

# ICT and its Impact on Skills and Creativity – Transformatory Catalyst or Dependent Variable?

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**Abstract.** This paper undertakes two tasks. First it examines the evidence on the degree to which ICT is impacting on skills and creativity among the UK workforce. Second, given the somewhat mixed picture that emerges, it probes accounts that cite ICT as having transformatory powers in respect to workforce skills and patterns of work organisation. Drawing on research in the areas of strategic management, marketing and human resource management, the paper argues that the way ICT is deployed, and the effects that it will have on skills, is often determined by previously established models of competitive advantage, organisational structures and patterns of managerial behaviour. Path dependency means that ICT frequently ends up reinforcing the existing order and distribution of skills and creativity rather than challenging or transforming it. The paper concludes that if a wider distribution and higher general level of workforce skills is the desired goal, interventions to question product market strategies, people management systems and work organisation and job design are a necessary precursor to widespread progress.

## 1. Introduction

In the last decade in the UK a range of authors and authorities have asserted the capacity of ICT to transform the demand for and usage of skills in the workplace [1]. These claims have been located within a wider literature, much of it fairly evangelical in nature, that has promoted the potential importance and impact of ICT on many aspects of business life and performance [2]. Proponents have argued that ICT's ability to support customisation and added value will help ensure that both Fordist models of standardised mass production; and Taylorist methods of routinised, command and control work organisation, are doomed. The following quote, from an industrialist, gives a flavour of the high skills vision that has been promoted: 'every single product will be customised for every single customer....businesses are becoming less structured and hierarchical....tomorrow's organisation will have space for the person – will allow the person to design his or her own job....jobs will not be defined from above but developed by the individual' [3].

Not unsurprisingly, this vision has proved an attractive one for policy makers, not least because it chimes well with their widely-held belief that global economic forces are compelling developed economies to follow a high value-added, high skill route and that unskilled work is rapidly vanishing [4]. The result has been talk of the arrival of a knowledge-driven economy and a massive investment of time, political capital and public money in a rapid expansion of the education and training system to provide the highly skilled and qualified workforce that it assumed the economy will require [5].

Until recently, the data required to assess both the narrower claims of the ICT enthusiasts and the wider claims of proponents of the globalisation thesis was, at least in the UK, largely absent. However, a growing volume of recent research now makes it possible to undertake some preliminary audit of developments to date in respect of demand for skills and creativity among the workforce. What emerges suggests that some of the more

optimistic projections are not well-founded, and that the hoped for transformation of the workplace does not appear to have yet taken place. The paper seeks to explore some possible reasons for this.

## **2. ICT, Upskilling, Creativity and New Forms of Work Organisation – The Evidence**

This section draws on evidence from a range of case study and large-scale survey research conducted in the UK in recent years. While by no means comprehensive, the data it provides gives pointers to both the level and trajectory of change.

First, the good news. The 2<sup>nd</sup> Skills Survey (a UK-wide survey of a large, representative sample of individuals undertaken in 2001) was able to demonstrate that usage of ICT had increased significantly over the period 1986-2001. The importance of using PCs or other types of computerised equipment for most occupational categories had also risen quite sharply between 1997 and 2001. For example, whereas 37.8 per cent of managers reported PC usage as essential to their job in 1997, by 2001 the percentage had risen to 52.6. Overall 51.7 per cent of respondents believed that the importance of ICT skills in their job had increased in the last five years. Moreover, from a range of 36 generic skills, ‘using a computer, PC, or other types of computerised equipment’ was one of the few for which the 2<sup>nd</sup> Skills Survey was able to detect there being a positive wage premium [6] – the others being high level communications skills (such as report writing and making presentations), and planning skills.

At a more general level, the 2<sup>nd</sup> Skills Survey showed that the amount of training required to undertake most jobs across the economy had lengthened, and that employers were generally demanding higher levels of both qualifications and of uncertified generic skills (for example, the ability to instruct, train or teach people). There was also a modest rise detected in the perceived requirement to learn new things on the job.

