3.1 The Benefits of Technological Surveillance

Computer mediated workplace technology is now considered the norm in most workplaces but employers and employees can have conflicting attitudes or a "love–hate relationship with technology"[53]. Employers can identify legitimate reasons for electronic monitoring and surveillance (EMS):

- to conduct business transactions
- to make gains in areas such as productivity, quality, and safety, costs, attendance patterns and efficient scheduling
- to protect themselves against fraud, theft, defamation and claims of cyberbullying and discrimination[54]
- employers can be fearful of lost productivity if employees use workplace technology for personal reasons[55] and therefore monitor inappropriate private use.

Some research has noted the role of technology and electronic surveillance in improving employee productivity without a negative impact on workers[56]. For instance monitoring employee/customer calls to provide feedback and ensure continuous improvement of the customer/employee interaction is a common practice in banking call centres. Employers will also utilise EMS to provide valuable factual evidence where performance is poor or where a legal claim is made against a company[57].

Workplace technology can benefit employers and employees by facilitating:

- global working
- networking
- flexible working
- a cost efficient means of organising and storing data[58].

Holland and Bardoel[59] acknowledge the 'smart side' of technology in terms of enabling efficiency and innovation among workers, in facilitating more fluid and global boundaries of work, thus enabling employees to work more flexibly and allowing for greater diversity. In addition, some research has found workers can be supportive of electronic surveillance in relation to performance development because they may believe that data would be more objective than a supervisor's judgement[60].

Recent case law has raised questions about how employers can more effectively monitor employees' working hours to ensure they get their obligatory rest periods during the day and week. In 2019, the European Court of Justice ruled in a case involving Deutsche Bank that employers are required to keep

exact records of workers' hours, not just to calculate overtime but also to make sure they get their rest periods under the EU's working-time directive. This has significant consequences for the monitoring of work conducted via technology, particularly if working remotely. A case of a similar nature was heard in the Irish context in 2018 when a business executive was awarded €7,500 by the Labour Court in compensation for breaches of the Organisation of Working Time Act 1997 whereby the employee had worked in excess of an average 48 hours a week over a time period (*Kepak Convenience Foods Unlimited Company and Grainne O'Hara [2018]*). The former employee's representative argued that her workload and reporting structures led her to work up to 60 hours per week. In this case, the Ms. O'Hara submitted copies of emails that she sent to and/or received from her employers both before normal start times and after normal finish times on numerous occasions. The employer's defense was that the employee could have comfortably completed her work within the contracted 40 hours each week and also that the company provided a comprehensive training programme designed to ensure that employees understood duties and were capable of undertaking them within the statutory working week. However, the Labour Court concluded that the company, through the operation of its software and emails, was aware of the hours the Ms. O'Hara was working and took no steps to curtail the time she spent working. The Labour Court noted that it was an employers' responsibility to "not permit" an employee to work more than the average 48 hours. Though the financial settlement awarded may be viewed as a relatively innocuous amount, the case gave rise to some interesting understandings of how employers have failed, perhaps even willfully, to meet their duty of care in the employment relationship where technology is concerned. The two cases illustrate the potential benefits to workers of employers recording and monitoring working time which can help workers exercise their rights in regards to breaks and weekly working hours. Potentially technology has a greater role to play in accurately recording working time.

3.2 The 'Dark Side' of Technological Surveillance

In contrast to research on the positive impact of electronic surveillance on 'tangible' outputs such as productivity, other studies point out that greater productivity can be at the expense of quality[61]. For example, where employees are aware of the dimensions of the work that are being monitored, this can lead to diminished performance on dimensions that are not monitored so closely[62]. In addition EMS has been negatively linked to:

- worker's physical and mental health
- job satisfaction
- employee control
- employee privacy rights
- due process, fairness and trust[63]

In relation to control, it has been long been argued that technology could provide information which aides greater managerial control. Where surveillance is negatively perceived as limiting individual control over work, this can lead to counterproductive behaviours on the part of employees such as absenteeism and withholding of effort[64]. In relation to privacy, workers may feel that information collected by employers can be used to draw conclusions about their performance with implications not just for their behaviour inside the workplace, but sometimes for their lifestyle outside it[65], which for many workers is an illegitimate use of EMS and an intrusion of privacy. Holland and Bardoel[66] refer to the "dark side" of technology and the potential of EMS to undermine important aspects of work such as employee trust and commitment to the organisation. For instance, research has shown that a potential hidden cost of surveillance was a decline in collegiality or willingness to help others in the workplace[67]. EMS policies and practices can thus be contradictory to other human resource management strategies which emphasise relationship building, empowerment and involvement, and are underpinned by trust[68].

