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'Good work' in the knowledge economy: Evidence from two studies

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Introduction

The last two decades have witnessed extensive economic restructuring across the developed world and across all sectors of the economy. Employment has shifted from manufacturing to services, and latterly to higher value knowledge intensive services (e.g., high-tech manufacturing, financial services, telecommunications, health and education). These processes have been driven by technological progress, the liberalisation of international markets and a differentiation of consumer demand as a consequence of rising affluence. The phenomena have often been described as characteristics of a new "knowledge economy." While there is no official definition of this new economy, it is generally agreed that behind the knowledge economy is a story of how general purpose technologies have combined with workers' intellectual and knowledge assets to create value within organisations

This Local Work explores what is meant by the "knowledge economy" as well as what it looks like in reality. In particular it explores in more detail what the knowledge economy means for workers. It offers a new approach, developed by The Work Foundation, to defining knowledge workers and examines job quality and work-related outcomes, in particular looking at the health of knowledge workers.

What is the knowledge economy and what does it mean for workers?

A key component of the knowledge economy is the effective deployment of a highly skilled workforce. The knowledge economy thus implies a rising demand and premium for skilled labour relative to unskilled labour. The traditional justification for the shift in the workforce dates back to the late 1970s when it was hypothesised that the adoption of computer-based technology replaced the need for routine human labour, and increased the ability of highly-skilled workers to develop new products and tailor them to clients' specific needs.[iii]This interaction between technological change and innovation had multiplicative impacts on the nature of work over time.

Thinking more deeply about the nature of jobs and tasks across the labour force, it becomes apparent that the computer replaceable tasks are those that require methodological precision and repetition frequently found in traditional clerical or production jobs. The "unreplaceable" tasks, on the other hand, are non-routine and involve constant flexibility including both highly-skilled analytic or creative tasks as well as unskilled manual labour.[iii] This suggests a sharper dichotomy in today's labour force relative to the past, with significant proportions of both highly-skilled knowledge workers and less skilled non-knowledge workers. A more positive interpretation of this hypothesis is that the transition to the knowledge economy has mandated new ways of working within all occupations with an increased demand for human capital across the labour market.

While many believe that knowledge and innovation are at the heart of today's economy, very few studies to date have explored the concept of knowledge workers in great detail. This is primarily due to a lack of a clear, measurable definition for such workers as well as limited extant data. At the simplest level, knowledge workers can be classified as those working in the top three Standard Occupational Classification (SOC) categories, including managers and senior officials, professionals and associate professionals. An alternate, but commonly used definition is workers with degree-level qualifications. The correspondence between these two definitions is poor, however, as many in the top three occupational groups are not graduates and increasing numbers of graduates are employed in occupations outside of the top three occupational groups. Perhaps most importantly, these occupational or educational categories tell us very little about what knowledge workers actually do at work. If new forms of labour market flexibilities and ways of working are emerging, we need to get into the workplace itself to map and understand them.

Beyond definitional limitations, another understudied aspect of the knowledge economy and knowledge work is whether or not the abundance of "good jobs" (i.e., well paid and highly skilled jobs) and the demand for highly skilled workers in the knowledge economy has led to better job quality. Job quality focuses on the features of work that make it satisfying for individual workers and compatible with their career aspirations. In addition to pay and rewards, job security and working time, there are several more subjective features of job quality that differentiate good work from bad work including:

- workers' experiences of control and autonomy in the workplace;
- the availability of interesting, challenging and non-repetitive work;
- opportunities for learning and progression;
- appropriate utilisation of skills;
- access to social capital; and
- the feeling of doing useful work.

