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Global regulation of the knowledge-based economy : The rise of standards in educational services

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Global regulation of the knowledge-based economy: The rise of standards in educational services

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Abstract

This article examines the extent and limits of non-state forms of authority in international relations. It analyses how the information and communication technology (ICT) infrastructure for the tradability of services in a global knowledge-based economy relies on informal regulatory practices for adjustment of ICT-related skills. Companies and associations provide training and certification programmes as part of a growing market for educational services setting their own standards. The existing literature on non-conventional forms of authority in the global political economy has emphasised that the consent of actors subject to informal rules and explicit or implicit state recognition remains crucial for the effectiveness of those new forms of power. However, analyses based on a limited sample of actors tend toward a narrow understanding of the issues and fail to fully explore the differentiated space in which non-state authority is emerging. This paper examines the form of authority underpinning the global knowledge-based economy within the broader perspective of the issues likely to be standardised by technical ICT specification, the wide range of actors involved, and the highly differentiated space where standards become authoritative. The empirical findings highlight the role of different private actors in establishing international educational norms in this field. They also pinpoint the limits of profit-oriented standard-settings, notably with regard to generic norms.

Keywords: Knowledge-based economy; private authority; services; ICT-related training; standards

Résumé

Ce travail porte sur l'étendue et les limites de l'autorité non étatique dans les relations internationales. Il analyse la façon dont l'infrastructure de technologies d'information et de communications (TIC) facilitant l'échange des services dans une économie mondialisée de plus en plus fondée sur la connaissance dépend d'un ensemble de pratiques de régulation informelle. De nombreuses entreprises et associations spécialisées fournissent des programmes de formation et de certification dans le cadre d'un marché de services éducationnels en plein essor et se fondant sur ses propres règles. Les travaux existants sur les formes non conventionnelles d'autorité en relations internationales soulignent que le consentement des acteurs aux règles informelles et une reconnaissance implicite ou explicite de l'Etat est essentiel pour que ces nouvelles formes de pouvoir puissent être effectives. En restant confinées à un nombre restreint d'acteurs, les analyses ont toutefois tendance à se borner à une compréhension étroite des enjeux en question et peinent à décomposer l'espace dans lequel se déploie l'autorité non

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étatique. Au niveau théorique, ce travail examine les formes d'autorité qui soutiennent le développement d'une économie mondiale fondée sur la connaissance en élargissant le type d'enjeux susceptibles d'être normalisés au travers de spécifications techniques dans le domaine des TIC, tout en tenant mieux compte de la variété des acteurs impliqués et de la très grande différenciation de l'espace sur lequel les normes sont susceptibles de faire autorité. Sur le plan empirique, les résultats mettent en lumière le rôle des acteurs privés dans l'établissement de normes internationales dans ce champ particulier de l'éducation et de la formation. Ils soulignent également les limites intrinsèques de normes établies dans un but lucratif et identifient les alternatives face auxquelles situer une consolidation des programmes de certification et de formation dans le domaine des TIC.

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Introduction[2]

'Global knowledge-based economy' has become a popular term designed to capture ongoing changes in contemporary capitalism. The service sector is at the core of changes that rely on a constantly evolving stream of specialised skills. The crucial role of knowledge in a post-industrial society where the delivery of services superseded the production of goods was identified over 30 years ago by Daniel Bell.[3] Similarly, Manuel Castells has analysed the rise of the network society around communication and information infrastructures and services, as a distinct form of knowledge creation in information processing and diffusion.[4] The information and communication technology (ICT) infrastructure has dramatically increased the tradability of services promoting further economic integration. Numerous studies have examined the impact of the new ICT infrastructure on global governance and highlighted the role of the private sector and civil society in undermining the principle of territoriality in this domain.[5] While the importance of private regulations in the context of the Internet Corporation for Assigned Names and Numbers (ICANN), electronic commerce and trade in services has been intensively analysed,[6] little research has been done so far on the governance structure of ICT training and certification programmes. The lack of research is particularly surprising given the importance of training in exploiting the full potential of the ICT infrastructure and providing timely responses to the continuous shift in ICT-related skill needs. Furthermore, ICT training and certification challenge traditional state and corporatist regulations inherited from a time when education and training existed only in physical classrooms or was part of a very context-specific on-the-job training. By contrast, ICT training and certification is highly privatised and internationalised. This paper explores the enabling conditions for international governance structures involving market forces, state regulations, intergovernmental agreements and non-governmental arrangements. The closer analysis presented here examines the strengths and shortcomings of emerging regulations and emerging forms of transnational authority, and identifies which voices are heard and unheard in the process.