4.0 Worker Attitudes to Technology

Existing literature that focuses on worker attitudes to technology, and in particular how we might understand and explain worker attitudes to technology, largely draws on Davis's (1989) famous work on what is referred to as the Technology Acceptance Model (TAM)[69]. Davis (1989) noted that a person's attitude to technology is influenced by two beliefs:
(i) the perceived usefulness of the technology and
(ii) the perceived ease of use of the technology.

Davis defined perceived usefulness as "the degree to which the person believes that using the particular system would enhance his or her job performance", whereas the perceived ease of use was defined as "the degree to which the person believes that using the particular system would be free of effort"[70]. According to the original TAM these beliefs influence attitudes which in turn influences behaviour intention to use technology and influences actual usage behaviour. More recently, scholars have argued that it is important to focus on worker attitudes in environments where the use of new technology is mandatory as the user's attitude towards the system can have positive or negative organisational consequences[71].

4.1 Emerging Themes on Worker Attitudes to New Technology

In reviewing the literature on the impact of new technology on work, a number of key themes have emerged.

(1) New technology will result in job losses, but not my job

It appears from international survey results that workers believe that the introduction of technology in the workplace will result in job losses throughout the economy.

- In research by the Pew Research Center, 72 per cent of respondents in the USA said that they were either very or somewhat worried that machines might do many of the jobs currently done by humans[72].
- In the Northeastern University/Gallup survey, 73 per cent respondents said that an increase in the use of AI will eliminate more jobs than it creates[73].
- In the Special Eurobarometer 460 report on attitudes towards the impact of digitisation and automation, 74 per cent of respondents agreed that due to the use of robots and AI, more jobs will disappear than new jobs will be created[74]. In addition, 72 per cent of respondents agreed that robots and AI will steal people's jobs.

However workers were more optimistic when it came to questions about the impact on their own jobs:

- In the Northeastern University/Gallup survey, only 23 per cent of respondents were somewhat worried or very worried they will lose their job to next technology[75].
- In the Randstand Employer Brand Research, only 14 per cent respondents were worried that automation will take their job away[76].
- In research by the IPSOS/World Economic Forum, 30 per cent of respondents said that automation was putting their job at risk[77].

(2) *Certain sectors are more vulnerable to new technology*

It appears that workers in certain sectors are more worried than others about the impact of new technology.

- In the Pew Research Center research, respondents in the Banking, Finance, Insurance, Accounting or Real Estate sector were second highest in reporting that their jobs were likely to be automated[78].
- In the Northeastern University/Gallup survey, 79 per cent of respondents in the Financial, Insurance, Real Estate or Consulting sector felt that AI will eliminate more jobs than it creates[79].
- In the IPSOS/World Economic Forum research, respondents in the Financial, Insurance and Real Estate services were more likely to say that their employment was at risk[80].

(3) Technology has the potential to have a positive effect on jobs

In many surveys workers were quite positive and optimistic about the impact of technology in the workplace.

- In the Pew Research Center research, 40 per cent of respondents think humans would find jobs more meaningful and appealing whilst a quarter think the economy would create many new, better paying jobs for humans[81].
- In the Randstand Employer Brand Research, 40 per cent of respondents said automation would make their job better[82].
- In the IPSOS/World Economic Forum research, 46 per cent of respondents said that automation has made their job completely different from what it was 10 years ago and tend to view the changes positively; 49 per cent of respondents said it made their job easier; 46 per cent said that it improved the quality of their work; 42 per cent said that it reduced the risk of injury and; 40 per cent said that it made their job more interesting[83].

(4) Technology skill sets

A key issue for workers around the growth of technology in the workplace is having the skills to survive and develop with advances in technology. Some workers fear not having the skill set and the need to reskill themselves in order to do their job or future jobs.

- In the Northeastern University/Gallup survey, a slim majority, 51 per cent, revealed that they would need additional training to secure a new equivalent position should they lose their current job because of technology. A significant number of respondents (49%) suggested that they are looking to employers to provide that training[84].
- In the Special Eurobarometer 460 report on attitudes towards the impact of digitisation and automation, 80 per cent respondents who work believe they are sufficiently skilled in the use of digital technologies to do their job[85].
- In the IPSOS/World Economic Forum research, 64 per cent of respondents said that their employer has offered training to improve/update their skills[86].

(5) Negative sides to technology

In addition to possible job losses, some other negative associations with advances in technology have been noted.

- The fear that a robot or computer could put workers out of a job and into unemployment may have direct negative effects on a person's general, physical and mental health[87].
- There are possible negative effects of technology on workers' wellbeing with media stories of electronic leashes, stress and burnout[88].
- The use of technology as a mechanism for employee surveillance has also received attention with many negative issues raised, as noted earlier, such as invasion of privacy and civil liberties[89], feelings of injustice[90], control[91], lower job satisfaction, lower job autonomy, greater perceived discrimination at work, more negative attitudes to authority[92] and lower levels of trust[93].

