The Effects of Policies for Training and Skills on Improving Innovation Capabilities in Firms

Skills and innovation are often claimed to be the twin engines of economic growth but there is a surprisingly limited appreciation of how these core features combine and interact both at the firm level and at the interface between tertiary education and industry. Governments around the world, especially in high-income countries, have invested in training schemes and in higher education to improve 'human resources in science and technology', as well as to grow the pool of 'knowledge workers' equipped with skills of problem-solving and analytical thinking ready to contribute to expanding knowledge-intensive industries. There is thus an apparent consensus that skilled workers in both the public and private sectors are needed to create and diffuse the knowledge needed for successful innovation performance. But what evidence underpins this policy consensus? In particular: Do innovative firms tend to utilize a more skilled workforce than non-innovative firms? Do innovative firms devote more resources to training provision than non-innovative firms? What are the inter-linkages between skill types and innovation types and do these vary by industry (e.g. services versus manufacturing)? Are there benefits from new systems for valuing skills in the market place? How important are levy and other incentive schemes for enhancing the skill pool? What are the relative merits of high-level, tertiary education as opposed to intermediate, vocational training for innovation? At the conceptual level, a cursory reading of the innovation literature reveals a rather oblique interest in matters of worker skill and workplace-based training. Notions of 'in-house capacity', 'knowhow' and 'human capabilities' are theorized in preference over more real-world notions such as on-the-job training, apprenticeships, graduate training and shared training programmes. This makes it difficult to draw out the inferences for training and skill from the conclusions of innovation research. Nevertheless, this report distils four key analytical concepts from innovation studies and makes the relevant links with innovation performance at firm level. These are: - knowledge (e.g. knowledge cumulativeness implies a need for sustained commitment to skill development for innovation); - skill (e.g.. project skills are critical for radical innovations but we understand very little about how to organize these mixed tacit and formal skills); - training (e.g. training expenditures are critical for technology diffusion and to support technology investments); and - firm competences (e.g. competences play a key role in underpinning absorptive capacity). While there are many useful insights in the literature, for the most part the training/skill-innovation inter-linkages remain under-researched. Most studies set out with the rather modest task of analyzing simple associations, for example between R&D spending and the share of qualified scientists and engineers in the sector or firm. Where there is a focus on the effects of differences in training provision or skill-mix at the level of the firm the analysis tends to focus on the productivity and profitability effects rather than innovation. A state-of-the-art review of the limited empirical evidence on the association between training/skill and innovative performance at the firm level reveals two key findings: There appears to be a positive association between innovative firms and the level of expenditures on formal and informal training compared to non-innovative firms; and Firms benefit from a significant positive effect by developing their 'knowledge pool',particularly with respect to the organization's legacy of past innovations and the technical competences of owner-managers in small and medium-sized firms. These findings have illuminated some issues and insights that have significance for innovation policy: - high skill-mixes in firms need to be developed through better incentives; - both tertiary level education and vocational training produce valuable skills - in particular there is a clear positive innovation effect of intermediate technical skills and a firm's investment in 'technicians'; - innovative performance is associated with the making rather than the buying of skills because of the way skill development enhances absorptive capacity; - and the evidence of sector-specific inter-linkages between training and innovation supports the need to further reinforce institutions such as sector skill councils. There are nevertheless gaps in our knowledge. We do not know much about what groups of workers and managers within an organisation need particular training for the skills required to enhance innovation performance. Also, surveys show that many skills are under-utilised by firms suggesting that workers do not often enjoy the opportunity to contribute to improving innovation performance. Moreover, many firms do not systematically calculate the costs or measure the benefits of training; Eurostat company surveys indicate that almost three in five companies do not evaluate the effects of their training provision. The report reviews empirical evidence associated with two important areas of education and training

policy - i) Levy schemes for enterprise training and ii) Policies for high-level skill formation: i) Levy schemes for enterprise training The report considers the relative merits of levy schemes for encouraging training as a potentially fruitful policy mechanism designed to facilitate and/or improve innovation performance. An international review of country experiences of levies, tax rebates and tax incentives draws out several lessons for policy. First, compulsory systems have the advantage of an economy-wide approach but may require strong engagement of social partners to establish a lasting reputation. Second, the careful positioning of a levy scheme within the wider skill formation system of an economy is fundamental to its design since there may be a positive opportunity to develop the wider training infrastructure through new agencies in the public and private sectors. Third, schemes can be targeted, for example with special provisions for small and medium-sized firms or for sectors such as construction or social care. Finally, given the tendency for employers to favour skills tailored to the needs of their business some schemes are notable in that they usefully incorporate incentives to encourage the development of general, transferable skills. Further empirical research is urgently required in this important policy area. ii) Policies for high-level skill formation In the area of higher skills, a key preoccupation for policy-makers and practitioners is the extent to which tertiary education can effectively meet employers' demands, particularly in innovative sectors of the economy. University-industry collaborations and partnerships seek to address this policy challenge. They have existed for some while and continue to be developed as part of innovation policy strategies. The significance of these types of schemes between employers and universities may be their recognition of the value of human resource formation in terms of skills, knowledge and expertise acquired in the workplace which can be validated at the tertiary level of education, whether through undergraduate and postgraduate degree programmes or business-related professional doctorates. It is, however, as yet unclear as to whether these sorts of schemes are sufficiently similar in their design and operation so as to facilitate lessons for cross-national policy transfer in order to improve policy interventions in different national contexts. Further research is needed to determine the value of these approaches as tools for policy interventions aimed at increasing innovative capacity through unique skill formation pathways and the validation of industrial expertise at postgraduate qualification level. The report concludes with several recommendations for further research and investigation as well as for policy and practice. These include the following: - in-depth interrogation of the innovation consequences of targeted sector-based training investments; - finance and support cross-national evaluations of the innovation effects of varying training levy schemes; - exploration of new processes and methods through which firms assign value to their stock of skills and commit to prospective training investments; - further exploration of the innovation impacts of university-industry collaborations; and - the development of new approaches to training in doctoral and post doctoral studies.
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