Perceptions of job quality may be particularly important in today's knowledge economy because employers need to ensure they utilise workers' skills optimally while simultaneously offering them flexibility and support. This means that organisations must offer a high level of autonomy and job control in working environments that offer adequate opportunities for training, growth and advancement. Yet, some evidence suggests that employers find it hard to create these conditions. The proportion of workers reporting task discretion (a form of autonomy) in their jobs has declined since the 1990s[iv], and this decline in autonomy occurred alongside increased work intensification[v]. Moreover, employees are increasingly likely to report that their skills are not being fully utilised. This suggests that the rise of the knowledge economy has not necessarily been associated with increases in the availability of "good work." Others have hypothesised that the increase in the number of knowledge workers is leading to an increasingly polarised labour market, with more good jobs, more bad jobs and fewer "middling" jobs.[vi] Research is needed to illuminate these dynamics and investigate whether there is any association between the growth of knowledge work and the quality of employment.

Finally, greater understanding is needed of the implications of the knowledge economy on workers' health and wellbeing. That is, while bone, joint or muscle conditions remain the most common work-related health problems[vii], recent years have witnessed some decline in these physical symptoms concomitant with an increase in stress-related illness. Indeed, within the UK, the number of lost working days between 2000 and 2007 due to musculoskeletal conditions declined by 9 percent, while the days lost due to stress-related conditions increased by 7 percent.[viii] Further, EU-level data from Eurostat suggests that the prevalence of stress is concentrated among workers in the top three occupational groups and these workers are less likely to report musculoskeletal disorders than workers in other occupations. The work intensity and intellectual demands imposed on workers in the knowledge economy may be driving this trend. In turn, further exploration of the impact of job quality in attenuating workers' stress is needed. The shift to the knowledge economy may be giving rise to a larger shift in the health and wellbeing of the workforce, which has implications for health-related policies in the workplace and in society.

Current work

The Work Foundation are currently undertaking a study which aims to examine what the knowledge economy means for the experience of workers in the UK focusing on job roles, job quality and work-related health outcomes. In particular, the study has several aims:

- First, we offer a data-driven approach to defining knowledge workers based on specific job content using data from a pilot of The Work Foundation's upcoming Knowledge Workers Survey (KWS). Our pilot work examines the key features of knowledge work and their spread across the workforce.

- Second, using data from the European Working Conditions Survey (EWCS), we examine links between growth in knowledge work and workers' reported stress. We concentrate first on aggregate trends across the EU and subsequently focus in on workers in the UK.

- Third, we explore whether various components of job quality including skill utilisation, autonomy, perceptions of job security and opportunities for progression and the level of challenge and complexity in work alleviate UK workers' stress levels in the knowledge economy.

The underlying premise of the present study is to better understand how a large-scale economic shift impacts workers on the ground. More than ever where employers demand high levels of knowledge and innovation output in an increasingly global and competitive market, workers perceptions of their jobs needs to be put to the test. It is also important to examine the extent to which employers successfully deploy their workers' skills without causing undue stress on behalf of their employees.

Methodology

Knowledge Workers Survey (KWS)

The KWS was designed to provide a robust definition of workers in the UK based on the content and frequency of workers' tasks. We focus here on findings from the pilot survey conducted in 2007 with 194 UK adults in employment at least 20 hours per week. The 20-minute online survey contained 138 job tasks and activities commonly used in job analysis and design inventories and extensively piloted with over 30 UK workers. Respondents were asked to indicate how frequently, on a 4-point scale (1=never to 4=often), they had engaged in each of the tasks, over the past 3 months.

Factor analysis reduced the 138 job tasks into a set of 10 task-related scales. The 10 scales included:

1. lead and strategise;
2. innovate and plan for the future;
3. hr and management;
4. analyse;
5. create and write;
6. use equipment and heavy machinery;
7. use perception;
8. basic administrative;
9. work with food/people; and
10. liaise externally.

Subsequently, we cluster analysed the factors to enable us to group respondents with similar patterns of work task activity together. The resulting clusters – explicitly based on job content – formulated our new categories of workers, which we describe in the following section[1].

European Working Conditions Survey (EWCS)

The EWCS is a self-report survey from the European Foundation for the Improvement of Living and Working Conditions administered every five years since 1990 aimed at providing a comprehensive view of working conditions, job characteristics, organisational culture, health, job satisfaction and work-life balance

[1]Additional survey items focused on individual and job characteristics (e.g., working time, flexible work), job quality (e.g., autonomy, challenge at work) and work-related outcomes (e.g., job satisfaction).

across European countries. The present study primarily focuses on UK data from the 2005 wave, comprising 1,039 working adults.[2] For the purposes of this study, knowledge workers were defined as workers in the top three International Standard Occupational Classification[3] categories including:

- legislators;
- senior officials and managers;
- professionals and technicians; and
- associate professionals.