4.2 Worker Attitudes to Technology in the Financial Services Sector

Whilst much of the literature on changes in technology in the banking sector have focused on the customer perspective, there is some limited research which focuses on worker attitudes. In a study of worker attitudes to increased automation in Nigerian banks, workers expressed fears about losing their jobs if they did not have the adequate technological skills to perform the new roles within the job [94]. However worker attitudes to technology were quite positive in that a majority of workers felt that technology had made their jobs easier and more interesting and it had not complicated their work. Other research has explored the impact of organisational influences on worker attitudes towards technology in a mandatory environment[95]. One study found that perceived organisational benefits and the opinions of both peers and information system consultants exerted a positive influence on workers' attitude to technology whilst managers had a negative influence. After workers had some experience of the technology, management continued to have a negative influence on attitudes whilst perceived organisational benefits continued to have positive influence on attitudes. Furthermore the study found that initial worker attitudes to technology determined later attitudes[96]. A range of factors influencing banking workers' attitudes to introduction of e-banking include[97]:

- Organisation change - fear of new responsibilities, fear of uncertainty and job losses, fear of losing autonomy and control, and fear of losing customer relationship.
- Management support - lack of effective leadership, lack of training, lack of strategic IT plan
- IT knowledge and awareness - lack of appropriate technical knowledge amongst bank staff, IT terminology
- Availability of IT funds
- Telecommunication infrastructure
- IT key resources – e.g. lack of national IT expertise
- Security and privacy fears of transaction errors and fraudulent activities, poor security measures, confidentiality and privacy
- Compatibility - system integration problems
- Complexity - system technical difficulties

5.0 Investment in Reskilling of Employees

There are a range of strategies open to employers in relation to how they plan to use new technology and whether they plan to replace workers with technology where possible i.e. job losses or whether it is envisaged that technology will enhance the work done by individual workers. Employer strategies can include:

- Investment in reskilling current employees
- Support mobility and job rotation
- Collaborate with educational institutions
- Target more female / foreign / older workers' talent

Not only is investment in employee upskilling and reskilling required as a result of technology but skills gaps have been identified as a barrier to the adoption of technology in financial services[98]. The World Economic Forum (WEF) found that across all industries, plans to invest in reskilling current employees feature prominently among reported future workforce strategies. Around two thirds of respondents in the study reported intentions to invest in the reskilling of current employees as part of their change management and future workforce planning efforts, making it by far the highest-ranked such strategy overall. On a global level, the WEF has argued that 56 per cent of the workforce in Financial Services require reskilling with 24 per cent needing reskilling time of at least 6 months. In the Financial Services sector 67 per cent of respondents cited investing in reskilling current employees as part of their future strategy[99]. However in Ireland, the Expert Group on Future Skills Needs noted that stakeholders in Financial Services were

negative about the potential for existing workers to be retrained into new roles, particularly those whose current roles involve manual, repetitive tasks which will be easily automated[100]. The CIPD, the professional body for HR, has emphasized the importance from a business case perspective for HR teams to be involved in the investment and implementation of automation and AI and the need for such initiatives "to be designed in relation to the humans who integrate them with wider work processes"[101]. The CIPD has recommended that employers need to focus on understanding skills requirements and developing effective workforce planning including giving employees the support they need to adapt for the future.

The Government has recently published a Future Jobs report which recognised that "technology will alter many occupations and create new ones which will demand different skills in the near future"[102]. While predicting that many job types of the future are not currently conceived of, the Government identified skills which it believes are as important to adapting to technological developments - soft skills, competences in digital technology, advanced cognitive skills and social and emotional skills. It also noted that people in vulnerable sectors must have options to retrain or upskill. While it is useful that the Government is giving consideration to the impact of technology on worker skills, its report does not include a systematic analysis of sectors and their potential vulnerability to automation and other technologies. The only mention of the financial services sector in the report was the observation that AI has impacted it, but no further discussion was provided. The Government's plan for improving workforce skills includes more apprenticeships and continuation of existing retraining programmes such as Springboard but excludes little discussion of, and no obligation on, employers to upskill workers particularly in vulnerable sectors. Interestingly, the Government recognised that "the availability of workers and enterprises with the right skills for emerging jobs is necessary for the transition to the digital and low carbon economies and for enabling a just transition"[103] but a 'just transition' is only mentioned once in the Government's report so there is no explanation of what is understood by this term and no discussion about the involvement of trade unions in representing workers' interests in this transition. Engagement and dialogue between government, employers and employee representatives is necessary to ensure that workers will have sufficient opportunities to upskill in a way that is appropriate to their needs.