However, the 2<sup>nd</sup> Skills Survey also indicated that there are some significant problems. Levels of apparent over-qualification are rising. Overall, 37 per cent of respondents appeared to hold qualifications at levels higher than those needed to obtain their current employment. Thus there are about 6.4 million people in the UK workforce with intermediate or level 3 qualifications, but only about 3.9 million jobs that appear to require this qualification as an entry requirement. At the bottom of the labour market, there are now only about 2.9 million economically active people aged 20-60 who possess no qualifications, but about 6.5 million jobs for which no qualifications would be required to obtain them. If nothing else, this indicates that the arrival of anything resembling a knowledge-driven economy is still a long way off.

Perhaps the most worrying data generated by the 2<sup>nd</sup> Skills Survey and associated earlier surveys relates to the issue of task discretion and creativity. If control over one’s job is an aspect of what it is to be skilled, then on this measure, the UK workforce has been becoming less skilled. Respondents indicated a marked decline in task discretion. For example, the proportion of employees reporting a great deal of choice over the way they do their work fell from 52 per cent in 1986 to 39 per cent in 2001. This decline has taken place across the entire economy, but has been most marked for those in professional occupations. Overall, the opportunities for displaying creativity at work appear to be shrinking rather than expanding.

This data on declining task discretion fits in with other information on work organisation and the way employees are managed, particularly that generated by the Workplace Employee Relations Survey (WERS). What WERS shows is that the kind of high-involvement, high-trust, high-performance work organisation (HPWO) systems that advocates of the knowledge-driven economy see as becoming the norm in fact remain a

distant dream for the vast bulk of the UK workforce [7]. There continue to be many highly routines, lowly-skilled jobs offering very limited opportunities for creativity, trust or discretion. At best, the proportion of UK workplaces that have anything that resembles the full-blown HPWO model in place is somewhere between 2 and 6 per cent. These general findings are replicated by research being undertaken as part of the Economic and Social Research Council's Future of Work Programme [8]. Even in sectors where the UK has a strong global presence and a record of success, such as pharmaceuticals and aerospace, research suggests that the spread of the HPWO model is very limited [9].

The work of Gordon [10], and Cappelli et al [11] indicates, a similar picture on work organisation and employee relations systems is emerging in the USA. As Milkman [12] observes, "the low-wage, low-trust, low-skill 'low road' is the path most US firms are following".

There are many possible reasons why ICT, acting alone or in combination with the forces of globalisation, does not appear to be promoting the kind or levels of upskilling, and new forms of work organisation that had been expected. Three are explored in what follows.

### **3. ICT – Dependent or Determining Factor?**

The first reason for more limited change revolves around the degree to which ICT is a dependent rather than determining variable in the institutional matrix or equation. Some of the more evangelical literature on ICT assumes that the technology has a transformatory capacity. Much of the research on the impact of technology (of all kinds) on work and work organisation refutes simple technological determinism and indicates that, "technology is always a tool and never an independent cause of human arrangements" [13].

The danger is that path dependency will mean that, rather than deploy ICT in order to allow it to function in a radically different and potentially emancipatory ways, many organisations will use it to do more of the same, harder. Thus ICT can be used to reinforce and upgrade the capabilities of well-established ways of organising and controlling work, making existing systems more powerful and pervasive. Rather than replacing hierarchy and bureaucracy, ICT can, if it is so wished, be deployed to support and enhance them. This can lead to low trust work organisation, not least in terms of how managers choose to manage other managers through performance monitoring and through reward systems.

Indeed, as Bjorkman [14] points out, aspects of Taylorism and scientific management form an integral component of many new business management tools and technologies, such as Total Quality Management (TQM), Business Process Reengineering (BPR), and Just-In-Time production (JIT). ICT can facilitate these techniques by aiding the flow of information to managers, supporting measurement and new systems of metrics, and by encouraging the centralisation of power, control and co-ordination [15]. The 'iron cage' of rational bureaucracy has thus, in some cases at least, been given new and stronger bars.

