第３章　欧州におけるエンプロアビリティとコンピテンス形成：大学院博士レベルにおける産業人材育成プログラムに関する考察

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課題

本稿は、大学院、特に博士課程レベルにおける研究者育成の過程における「産業人材」のコンピテンス形成のための制度の比較考察の背景となる議論を提供する。具体的には大学院、特に博士レベルでの産学連携と人材育成の融合プログラム（例：フランスCIFRE, 英CASEなどの産学の資金を連携して博士課程を行っているプログラム、ドイツ型のモデル、スウェーデンの新たな博士プログラム）を概観する。本稿は、多様な教育システムを背景とした「コンピテンス」形成に関する概念上の議論を整理しながら、大まかな政策上の議論の概要を手短に提供し、研究上の課題を同定することを目的としている。紙面の制約上、ここではそれぞれの国の政策やプログラムのより詳細な議論までは立ち入らない。欧州におけるマクロな政策的な文脈として、2000年３月にリスボンで開かれた欧州理事会で「2010年までに、EUを世界でもっとも競争力のある、ダイナミックな知識を基盤とした経済空間とする」とした「リスボン戦略」が策定された。教育は、この「リスボン戦略」を達成する鍵を担う重要な要素として位置づけられ、「ヨーロッパ高等教育領域」(EHEA)の確立が目指されている。2 一方、「ヨーロッパ研究領域」(ERA)の確立を目指すヨーロッパ「知識経済」の課題のひとつは、しばしば語られる知識の商業化、実用化における遅れであり、研究の質は高いものの、研究成果の商業化、経済的競争力が弱い「ヨーロッパのパラドックス」として知られている。大学院、特に博士課程レベルにおける高度知識労働者としての研究者育成は、「知識社会・知識経済」としてのヨーロッパの将来像の重要な課題として政策的に認識されている。このような観点から、科学技術系の研究者の知識とスキルの「供給」と民間セクターの市場としての「需要」が質量ともに見合った「産業人材」をいかにして養成するかが、人材育成、技能・イノベーション政策の鍵といえる。以上のような観点から、本稿は博士課程レベルにおける研究者育成の過程における「産業人材」のコンピテンス形成のための制度についていくつかの国に見られる事例の簡単な紹介を行い、それぞれの国における高等教育システムとイノベーション・科学技術政策がいかに相互互恵的な関係を築いているのか、あるいはそこにどのような制約が見出されるのかを論じる。特に日本の状況との直接的な比較は行わないが、ヨーロッパ以外の国々の状況においても、政策的な問題意識として同様な課題が見出されると考えられる。

１．知識経済、競争力とコンピテンス形成に関する議論と博士人材育成

The concept of the knowledge economy is often used to illustrate the shift from an economy based on the low skilled industrial production to knowledge intensive production and services as the backbone of the economy. This is also seen as the shift from a Fordist to a

post-Fordist society, marked by flexible production, 'de-nationalisation' and 'trans-nationalisation' of state regulation, leading to transnational flow of capital, skills and global competition. Many developing economies such as China and India are closing the skill gap with high skilled workforce in the developed nations. As Brown and Lauder point out, many former 'knowledge' jobs are being 'routinised', and consequently, the competitive pressures created by economic globalization and the global nature of knowledge based industries have led companies to substitute highly skilled workers at home with skilled but less costly workers in developing countries (Brown and Lauder, 2006).

The dominant view of the globalising knowledge economy is of a competition between nations in which education and training plays a key role in outsmarting others in the competition for scientific knowledge and technologies that enable innovation. Lam and Lundvall (2006) make typology of 'national systems of competence building and innovation'. Societies with different institutional arrangements develop different types of learning organizations and competencies. Along with the globalising political economy of knowledge production and skills and a new spatial division of labour as depicted above, national policies and public resources substantially condition the 'learning capability' and 'competences' of organizations within the nation.

On the other hand, individuals construct and manage their 'employability'[3] and 'competences' (see Brown and Hasketh, 2004). The discourse of the knowledge economy seems to emphasise the 'shift to knowledge intensive high-skilled labour force, international circulation of brains, life long leaning, transferable skills and competences and knowledge management as a key individual and organisational capacity' (Macerinskiene and Vaiksnoraite, 2006, p.82). In this light, the question of how to enhance learning capabilities of individuals and organizations, along with the impact and influences from national and trans-national policies is the focus of discussion of this short paper, with special focus on doctorate training.

Some of the issues concerning doctoral training have been identified: the 'complex interactions of higher education and research policy and practice, changes in knowledge production, and the status of research students, among others' (Pearson, 2005, p.119). The specific topic of this paper is '*industry-oriented doctoral training*' and its implication to policy, regarding how to enhance the learning capabilities between individuals, universities and firms.

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２．欧州における博士課程レベルにおける「産業人材」のコンピテンス形成

In Europe, 'doctoral training and the further careers of PhD graduates' lie at the crossroads of current innovation policies towards a European Research Area (ERA) and a European Higher Education Area (EHEA) (Enders, 2005). The 'European paradox' refers to the 'conjuncture that EU countries play a leading global role in terms of top-level scientific output, but lag behind in the ability of converting this strength into wealth-generating innovations' (Dosi et al. 2006, p.203). The supply and demand in R&D in terms of 'quantity and quality of

human resources' (Enders, 2005, p.119) is crucial in this context, and a synergy is required between basic research and market application (Brown, 2003).