6.0 Trade Unions and Workplace Technology

Trade unions have engaged in a variety of initiatives at company and national levels internationally aimed at protecting workers in the transition to expanding workplace technology and growth in workers using technology to work in their personal time. In relation to automation of work, unions have been concerned with protecting as many jobs as possible and with underlining the importance of investment in upskilling and reskilling. The European Trade Union Institute has argued that such investments are also beneficial to companies because "by increasing the skill levels of their workforce, they improve efficiency and increase competitiveness"[104]. In relation to working time, unions have been involved in representing employees in legal cases against employers for breaches of employment law. For example, the European Court of Justice case noted earlier was the result of a Spanish union (Federación de Servicios de Comisiones Obreras (CCOO) taking a case against Deutsche Bank over their obligation to set up a system for recording the time worked by staff. In addition, unions have proactively engaged in negotiating protective provisions for workers in organisations. This has been particularly facilitated in countries with strong systems of employer-union consultation and works councils. For example, in Germany in 2014, BMW agreed with its works council that all employees would be allowed to register time spent working outside the employer's premises as working time, which Eurofound and the ILO suggest allows for the possibility of overtime pay for responding to emails after the end of their normal working day[105].

7.0 Results from the FSU Working Conditions Survey: the Impact of Technology on Workers

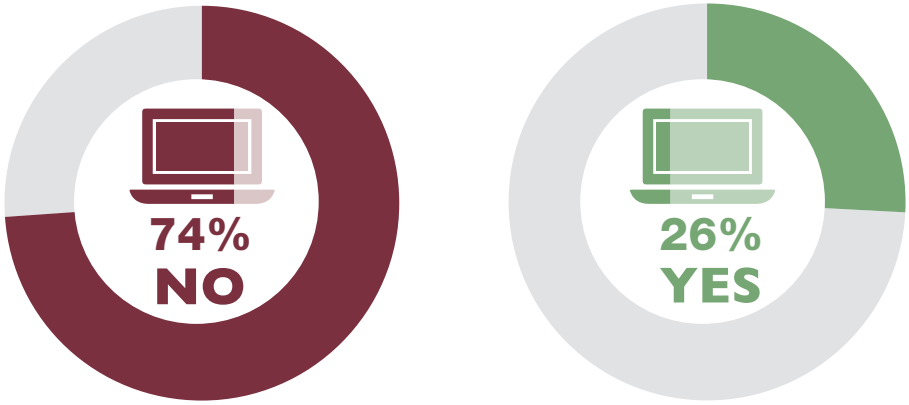
7.1 Introduction

As part of a broader survey on working conditions conducted by the FSU in 2019, a number of questions were included which focused on the impact of technology on work. These included workers' perceptions of the effect of technology on WLB, and the extent to which individuals feel that their employers take actions to manage the impact of technology on WLB, be it positive or negative. The survey also explored respondents general perceptions of the likely positive or negative impact that technology may have on their role in the future; the extent to which their employers plan to introduce technology to amend aspects of their role; and how supported they felt in that transition through employer supported training and development initiatives. The final aspect explored in the study is the extent to which workers feel technology is used by employers for the purposes of surveillance and monitoring of their work. In total 1936 responses to the study were received. The majority of the respondents were female (62%), aged between 35 and 54 (66%), and worked in the retail banking sector (72%). The findings are outlined below.

7.2 Work- life balance

The advantages of technology to organisational efficiency are well documented and such efficiency is very often achieved in relation to working time, both within and outside of standard working hours. However, employees' overuse of technology to remain engaged with work has also been linked to negative outcomes such as stress and burnout. Survey respondents were asked if they are expected to answer calls and check emails outside of working hours. Three quarters of respondents indicated they are not expected to do so while 25 per cent are (Fig. 1 and Table 2 in Appendix). The areas with the highest proportions of people who stated they are expected to answer call/emails outside hours were technology and professional services, insurance, and international banking, followed by retail banking, funds and payments. Higher proportions of male respondents (32%) reported they are expected to answer calls outside work than female respondents (23%).

Figure 1: Working outside Hours



Employers in some industries have taken steps to introduce measures which restrict/discourage employees' over-use of technology for work purposes. However, there is little evidence of this in the financial services sector where just over half of respondents felt that their employer had not put in place measures to prevent employees' over-use of technology for work purposes (Table 3). Only 7.4 per cent of respondents felt that their employer had engaged in some effort in this regard. When examining the results by where respondents worked, the findings revealed that 64 per cent of those working in insurance felt their employer had not put measures in place to prevent over-use of technology. Substantial proportions of respondents in international banking (53%) and retail banking (54%) also indicated that no measures had been established by their employer. This may indicate that expectations to be available outside of working hours vary depending on the type of work being performed in each sector, perhaps reflecting aspects such as customer demand.