Moreover, there is a potential clash between the logic of production, particularly where it is governed by a more or less Taylorist approach, and the logic of learning and upskilling through the work process [16]. Many large, modern organisations are managed in ways that stress routinised actions to deliver quality, the development of rules and norms, standardisation of products and processes, and the avoidance of uncertainty. The logic of workplace learning demands experimentation, tolerance of ambiguity, variation, the existence of the potential for mistakes, and space and time for reflection.

#### **4. The Failure of Strategic Human Resource Management.**

As evidenced above, progress towards the predicted new forms of HPWO has been slower and more limited than expected. This in turn reflects the overall failure of human resource management (HRM) to take root in UK (and US) workplaces. Isolated elements of the HRM model have been implemented, but the full-blown model is seldom seen. As Pfeffer [17], and Bach and Sisson [18] have noted, the kind of people management systems and practices that might support a high-skills, high commitment strategy are currently, at best, a route for a small minority of organisations. This limited take-up appears to be due, at least in part, to managerial preoccupations with avoiding risk and maximising short-term financial returns. For as long as this situation pertains, there will be major problems with moving towards the kind of organisational forms that can use skills to best effect.

#### **5. The Dominant Influence of Product Market Strategies**

The final reason why ICT may be having a more limited impact on skill profiles than expected relates to second, and concerns the way that organisations choose and formulate their competitive and product market strategies. In making these choices, organisations are confronted with a wide range of models of competitive advantage, by no means all of which are chiefly dependent upon a more creative or autonomous workforce, or upon generally higher levels of employee skill [19]. The focus of these models varies, ranging across mergers and acquisitions, strategic alliances, outsourcing, moving up the value chain, economies of scale, monopoly or semi-monopoly, commodification, cost cutting, and seeking protected markets [20].

Much of the literature on marketing makes clear the importance to competitive and product market strategies of creating and sustaining successful brands [21]. One of the effects of successful brands is that they allow firms to charge a premium for products that may lack any tangible quality or specification advantage over competing products. Many highly successful global brands do not require the bulk of the workforce delivering them to be particularly highly skilled or to be managed in ways that allow for high levels of creativity and autonomy – for example Coca Cola, Nike, and McDonalds.

It should also be recognised that firms in many areas of economic activity segment the market. This means that they offer different services or products to different groups of consumers. One of the main determinants of market segmentation is consumers' disposable income. Low income segments of any given market are more likely to be offered more standardised, lower quality, lower spec goods and services that are sold primarily on the basis of price. Some firms may choose or be forced to specialise in catering to this market, with consequent impacts on the skills profile of their workforces. In some cases the dynamics of consumer demand and inter-firm competition may lead to the partial or wholesale commodification of markets for some goods and services, so that price becomes the chief feature of competition. Examples of commodification at work in the UK include air travel and car and home insurance.

How do these choices affect skills? One useful pointer to this is the literature on core organisational competences, sometimes also referred to as the resource-based view of the firm. Boiled down, this literature argues that what makes an organisation successful are a set of unique capabilities that allows it to pursue its competitive and product market strategies differently from and better than its competitors [22].

While the concept of core organisational competences is not without its drawbacks as an analytical tool, it does indicate the importance of considering the location and distribution of these key skills within the organisation. Put simply, in some organisations the skills that

really make a difference may be widely distributed across the workforce, while in others they may be concentrated in a tiny sub-section of the employees. For example, in a leading edge software development firm the core organisational competences are likely to be widely distributed across the workforce. In a supermarket chain they may well be concentrated in a small cadre of specialist managerial staff who are experts in logistics and distribution chains, marketing, stock control, and purchasing. Store managers are simply glorified supervisors, carrying out detailed instructions and following manuals laid down by head office. The frontline staff in the stores are not depositories of skills that make up the core organisational competences, they are simply a commodity, cost or factor of production.

Many large UK service sector organisations, located in multiple retailing, retail warehousing (for example, DIY stores), insurance, and banking, appear to be closer to the concentrated end of the spectrum of distribution for core competences. Unfortunately, as suggested above, given the problem of path dependency, injecting more ICT into organisations that currently have a concentrated distribution of core organisational competences may have limited effect. That effect may be to make it easier to further concentrate expertise in head office, and to tighten monitoring and control of outlets and individual staff therein. Work organisation and job design may become more prescriptive, routinised and restrictive, with even less scope for creativity or individual autonomy. Moreover, unless and until the organisation adopts a competitive and product market strategy that requires a wider distribution of core competences, the overall skills profile of the workforce is unlikely to change dramatically.