Our analysis contrasted these knowledge workers with workers in the remaining six categories, which includes:

- clerks;
- service and sales workers;
- agricultural and fishery workers;
- craft and related trade workers;
- plant and machine operators; and
- assemblers and elementary occupations.[4]

Across the UK sample, 41 percent of respondents were knowledge workers. To look at job quality in more detail among UK workers, we selected 18 variables from the EWCS dataset that assessed different features of job quality and good work and condensed these 18 indicators into a more manageable set of factors to reveal five distinct job quality factors. These were:

1. no repetitive/monotonous tasks;
2. challenge at work;
3. autonomy/job control;
4. skill and talent use; and
5. retention/opportunities for progression.

We also examined work-related health problems. Workers were asked to indicate whether or not their work affected their health, and, if so, which of 16 common health issues they had experienced as a result of their work. We focused on stress-related problems, which included workers' reports of stress, sleeping problems, anxiety and irritability.

Findings

Defining knowledge workers

The analysis revealed a distinct group of knowledge workers, the "leaders and innovators," who exhibited high scores on the tasks related to leadership and strategy, innovation, management and analytic tasks (15 percent of sample). Four other distinct clusters with different patterns of work activity from the knowledge workers also emerged. These other groups of workers included the following groups:

- basic managers and communicators (23%);
- basic administrators (30%);
- personal services, restaurant and retail and related management (11%); and
- machines and brawn (21%).

While these groups are distinct, it is important to note that all groups of workers engaged in knowledge intensive tasks, but the "leaders and innovators" engaged in these tasks more frequently as a standard part of their working day. Most importantly, our clusters were distinct from the occupational groupings frequently used to proxy knowledge workers (i.e., top 3 SOC occupations), suggesting that a closer examination of the specific tasks workers engage in at work is crucial to understanding the nature of knowledge work.

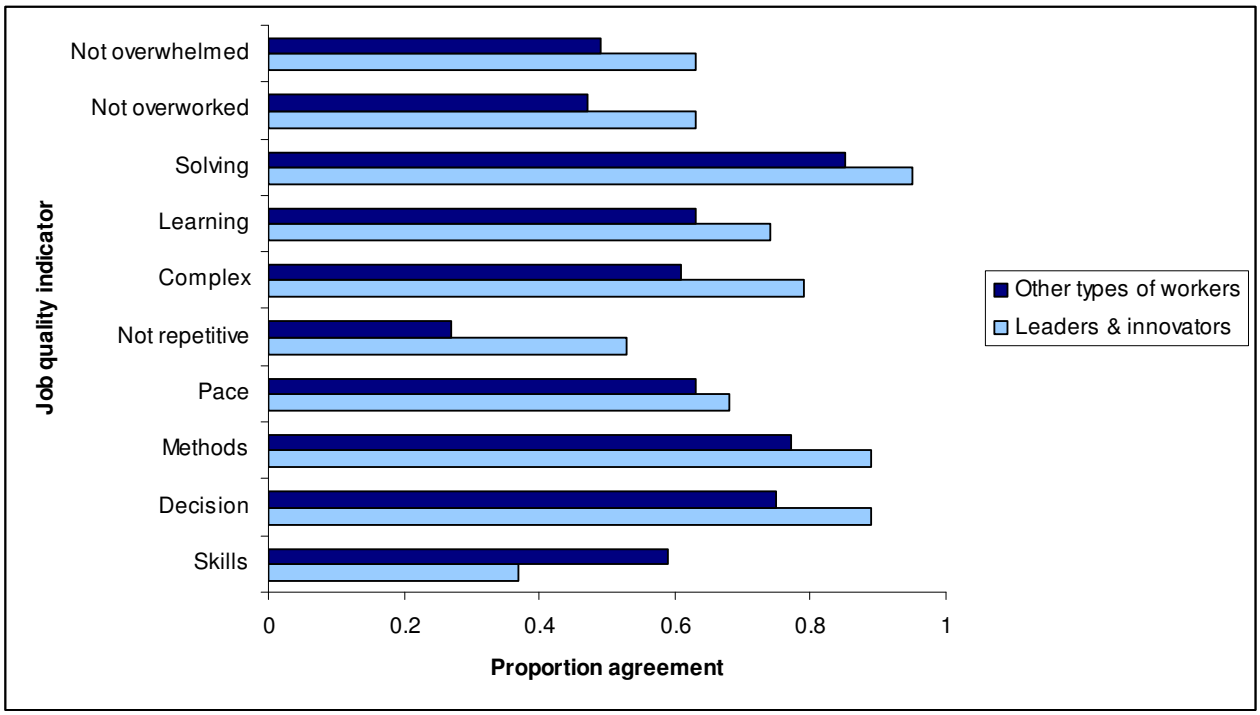
[2]While 1,058 UK adults were interviewed, we excluded 19 of them due to missing occupational data or because the respondent was not currently working.
[3] Also referred to as the ISCO-88
[4]We acknowledge that this operational definition of knowledge workers is only a very rough proxy.