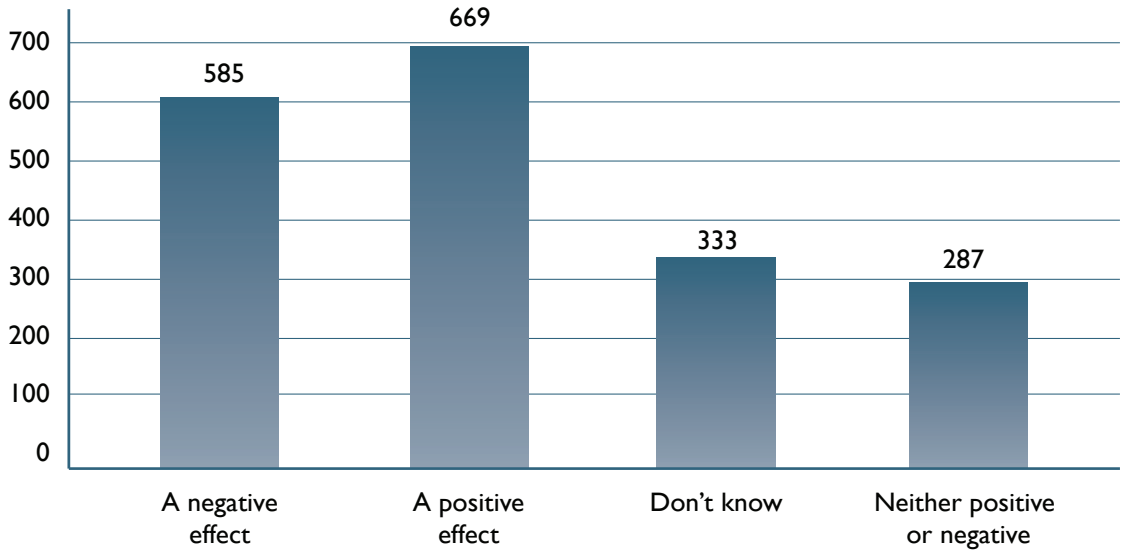
Table 3: Perception of extent to which employer put in place measures to prevent employees over-using technology for work purposes

	Frequency	Percent
Strongly agree	25	1.3
Agree	119	6.1
Neither agree nor disagree	749	38.7
Disagree	736	38.0
Strongly disagree	245	12.7
Response	62	3.2
Total	**1936**	**100.0**

7.3 The future impact of technology on work

In the survey, respondents were asked to indicate the extent to which they felt that technology would have positive or negative effects on their working life over the next 10 years. The results indicate that while over a third of participants (34.6%) indicated that they believed technology would have a positive effect, a sizable proportion (30.2%) felt that it would negatively affect their working life (Fig. 2 and Table 4 in Appendix). When this was explored along sector areas, those in retail banking were equally split with 33.5 per cent reporting negative perceptions and 33.5 per cent reporting positive perceptions. More positive perceptions of the effects of technology came from respondents in technology and professional services roles where 47 per cent indicated that technology would have a positive effect and those working in areas such payments (45% indicating positive effects). Almost 15 per cent of respondents indicated that technology would not impact their working life in either a positive or negative way, suggesting that some roles are at least perceived to be immune to either the threats or advantages associated with technological developments.

Figure 2: Employee Perceptions of Future Impact of Technology (frequencies)