Choices concerning competitive and product market strategy also plainly have a strong impact on the types of people management systems and practices adopted, and on the kinds of work organisation, job design and skills mix that is put in place for the bulk of the workforce.

## **6. Conclusions**

This paper has suggested that the ability of ICT alone, or ICT acting in conjunction with the impact of globalisation, to transform the nature and skill requirements of much UK employment, may be more limited than some pundits and many policy makers would like to believe. It has briefly reviewed the evidence to support this view, and has pointed to some of the factors that may explain this situation.

The chief conclusion that can be drawn from the foregoing is that if a high-wage, knowledge-driven economy where workers can deploy high levels of skill and creativity in more autonomous work settings is the desired goal for policy makers, new forms of intervention may be required. The range of 'usual suspects' that are generally deployed as forces that will impel organisations to change their basic product market strategies, as suggested above, do not seem to be enough. Many service sector organisations operate in domestic markets that face limited exposure to international competition. Furthermore, market segmentation limits the impact of inter-organisational competition. Thus a budget hotel will seek to compete with other budget hotels, not with The Ritz or The Savoy. Not everyone will need or want to make a step change to move upmarket. The extent of this problem was underlined by a piece of UK government sponsored research that indicated that, out of a sample of about 30,000 firms, 60 per cent were not planning to move to new higher quality product or service areas with higher profit margins [23].

Current policies assume that the supply of more skills through boosts to the education and training system, coupled with the impacts of ICT and globalisation, will be enough to achieve the desired goal of a new-style economy. This paper has sought to argue otherwise.

There are signs that this view is coming to be shared by some agents within the policy process in the UK, including the Cabinet Office's Performance and Innovation Unit [24].

In part this new perspective on the part of sub-sections of the policy community reflects a realisation of the potential dangers raised by too patchy or halting an adoption of the new models of workplace organisation and economic competitiveness. Current policies require significant investments, by the state and increasingly by individuals, in higher levels of qualification. Of particular note is the target of 50 per cent participation in higher education by the 18-30 age cohort. If the knowledge and skills being created by ever more extended periods of initial education and training are not used productively, the risk must be that both the public and private rates of return on the investment will be sub-optimal. This problem is heightened by the knowledge that skills that are not used are often prone to loss due to atrophy [25]

There is also the danger that people trapped in jobs that do not make the full use of their skills are liable to become discontented and less committed to their work and to their employer [26]. It is therefore the possibility that one outcome of supplying a workforce potentially over-qualified for many of the narrowly-designed jobs available is that, far from boosting productivity, it may actually create the conditions in which productivity can either decline or plateau.

If simply supplying more skills is not sufficient, what more needs to be done? A range of different types of policy intervention at national, regional, local, sectoral and supply chain levels may be required. These include business support aimed at helping organisations shift their product market strategies towards high value added and the adoption of models of HPWO; the use of public purchasing policy to encourage these developments, attempts to foster a better quality of working life, linked to the need for better and more innovative work organisation and job design; encouragement of and support for industry clusters and supply chains to shift product market strategies upwards and encourage the spread of HPWO; the use of the public sector as an exemplar of good practice, not least in terms of using ICT to support more empowering forms of work organisation and management; encouraging better educated and more demanding consumers; and closing off routes to cost-based competition, for example through higher minimum wages. This is, at least by UK standards, a fairly radical agenda, though one that would be recognised in much of Northern Europe. It is also a long-term agenda, one that would require at least a decade to make significant headway.

Whether such policies will be adopted remains to be seen. At present policies in the UK are in a state of transition and flux. What is increasingly apparent is the dawning of a realisation that the kind of world advocated by the evangelists of the ICT revolution will not simply happen, at least for the majority, without sustained support and intervention.

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