We examined several aspects of job quality to assess the extent to which knowledge workers reported better or worse working conditions than other types of workers. We list the indicators below:

- job demands match workers' skills;
- job control/autonomy;
- autonomy over methods;
- autonomy over pace;
- (no) repetitive tasks;
- work involves complex tasks;
- work involves learning new things;
- work involves solving problems;
- (not) overworked all the time; and
- (not) overwhelmed by workload all the time.

Figure 1 below presents the proportion of workers who reported each of the working conditions in their current jobs. We present the proportion separately for knowledge workers and other types of workers.

Figure 1. Job quality by worker type



As seen above, knowledge workers reported better working conditions than other types of workers with the exception of skill demand. Interestingly, of the 63 percent of knowledge workers who report a mismatch between their skills and the demands of their jobs, two-thirds felt they were overqualified for their current posts. This finding suggests that employers are not fully maximising the talents of their workforce, particularly among knowledge workers. Also of note is the high proportion of workers who reported problem solving, learning new things and complex tasks as a regular part of their jobs. This fits with the contention that work in the knowledge economy is increasingly non-routine in nature and requires innovation and increasingly, work intensification on the part of the workforce.

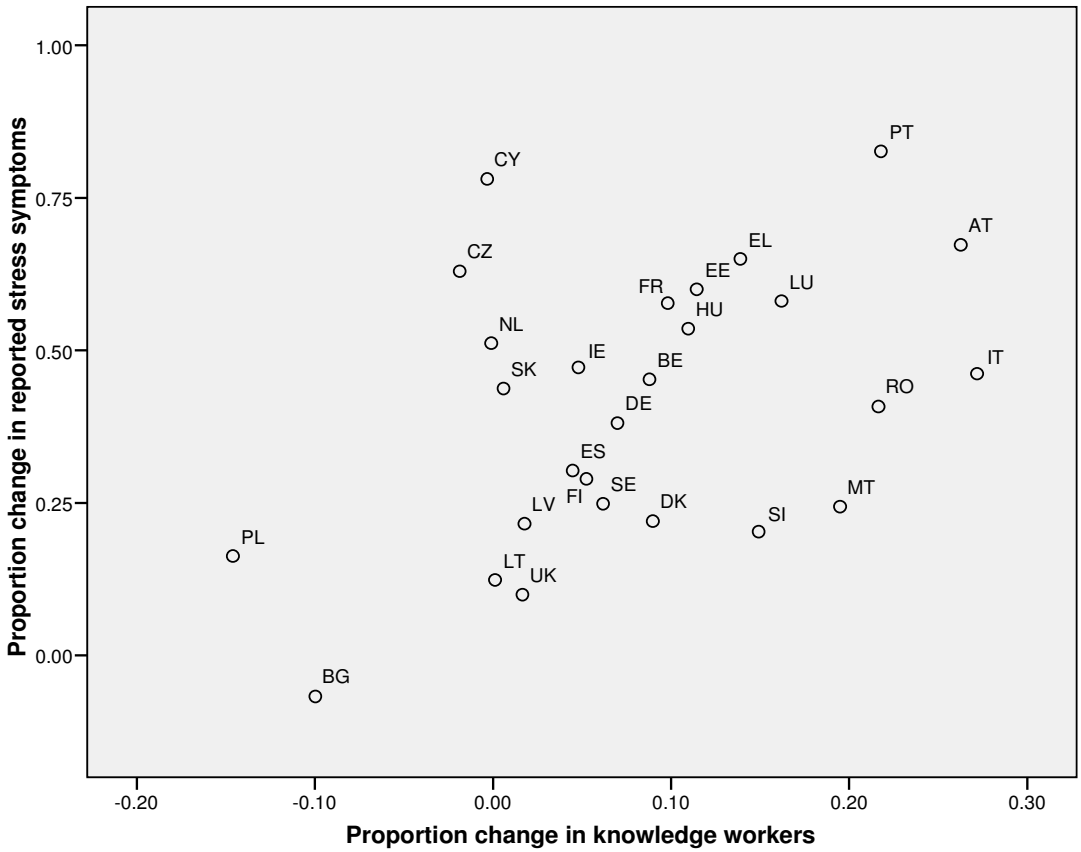
Good work, health and wellbeing in the knowledge economy