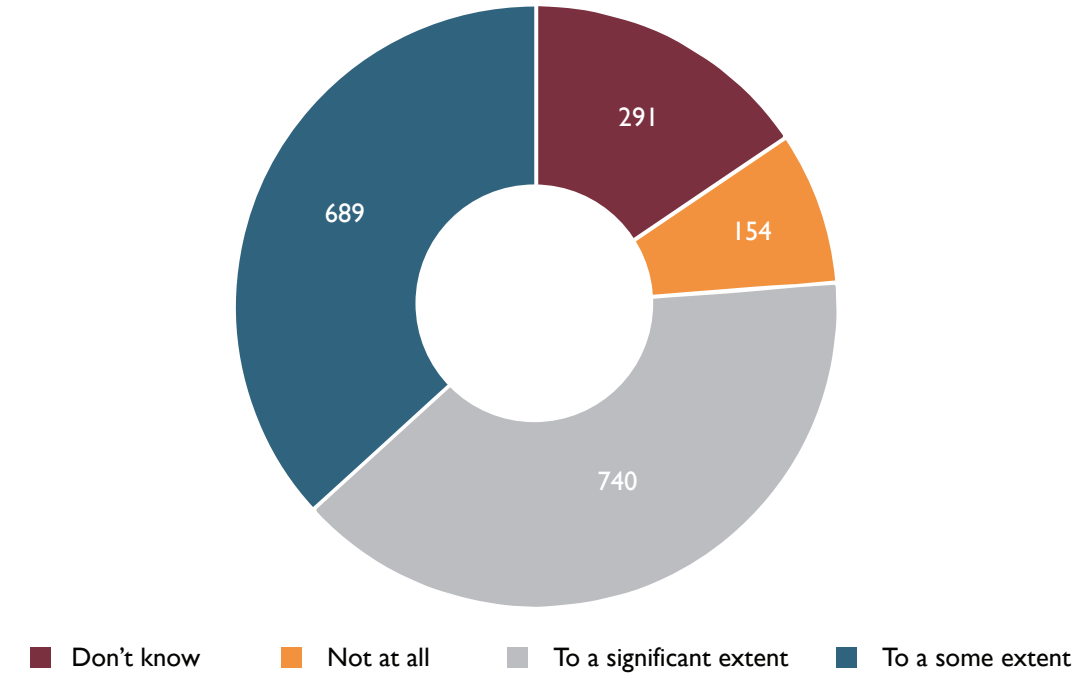


Over 17 per cent of respondents indicated that they did not know how technology would impact, either positively or negatively. This may suggest than some workers are unsure as to how technology might affect their organisational roles in the future, in terms of what technology may be developed or adopted. However, it could also indicate a lack of communication within organisations with regard to technology adoption, as such leaving employees with limited insight of potential changes.

The survey asked respondents to indicate the extent to which their employer is planning to automate/ replace aspects of their role through technology over the next 10 years. Similar to the previous question, 15 per cent of respondents indicated that they did not know to what extent their employer was planning to automate or replace aspects of their role (Fig. 3 and Table 5 in Appendix). This may lend support to the suggestion that there is a lack of organisational communication between management and workers in this regard. Research on technology in the workplace generally suggests that workers are more positively disposed to the introduction of new technologies where management actively engage and involve workers in both the development and implementation of technological change.

The vast majority of respondents (74%) felt that their work would change in the future based on the introduction of automation and new technology over the next 10 years. Of these, 38.2 per cent felt that their role would be automated to a significant extent. Only 8 per cent of individuals felt that their employer had no plans to automate or replace elements of their role. Within areas of financial services, respondents with the strongest perceptions of significant change to their role arising from automation came from retail banking (44%), followed by insurance (39%) and payments (31%). In addition, a higher proportion of female respondents (41%) believed that there would be a significant level of automation of their role over the next 10 years compared to 36 per cent of males.

Figure 3: Extent to which Employer is Planning to Automate/Replace Tasks with Technology (frequencies)



What is clear from the results is that the majority of workers feel their employer will take steps to automate or replace elements of their role in the future. In the past, the introduction of new technology in the workplace invariably involved some form of training, reskilling, or even in some cases compensation for workers. However, research internationally reveals that a strong relationship between training and the introduction of new technologies no longer exists. This is in part attributed to more "on the job" learning, which is itself facilitated through technology. A lack of training and development supports amid the introduction of new technology may have negative consequences for workers, for example if they lack confidence in how to use the system or conduct their role after the introduction of new technology. Furthermore, employees who face potential job losses as a result of automation require longer term development supports to facilitate reskilling or redeployment to other roles. In the survey, over a third of respondents (36.4%) indicated that their employer was not providing sufficient training and development to help them feel prepared for the impact of technology on their role, while 35 per cent reported that their employer was providing such training (Table 6). This indicates that training and development is not keeping pace with the level of new technology introduction in some organisations.

Table 6: Extent to which Employer Provides Training and Development in Relation to Impact of Technology on Job Role

	Frequency	Percent
Strongly agree	71	3.7
Agree	607	31.4
Neither agree nor disagree	492	25.4
Disagree	509	26.3
Strongly disagree	195	10.1
No response	62	3.2
Total	**1936**	**100.0**