More than a decade after Susan Strange's pioneering work on the 'diffusion of power in the world economy', the rise of non-state actors has generated insights into the analytical foundations of such new forms of transnational authority.[7] The existing literature on the rise of non-state and private authority in international affairs has

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[2] This paper draws on a project funded for a 4-year period (2006-10) by the Swiss National Science Foundation (SNF) entitled *Standards and international Relations: Devolution of Power in the Global Political Economy* (grant # PP001-110528). We are grateful to the SNF for its support.

[3] Bell, Daniel (1973). *Coming of Post-Industrial Society: A Venture in Social Forecasting*. New York: Basic Books.

[4] Castells, Manuel (2001). *La société en réseaux*. Paris: Fayard; Castells, Manuel (2005). "Global Governance and Global Politics" *PS: Political Science & Politics* (1): 9-16.

[5] Sassen, Saskia (2006). *Territory, Authority, Rights. From Medieval to Global Assemblages*. Princeton: Princeton University Press; Comor, Edward A. (1999). "Governance and the Nation-State in a Knowledge-Based Political Economy", in Hewson and Sinclair, *Global Governance Theory,* Albany: State University of New Yor Press: 117-134; Anzelmo, Erin L. (2006). "Cyberspace in International Law: Does the Internet Negate the Relevance of Territoriality in International Law? *Studia Diplomatica* 58(4): 153-169; Weiss, Charles (2005). "Science, Technology and International Relations" *Technology in Society* 27(3): 295-313.

[6] Drissel, David (2006). "Internet Governance in a Multipolar World: Challenging American Hegemony" *Cambridge Review of International Affairs* 19(1): 105-120; Wilson, Ernest J. (2005). "What is Internet Governance and Where Does it Come From? " *Journal of Public Policy* 25(1): 29-50.

[7] Strange, Susan (1996). *The Retreat of the State*. Cambridge: Cambridge University Press.

emphasised that at least two conditions must be met for such new forms of authority to be effective.[8] First, they must gain the consent of actors who are subject to the rules even though they have not been involved in their making. Second, they require explicit or implicit recognition by the state. It is in this regard that recent scholarship has stressed the limits to what is usually seen as private, transnational and excluding states in supposedly new practices of governance. However, understanding of the effectiveness of such regulations remains disputed in respect of more detailed examinations of voluntary consensus mechanisms and their articulation to state practices. For instance, Higgins and Tamm Hallström have argued that voluntary standards can be viewed as a disciplinary power reflecting a neoliberal rationality of government.[9] Moreover, analyses focus on a limited sample of actors amongst large multinational corporations and nongovernmental organisations. Even when they are more inclusive, they offer little differentiation between agents competing for legitimacy as representatives of civil society and tend to have a narrow understanding of the issues involved.[10] Recent research has led to some fruitful studies on the rise of private authority in domains such as finance, labour, the environment, consumer issues, security and cyberspace.[11] Yet similar phenomena are arguably as fundamental in other fields underpinning the rise of a global knowledge-based economy. Finally, despite the growing number of studies debating the advent of a post-Westphalian world order, few fully explore the differentiated space in which non-state actors and less conventional forms of domination seek recognition in the reconfiguration of states' distinctive form of spatial production.[12]

Against this background, this paper examines the role and limits of voluntary standards in the rise of a global knowledge-based economy by using three distinct categories: the scope of the issues involved; the range of non-actors concerned; and the reconfiguration of the scale and spatial scope of their authority. In reassessing how consent and state recognition underpin non-state forms of authority in education and training services with the help of these categories, the paper argues that the more technical specifications take social behaviour into consideration, the more profit-oriented standard-setters face intrinsic limits. The shortcomings of such private