Building on the preliminary analyses from the KWS pilot survey, we examined in more depth the impacts of the growth in the knowledge economy on UK workers' health. Given data limitations, knowledge workers were defined according to their major occupational grouping including managers and senior officials, professionals and technicians and associate professionals.

Before detailing the UK findings, we first conducted an aggregate, country-level analysis to assess whether increases in reported stress observed across the EU might be accounted for by the growth in knowledge work. Using the 2000/2001 and 2005 EWCS, we computed the proportion increase in knowledge workers over the 5 year time period within the 27 European Union Countries, and subsequently examined whether this proportion change in the workforce was associated with the proportion change in workers reporting stress-related symptoms. Across all workers in the 27 European Union Countries, we did not see net increases in the proportion of stress-related symptoms as function of growth in knowledge workers. However, when exploring the proportion change in stress-related symptoms *only*, the analyses revealed a significant, positive association between the increase in knowledge workers between 2000 and 2005 and increased stress levels.

Explicitly, countries with more than median growth in the proportion of knowledge workers over the 5-year period (i.e., approximately 7 percent), exhibited a 50 percent increase in reported stress-related problems compared to 33 percent in countries with less than median growth. Figure 2 plots the proportion change in reported stress-related symptoms (among workers reporting work-related health problems) by the proportion growth in knowledge workers across the EU.

Figure 2. Proportion increase in stress symptoms 2000-2005 by proportion growth in knowledge workers in the EU-27