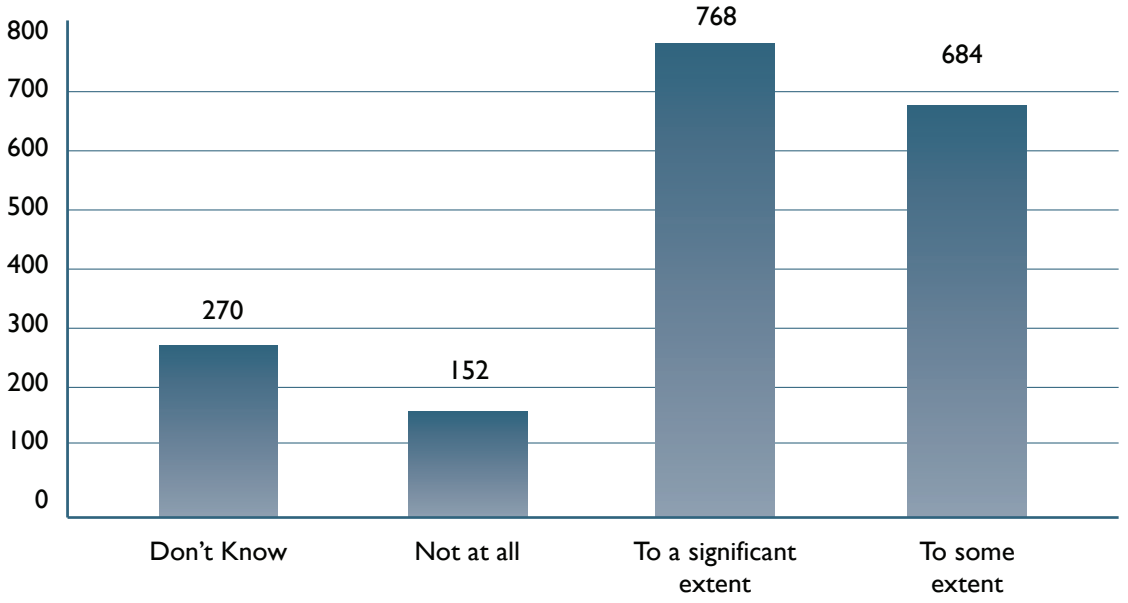
Differences were identified depending on the roles held by respondents: those from insurance roles had the most negative perceptions that their employer was providing training to prepare for the impact of technology with 43 per cent disagreeing with the statement and only 18 per cent agreeing. Those in retail banking were split more evenly with 38 per cent agreeing that training was provided and 37 per cent disagreeing. The most positive responses came from those working in funds (including asset management) with 43 per cent indicating that their employer provided training as opposed to 17 per cent disagreeing.

7.4 Monitoring and Surveillance

The survey asked participants to indicate the extent to which they felt their work was monitored through the use of technology. Three quarters of respondents indicated that work was monitored through technology to some extent (40% felt that a significant level of monitoring existed) (Fig. 4 and Table 7 in Appendix). There was some variation within financial sector areas with regard to perceptions of significant monitoring of work. For instance, 45 per cent of respondents from the retail banking sector felt that there was a significant level of monitoring of work through technology compared to 35 per cent of those working in payments, 35 per cent of those working in funds (including asset management), 28.5 per cent working in international banking and 25 per cent working in insurance. However, an average of 39 per cent of respondents across all sector areas felt there was monitoring through technology to some extent. Female respondents were more likely to feel that their work was monitored to a significant extent (45%) than male respondents (34%).

Only a small proportion of respondents (8%) felt that technology was not used to monitor their work at all and interestingly, almost 14 per cent indicated that they did not know the extent to which technology is used in monitoring work in their organisation or role. At the workplace level, IT and data use policies provide guidelines around the use of technology in the workplace. While such policies generally relate to employees' use of technology, arguably organisations should make efforts to outline how it gathers and uses employee data also. In the absence of such policies, there are general regulations deriving from Irish data protection and the more recent General Data Protections Regulation that require employees be informed around such issues.

Figure 4: Extent to Which Employees Feel Their Work is Monitored through Technology



8.0 Conclusion and Recommendations

The survey results indicate that workers recognise there can be positive and negative implications from the increasing pervasiveness of technology. When respondents were asked a general question about the expected impact of technology, a slightly higher proportion reported a positive perception than a negative perception. When more specific questions were asked about the impact of technology on job roles, the results indicate a strong expectation amongst financial services workers that their jobs will be automated at least to some extent in the next 10 years. In addition, a high proportion believed their work is being monitored through technology. A substantial minority of respondents reported an expectation amongst employers that they answer phone calls and emails outside of contracted hours though some other findings from the survey reported elsewhere suggest that a high proportion of respondents regularly work outside their work hours. This may indicate that while workers may not have to answer calls/emails, the size of their workload necessitates them to continue working in their personal time. This practice is commonly known as 'leavism'. A key challenge is to identify areas of concern flagged by workers in the survey and to address issues now that can safeguard workers' jobs and job quality. The following are a set of preliminary recommendations arising from the survey results.