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[8] See among others: Graz, Jean-Christophe and Nölke, Andreas, Eds. (2008). *Transnational Private Governance and its Limits*. London: Routledge; Krause Hansen, Hans and Salskov-Iversen, Dorte, Eds. (2008). *Critical Perspectives on Private Authority an Global Politics*. Houndmills: Palgrave Macmillan; Grande, Edgar and Pauly, Louis W., Eds. (2005). *Complex sovereignty*. Toronto: University of Toronto Press; Cutler, A. Claire (2003). *Private Power and Global Authority*. Cambridge: Cambridge University Press; Cutler, A. Claire, Haufler, Virginia and Porter, Tony, Eds. (1999). *Private Authority and International Affairs*. New York: SUNY Press; Fuchs, Doris (2005). *Understanding business power in global governance*. Baden-Baden: Nomos; Hall, Rodney Bruce and Biersteker, Thomas J., Eds. (2002). *The Emergence of Private Authority in Global Governance*. Cambridge: Cambridge University Press; Higgott, Richard, Underhill, Geoffrey and Bieler, Andreas, Eds. (1999). *Non-State Actors and Authority in the Global System*. London: Routledge; Haufler, Virginia (2001). *A Public Role for the Private Sector*. Washington D.C.: Carnegie Endowment for International Peace; Sassen, Saskia (2006). *Territory, Authority, Rights*. Princeton: Princeton University Press; Strange, Susan (1996). *The Retreat of the State*. Cambridge: Cambridge University Press; Djelic, Marie-Laure and Sahlin-Andersson, Kerstin, Eds. (2006). *Transnational Governance*. Cambridge: Cambridge University Press.

[9] Higgins, Winton et Tamm Hallstrom, Kristina (2007). "Standardization, Globalization and Rationalities of Government", *Organization Science* 15(4): 685-704.

[10] Hall and Bierstecker (*The Emergence of Private Authority…*, op. cit.), for instance, widen the types of actors potentially concerned by drawing a distinction between market, moral and illicit authority so as to build a typology including actors other than firms.

[11] Chapters in volumes referred to in note 8 above are mostly on those issues.

[12] Notable exceptions include: Cameron, Angus and Palan, Ronen (2003). *The Imagined Economies of Globalisation*. London: Sage; Palan, Ronen (2003). *The Offshore World*. Ithaca, Cornell University Press; Sassen. *Territory…*, op. cit..

authority shed light on the role of an emerging transnational civil society which includes not-for-profit organisations and associations. In the distinct domain of ICT educational and training services, this suggests that future standards and certifications are likely to follow two competing routes: on the one hand, a deepening commodification of technical market-based certifications on industry products claiming a global reach, and on the other hand, a re-embedding process of ICT certifications of skills implying societal concerns taken over by professional associations and a number of official standard-setting bodies.

Section 1 provides some background on ICT training and certification programmes, including the supposed need for continuous adjustment of skills in a knowledge-based economy; it also shows the growing importance of international standards established by non-state actors. Section 2 proposes an analysis of the regulatory power of non-state actors and of their exercise of authority in regard to international standards in services. Section 3 examines the different types of international standards for ICT training and certification in detail and considers tensions across the configuration of power giving a larger role to private actors. We analyse the political struggles involved in the definition of 'proper training', show how some actors are excluded from the process, and stress the limits of market forces in providing the infrastructure for the emerging knowledge-based economy. It is within the context of those struggles that the paper finally hypothesises competing scenarios for future developments of certifications used in a timely, reliable and constant renewal of ICT skills. The conclusion recapitulates the argument and draws implications for the understanding of non-state forms of authority in international relations.

Education and training in a knowledge-based economy

Increasing competition in the knowledge-based economy leads to an ever-shorter life cycle of knowledge. The ICT sector is perhaps the most significant domain in which rapid change not only changes the industry, but also impacts upon its enabling environment. Constant adjustments in skills are crucial for the full potential of ICT to be realised. The economic historian Morris-Suzuki speaks of a 'perpetual innovation economy' relying on a continuous stream of scientific and technical knowledge, which has been in place for much of the twentieth century and is now increasingly focused on information technology and networks.[13]

Life-long learning is the buzzword of the new education strategy in the knowledge-based economy. The European Council and the European Parliament designated 1996 as the European Year of Life-long Learning in order to draw the attention of member states to this change. In an accompanying White Paper, the European Commission argues that the society of the future will be a learning society.[14] Life-long learning challenges the education system by reorganising the relationship between formal, informal and non-formal education.[15] Formal education refers to the highly institutionalised, chronologically graded and hierarchically structured education

[13] Morris-Suzuki, Tessa (1984). "Robots and Capitalism" *New Left Review* (147), quoted in Schiller, Dan (2000). *Digital Capitalism*. Cambridge Mass.: The MIT Press.