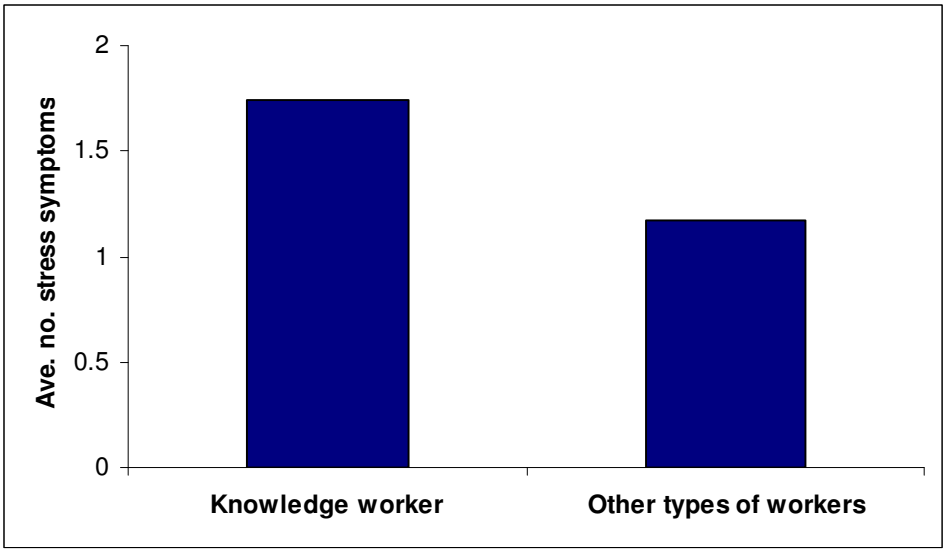
Focusing on workers in the UK, our next aim was to assess the impact of job quality on workers' stress-related symptoms. Using the 2005 data at the individual-level, we examined associations between worker type and the probability of reporting stress-related symptoms. We found that across the UK, 20 percent of knowledge workers reported at least one work-related stress symptom, while only 9 percent of other types of workers reported stress symptoms attributable to their work.

Among workers reporting work-related health problems[5] 77 percent of knowledge workers reported at least one stress-related symptom compared to 54 percent of other workers. When looking explicitly at this

[5] 21 percent of UK workers

subgroup of workers, we see that knowledge workers reported 1.74 stress-related symptoms (maximum=4) on average and other types of workers reported 1.17 – a 25 percent difference. Figure 3 below displays the mean number of reported stress symptoms for knowledge workers and other types of workers in the UK.

Figure 3. Average number of reported stress symptoms among UK workers experiencing work-related health problems.



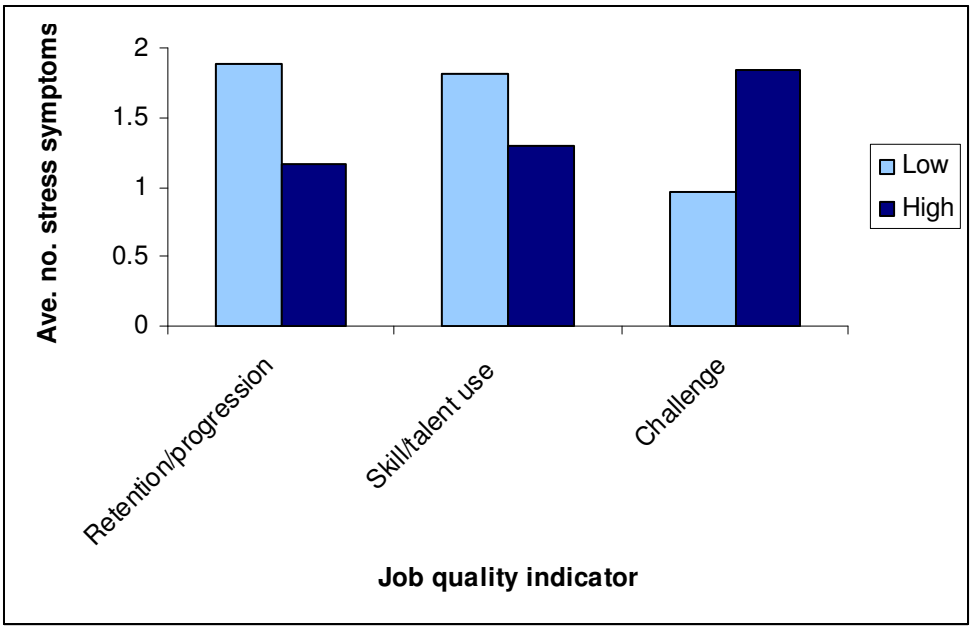
We subsequently assessed the impact of perceptions of job quality, taking into account five dimensions, on the probability of reporting stress symptoms. The five dimensions were:

- the presence of repetitive or monotonous tasks;
- whether workers experience challenge at work;
- the degree of perceived autonomy or job control;
- employers' use of workers' skills and talent; and
- the degree to which employees are retained in their jobs and have opportunities for progression.

