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Impact of Information and Communication Technologies on Work and Employment in Canada

Ottawa – Controversies surrounding the employment implications of the computer revolution have been with us for a long time. In fact, futurists and social scientists were debating the likely impacts of information and communication technology (ICT) even before the technologies themselves really started making inroads into the workplace in the late 1970s. Now, twenty years later, we are still trying to sort out what effects ICT is having on employment levels and the nature of work. Are we on the road to the disturbing scale of technological displacement and deskilling articulated by Rifkin (1994), Braverman (1974), and others? Or is ICT the key to job creation, skilled work, and rising incomes as most national governments and much of the economics profession contends?

These technology debates, reflecting philosophical, ideological, and class positions, have persisted throughout the past two centuries. They become more intense during periods when technological change accelerates or when the fundamental nature of technology – what have been called "enabling" or "general purpose" technologies – shifts significantly as it has since the diffusion of ICT began. Now, in the late 1990s, it is obvious that these technologies have affected what we produce and how we produce it. And it is also obvious that, in the process, they have transformed our workplaces, our work experiences, and the labour market in many important ways.

But what is not so obvious is the precise nature of these effects. To the layperson, this must come as a surprise. It would seem completely realistic to expect that social scientists, armed with the latest models (and yes, the latest technology), would be able to sort out the impacts of technological change and settle for once all of the age-old debates. However, a review of the literature demonstrates that it is not so simple. Data on the diffusion of ICT tend to be partial and, in a sense, measurement issues are only becoming more problematic as the technology becomes increasingly embedded in everything we produce. Even where ICT can be measured, it is difficult to isolate its effects from related developments such as globalization, deregulation, and new management principles. Moreover, there is a qualitative, even subjective, dimension to all of this because the impacts of ICT are neither deterministic nor always tangible. And, finally,

it certainly has not helped that mainstream economic theories -- and, thus, mainstream analysis -- has too frequently assumed away the important things about technology.

However, while the research community has not come up with all of the answers, there is a growing body of analysis that is trying to come to grips empirically with the diffusion of ICT and its various employment effects. In this paper, we review the Canadian evidence on four related issues:

The diffusion of ICT. Various surveys have tracked the diffusion of computer-based technologies in Canadian workplaces through the 1980s and 1990s. In the next section, we summarize the trends over time, documenting the increased rates of adoption in terms of both breadth and depth.

ICT and organizational change. The adoption of these technologies has led many establishments to rethink existing organizational strategies, structures, and practices. In fact, as we will argue in section 3, it is these joint forces of technological and organizational change, and not the technologies by themselves, that are driving the significant changes in employment and the nature of the work.

ICT effects on labour demand. In section 4, we turn to the key question of the impacts of ICT on employment. Research on the effects on both (1) aggregate employment levels and (2) the composition of employment will be reviewed. As we will see, evidence relating to aggregate employment effects is very partial and inconclusive. However, the compositional effect seems clearer with most of the analysis pointing to the conclusion that the diffusion of ICT is shifting labour demand to more skilled workers.

Distributional effects of ICT. We argue in section 5 that ICT is contributing to making earnings distributions more unequal. The shift in labour demand is one factor. As well, training activities sparked by the technologies have been concentrated on the already skilled. It is no surprise, then, that Canadian workers with a lot of human capital tend to see ICT as an opportunity while those without the skills are more likely to see it as a threat.

In the final section, we turn to human resource policy issues. ICT and the flexible organizations and institutions that accompany it are very much at the centre of a new economic paradigm which is forcing governments to rethink traditional approaches to human resource policy. On a variety of counts, longstanding policy strategies seem increasingly ill-fitted to the emerging realities of the labour market which has implications for both productivity and growth and for distributional issues. Education and training must be a priority but the ways in which these are delivered undoubtedly will have to change considerably. However, policy-makers must also address changes in the nature of the employment contract and the basis of economic security, both of which have been fundamentally altered by the interdependent forces of technological and organizational change.

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