[14] European Commission (1995). *European Pilot Project for evaluating Quality in Higher Education. European Report*. Brussels: European Union.

[15] For the analytical framework distinguishing between formal, informal and non-formal education, see: Coombs, Philip H. (1968). *World Educational Crisis: a systems approach*. New York: Oxford University Press; Coombs, Philip H. and Ahmed, Manzoor (1974). *Attacking Rural Poverty: How non-formal education can help*. Baltimore: John Hopkins University Press.

system beginning in primary school and ending at the tertiary level; non-formal education concerns activities organised and carried on outside the framework of the formal system, for example training courses offered by a company or an association. Informal learning includes the acquisition and accumulation of knowledge, skills and insights from daily experience and exposure to the environment; although unorganised and often unsystematic, it accounts for the great bulk of any person's total lifetime learning. As the life-long learning strategy aims at expanding non-formal education and valorising informal learning, it profoundly alters the interplay between formal, non-formal and informal education.

Many proponents see market-driven offerings as the best way of ensuring a timely, flexible, and tailored provision of new skills in an economy with a drastically shortened life cycle of knowledge. A case in point is E-learning, which has become a privileged vehicle for promoting non-formal training.[16] The trend towards market-driven provision is even more pronounced in the field of ICT skills.[17] In addition, the quality control of skills through certifications has become a business in itself. A certification is not to be confused with a certificate, which only documents that an individual has successfully completed a course or a class. By contrast, a certification provides more information by formally documenting how the performance of an individual meets well-defined skill and competence criteria. Hence it controls the result of a specific training. Microsoft, for instance, confers the title Microsoft Certified Solution Developer (MCSD), which states that the certified person's skills meet the Microsoft standards with regard to planning, deploying, supporting, maintaining, and optimising IT infrastructures.[18] Many experts praise industry-based certification (IBC) as a model for ensuring quality standards in the provision of non-formal education, while informal learning is mobilised through the work experience requirements of many ICT training courses.[19] In other words, training builds on informal learning, transforms it and makes it visible through certification. As certifications are more linked to predefined standards than certificates, they fulfil a micro-governing function by defining what knowledge and competence ICT workers need to have.

This has direct implications for any form of governance in this field, and strengthens the position of private providers of non-formal education and certification. The standard-setting authority of certifications in this domain has gained such prominence that Adelman calls ICT certifications a 'parallel universe' to state-recognised higher education institutions, which conventionally enjoyed the monopoly in conferring educational titles.[20] Adelman's analysis tends to overlook the corporatist tradition, notably in countries with a well-established vocational system, where companies set educational standards in collaboration with government agencies and trade unions. Nonetheless, it spotlights an important change in how the private sector is involved in the definition and provision of training as it becomes more profit-oriented and less embedded in a corporatist structure.

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[16] IDC (2008). *Worldwide and U.S. Corporate eLearning 2008–2012 Forecast*. Farmingham, MA; Povalej, Roman and Weiß, Peter (2007). "Survey of ICT Certification Systems for ICT Professionals in Europe" *Upgrade- the European Journal for the Informatics Professional* 8(3): 36-45. There is currently a remarkable growth in China, see: Certmag (2008). "The China Boom" *Certification Magazine* (August).

[17] CEDEFOP (2006). *ICT Skills Certification in Europe*. Thessaloniki: European Centre of the Development of Vocational Training.

[18] See www.microsoft.com/learning/mcp/credential/default.mspx [accessed 11 July 2010].

[19] Summerfield, Brian (2007). "Funding your Certification" *Certification Magazine* (August).

[20] Adelman, Clifford (2000). "A Parallel Universe - trend toward replacing academic degrees with information technology certificates " *Change* (May); Adelman, Clifford (2000). *A parallel postsecondary Universe: The Certification System in Information Technology*. Office of Educational Research and Improvement, U.S. Department of Education.