Results revealed that opportunities for retention and progression as well as challenge at work were the strongest predictors of the probability of reporting work-related stress. These two factors operated differently, however, with employees' perceptions of their opportunities for progression associated with a *lower* probability of reporting stress, and challenge at work leading to a *higher* probability of reporting stress. To a lesser extent, the degree to which employees perceived their skills and talents were adequately utilised at work was associated with a moderate reduction in the probability of reporting stress. The level of repetition and monotony and autonomy were not significant predictors of stress symptoms net of the other job quality indicators. Even after including the job quality indicators in the regression model, knowledge workers were still more likely to report stress-related problems than other types of workers.

When examining the average number of stress symptoms among workers who reported work-related health problems, we saw, once again, that opportunities for progression and retention and skill utilisation were associated with declines in stress symptoms, while challenge at work was linked with increased symptoms. Figure 4 below displays the average number of stress-related problems reported by workers with high and low scores on the three significant job quality indicators.

Figure 4. Average stress symptoms by job quality



The inclusion of the job quality indicators attenuated the association between knowledge work and the number of reported stress symptoms, suggesting that while job quality did not affect the prevalence of stress for knowledge workers, it did impact on its severity.

This pattern of association suggests that employers need to find the right balance between jobs that offer workers security and opportunities to advance and grow whilst also not creating overly intense working conditions. As it is these working conditions, defined by high levels of complexity, learning and intellectual demand, which appear to increase stress levels, particularly for knowledge workers.

Conclusion

The underlying premise of the present study was to better understand how a large-scale economic shift impacts workers on the ground. The present study offers a close examination of knowledge work and knowledge workers, focusing in particular on the defining features of knowledge work and whether the move towards the knowledge economy is linked to the increasing prevalence of stress across the workforce.

Findings revealed that there is a distinct group of workers that engage in knowledge intensive tasks on a regular basis at work. These workers represent only 15 percent of the sample, which is much smaller than estimates using less specific operational definitions of knowledge workers. Perhaps more importantly, our research revealed that all workers engage in knowledge intensive tasks in their jobs, but that they do not do so as frequently as the core group of knowledge workers. The move to the knowledge economy thus appears to have impacted the workforce as a whole. Perceptions of job quality are highest among knowledge workers, suggesting some inequality in the experiences of workers across the EU. Yet, knowledge workers were more likely to report that the demands of their jobs were not well-matched to their skills. Although employers are demanding a highly-skilled workforce, they may not be adequately deploying workers' skills.

Our second set of analyses examined the prevalence of stress in the knowledge economy. Across the EU, we saw some evidence that increases in knowledge work are occurring alongside escalating stress levels. More detailed analyses focused on UK workers revealed that knowledge workers were more likely than other types of workers to report stress-related symptoms. Even after accounting for variation in job quality, stress was still more prevalent among knowledge workers than other types of workers. Job quality did attenuate the link between knowledge work and the severity of stress, however.

Job quality had mixed impacts on workers' stress levels. Workers' perceptions of job security and their opportunities for progression as well as the degree to which their employers utilised their skills attenuated both the prevalence and severity of stress. On the other hand, jobs with high levels of problem solving, intellectual demand and related challenges were associated with increases in stress.

This pattern of findings suggests increasing work intensification in the knowledge economy without adequate support systems for workers. If work continues to intensify, we will likely see further increases in stress levels across the labour market. Further, job quality does not appear to completely insulate workers from stress given the lingering association between knowledge work and the prevalence of stress above and beyond the impact of job quality.

In recent years, the balance of workplace health promotion has shifted from primarily health and safety concerns to a wellness and health promotion agenda. Workplace health promotion and relevant interventions are likely to become increasingly important in the knowledge economy. These programmes need a preventative focus to ensure they take place before workers' stress levels escalate. Employers would also be wise to consider how various aspects of job quality, over which they have control, can be altered to promote workers' health. If the incidence of stress and related illnesses continue to rise, national healthcare policies may also need to shift to provide more free and subsidised services aimed at stress reduction as well as offering additional training for medical staff to effectively handle stress-related complaints.

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