A considerable number of higher education systems across Europe seem to shift their paradigms for doctoral training, replacing an 'academic-disciplinary model of research training' by a 'hybrid model that crosses disciplinary and organizational borders' (Enders, 2005). This reflects the wider transformation of 'modes of knowledge production' (Gibbons et al. 1994) processes in sciences with a political appeal towards 'strategic science' and 'hybridization' between academia and the marketplace (Benner and Sörlin, 2007). In this process, borders are becoming fuzzy, not only between disciplines but between universities and other knowledge producers and users in society (Enders, 2005, p.127).

Lanciano-Morandat and Nohara (2006) argue that 'human actors' such as doctoral researchers and post-docs play a central role in the structuring of the hybrid 'space' between academia and industry. [4] Overall, the production of doctorate researchers brings into play a multiplicity of institutions at various national or local levels and mobilises the various resources available to them. In this paper, attention is drawn to the *industry-oriented doctoral trainings* as cross-boundary 'hybrid model'. Beyond Europe, the 'user-driven models of collaborative industry-R&D research centres' (Harman, 2002) with doctoral training include Cooperative Research Centres (CRCs) in Australia, the Network of Centres of Excellence in Canada, and the National Science Foundation Industry-University Cooperative Research Centres in the US.

In Europe, there are several different models of 'hybrid' doctoral training in different national contexts. In France, the public research policy has tried to direct a more important flow of PhD to the private sector since the 1980s with positive impacts (see Giret and Recotillet, 2004). The CIFRE ('Conventions Industrielles de Formation par la Recherche') progrrame [5] aims to place PhD students supervised jointly by academia and industry. In the UK, similar Industrial CASE scheme exists, and research councils fund Engineering Doctorate and Industrial Doctorate who carry out PhD-level research projects, jointly supervised by the university and a company, which aim to help the performance of the company. The German higher education system traditionally provides a unique and interesting case where there is a strong link of the PhD to the labour market outside academe, and this is based on a traditional academic-disciplinary mode of apprenticeship known as 'Humboldtian model' followed by 'enforced mobility' after graduation (Enders, 2005). In Sweden, since the 1990s, newly created semi-private foundations have contributed to the creation of new graduate schools, where academic-industrial collaboration is encouraged, and industry has been actively involved

in PhD training. It has been pointed out that 'Sweden was a European forerunner in the imitation of US models of innovation', pursuing both excellence and utility (Benner and Sorlin, 2007).

３．議論：研究人材と産業人材育成のための公的・私的資源、研究者キャリアの構築

This paper has provided a very brief account of several different national systems of competence building emerging in Europe by focusing on the new forms of doctorate training with industry involvement as cross-boundary 'hybrid model'. In general, doctoral researchers involved in university-industry collaborative projects can act as 'natural bridge builders' between academia and industry and this is highly valued by industry. In addition, inter-sectoral mobility would be a good asset for a future employment outside academia (see EUA, 2008). In the case of France (through Ministry of Research and Technology and the National Association for Technology Research), and the UK (Research councils), public resources are invested to create such flows during the PhD training, which seem to be successful in creating some 'hybrid models' of career pathways between academia and industry. In Sweden, a number of new graduate schools were created by semi-private foundations in the late 1990s and industry has been actively involved in PhD training and the course designing. However, financial involvement of industry in R&D cooperation was very limited (Benner and Sorlin, 2007).

Overall, these new 'hybrid models' seem to have added resources only marginally to each national innovation and research system. The majority of the structures or contents of university research training programmes has not been altered. Universities' institutional strategies of research training also need to correspond and be integral part of wider 'national systems of competence building' with 'hybrid' space between industry and academia. As Enders (2005, p.131) points out, a 'diversity of organizational and structural forms as well as different validation criteria and procedures' will determine the future face of research training, asking for a more segmented structure for research training. Other authors point out that Centres of excellence model from the US has been taken up by many other countries, which threatens institutional diversity within the systems (Lanciano –Morandat and Nohara 2006). Innovation in both policy and organizational forms which helps to link private and public resources needs to be sought. Another remaining question is how individual doctorates construct and manage their career through 'employability' and 'competences' as high-skilled knowledge workers. This needs to be examined in view of wider structure of national and international labour market, and also in terms of the value of the research training both in economic terms and social terms.

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【注】

[1] Centre for Innovation, Research and Competence in the Learning Economy (CIRCLE)

[2] 参照　木戸（2008）「ヨーロッパ高等教育の課題」　レファレンス 2008．8 http://www.ndl.go.jp/jp/data/publication/refer/200808_691/069101.pdf　access 7 March 2009

[3] The concept of employability has many definitions, while most of the works are found at undergraduate level. According to Harvey (2004), two broad groups can be identified. The first relate to 'the ability of the student to get (and retain and develop in) a job after graduation'. The other set are concerned with 'enhancing the students' attributes (skills, knowledge, attitudes and abilities) and ultimately with empowering the student as a critical life-long learner' (Hillage and Pollard, 1998; Harvey, 2001). Knight and Yorke (2003) argue that employability is context dependent and individual.

[4] Lanciano –Morandat and Nohara (2006) distinguishes three functions of doctoral students: 1) the resources used to produce scientific output of the research in which they operate; 2) the pool from which the next generation of scientists will be drawn; 3) the primary vector for the transfer of knowledge between academia and industry.

[5] CIFRE, 'Conventions Industrielles de Formation par la Recherche' is a system that has been around the 1980s　and is an agreement that aims to strengthen　the technological capabilities of enterprises and aids young researchers to carry out their studies through a research and development program in conjunction with a research team from outside the company, such as universities and research institutes.