Recommendation 1

Employers need to pay more attention to upskilling and reskilling of workers

Over 36 per cent of workers indicated their employer had not provided training and development in relation to technology and a substantial proportion neither agreeing nor disagreeing about the provision of training which suggests a lack of clarity or knowledge amongst workers about this issue. These results are concerning given the repeated calls in international studies and by national and international organisations for investment in upskilling and reskilling of workers. The Expert Group on Future Skills Needs in Ireland noted that "retraining and reskilling will be required to minimise the negative impact of digitalisation/automation on employment and there will be a role for many stakeholders to play in this"[106]. The Governments' Report on Future Jobs has highlighted the importance of managers and workers developing their skills throughout their career and just as a once-off exercise[107]. Given technology is predicted to change tasks and eliminate some roles, reskilling and upskilling should aim to enhance workers' capacity to undertake new tasks in their roles and to increase their employability for the future, both of which are win-win outcomes for workers, employers and the economy.

Recommendation 2

Employers need to ensure measures are in place to prevent the over-use of technology

The survey results suggest there are a lack of measures in organisations addressing the over-use of technology and a lack of protections for workers around out-of-hours use of technology. Only a small proportion of survey respondents indicated that their employer had established measures to prevent over-use of technology. While technology can be beneficial in facilitating work outside the boundaries of the workplace and a reduction in the need for commuting time, increasing use of technology has been linked to work extension and work intensification as noted earlier. This raises concerns about the impact on worker wellbeing and increases challenges for employers in meeting their obligations related to health and safety and working time regulations. These results support the calls for a legislative 'right to disconnect'. Whether workers 'choose' to work outside work hours or whether they feel they have to because of workload or accessibility expectations, employers are reminded that they are obliged not to permit workers to work in excess of legally set maximum working time limits.

Recommendation 3

Greater attention needs to be paid to possible gender implications of workplace technology

The survey results revealed that women and men had some different experiences of workplace technology. Men were more likely to report answering calls/emails outside work hours while women were more likely to expect there would be a significant level of automation of their role and that their work was being monitored through technology. These differences may also reflect diversity in sub-sectors and occupations, as levels of male and female employment vary across these dimensions. Higher proportions of female respondents worked in retail banking than men while more men reported working in areas like professional/technology services, insurance and funds.

Recommendation 4

Collective bargaining is needed at workplace level to address the challenges of workplace technology including the impact on workers

While the Government has recognised that the development of skills must match the needs of workers as well as enterprises, the absence of collective bargaining obligations on employers means that the needs of workers may not be adequately considered. In other countries such as Denmark, workers needs are represented by the inclusion of unions at national, industry and local levels in dialogue with employers and the government on training and skills[108]. In addition to the area of skills, this report has highlighted the multitude of ways in which technology can affect terms and conditions of employment. It will be increasingly important that workers have access to, and organise, a trade union in their workplace if they are to address the challenges identified. It is important that unions and workers push for collective bargaining at a workplace level in order to better address these issue. The important role for unions is recognised internationally with the ILO recently arguing that negotiations between unions, employers and government can help ensure that workers should "get a just share of economic progress, that there is respect for their rights and protection against risk in return for their continuing contribution to the economy"[109].

Further research

As the results are exploratory in nature, there are a range of issues that require investigation in the next phase of research including the following:

- The factors influencing the technology strategies of employers
- How employers integrate workplace technology with other human resource strategies to instigate change such as restructuring
- The myriad of ways in which technology has been introduced by employers impacting the nature of job roles
- The variety of techniques employers use to monitor workers that is facilitated by technology
- The attitudes of workers to workplace technology in relation to the automation of tasks, monitoring, and productivity
- The impact of technology on the nature of work within roles, on workers' ability to work effectively, and on the relationship between organisations and customers
- The mechanisms by which workers manage and cope with the demands placed on them by workplace technology
- The extent to which employers have consulted workers on the introduction of technology

Appendix

Table 2: Employer expectation of employee availability to answer calls/emails outside of working hours

	Frequency	Percentage
No	1378	71.2
Yes	496	25.6
No response	62	3.2
Total	**1936**	**100.0**

Table 4: Perceptions of the impact of technology on overall working life in the next 10 years

	Frequency	Percentage
A negative effect	585	30.2
A positive effect	669	34.6
Neither positive or negative	287	14.8
Don't know	333	17.2
No response	62	3.2
Total	**1936**	**100.0**

Table 5: Employer is preparing to automate/replace aspects of respondents' role through technology over the next 10 years.

	Frequency	Percentage
To some extent	689	35.6
To a significant extent	740	38.2
Not at all	154	8.0
Don't know	291	15.0
No response	62	3.2
Total	**1936**	**100.0**

Table 7: Extent to which respondents feel that work is monitored through technology

	Frequency	Percentage
To some extent	684	35.3
To a significant extent	768	39.7
Not at all	152	7.9
Don't know	270	13.9
No response	62	3.2
Total	**1936**	**100.0**

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