It is this market-driven orientation that facilitates the internationalisation of these new governance structures. As in e-learning, a worldwide market in certification is emerging with the United States taking the lead, followed by Europe and increasingly by other regions of the world.[21] This market has increased rapidly in recent years and is estimated to be about 40% of the overall e-learning market.[22] A study conducted by the online journal Certification Magazine in 2007, with more than 35,066 IT professionals from 195 different countries participating, shows that approximately 94% of the respondents were certified, with an average number of 3.31 certifications.[23] These figures indicate that ICT certification is not small-fry in the world of education and that it is indeed a significant topic in spite of its neglect in conventional studies. The certification of ICT through private providers has become a role model for a number of other initiatives aiming at establishing international standards for certifying qualification.[24] The emerging market in ICT training and certification leads to questions about both the validity of voluntary standards in a global knowledge-based economy and the new forms of private authority that are ensuring compliance with these standards. This makes an appealing case for the investigation of changes in governance structures in the rise of a global knowledge-based economy.

Non-state actors and the ascendancy of standards

Non-state actors lead to new forms of power and authority in international relations. The literature on the rise of non-state actors, private authority, and less conventional forms of sovereignty and governance has mushroomed over the last decade. A shared assumption of this scholarship, whatever its theoretical positions, is that at least two conditions must be met for such new forms of authority to be effective: i) the consent of actors who are subject to the rules without having been involved in their making; ii) an explicit or implicit recognition by the state.

i) Implicit or explicit consent – instead of coercion or enforced compliance –is an important element in such configurations of power. According to Cutler and her co-authors, 'those subject to the rules and decisions being made by private sector actors must accept them as legitimate, as the representations of experts and those "in authority"'.[25] In the same vein, Djelic and Sahlin-Andersson consider that non-state authority enabling various forms of transnational governance hinges upon 'powerful institutional forces that altogether constitute a transnational culture or meaning system'.[26] The authority of non-state actors in international relations is a form of normative power closely related to reputation, which substitutes command-and-control hierarchical and formal state regulation for informal and non-hierarchical

[21] IDC (2005). *Worldwide IT certification 2005-2009 forecast and analysis*.
[22] NZTE (2007). *Global Trends and Issues in the Corporate, Industry and Government Training Markets*. New Zealand Trade & Entreprise.
[23] Even if these figures are biased towards the United States, where 37% of the respondents lived at the time of the study, they nevertheless indicate a global spread of certifications. 11.6% of the respondent lived in India at the time of the study, 4.4% in the United Kingdom and 4% in Canada, see Margolis, Daniel, Prokopeak, Mike, Rummler, Lisa, Summerfield, Brian, Warden, Ben and Whithney, Kellye (2007). "Certmag's salary survey" *Certification Magazine* (December).
[24] Another important field of global certification has emerged with regard to language testing. The best-known provider in this field is the non-profit organisation Educational Testing Service (ETS) with its English-language test TOEFL or the British Council's International English Language Testing System (IELTS), see Janna D. Fox, Mari Wesche, et al. (2007). *Language testing reconsidered,* Ottowa: University of Ottowa.
[25] Cutler et al. Eds. (1999). *Private Authority…*, op.cit.
[26] Djelic and Sahlin-Andersson, Eds. (2006). *Transnational Governance*, op.cit.

governance. Non-hierarchical 'steering modes' based on private-public partnerships are, for instance, a central feature in the debate on the legitimacy of this new type of normative power.[27] Graz and Nölke remind us, however, not to overemphasise the consensual underpinning of non-state authority, which more accurately invents 'new channels in the relations between formal and informal procedures, as well as hierarchical and non-hierarchical mechanisms of social action'.[28]

ii) The ability of non-state actors to cooperate across borders to establish rules and standards accepted as legitimate by agents uninvolved in their definition requires explicit or implicit recognition by the states. States remain central in the rise of private actors in both domestic and international affairs. Explanations may differ according to competing theoretical approaches. For example, scholars with a background in neo-corporatist studies are likely to emphasise the 'shadow of hierarchy' required for effective self-regulation,[29] while transnational historical materialists tend to see private actors and the state as two different expressions of a larger configuration of social forces.[30] While there may be sharp disagreements as to the sense attributed to state recognition, there is little disagreement concerning the overall complementary and subsidiary role taken by private actors in regard to state functions. As Sassen argues, 'the redistribution of power within the state is a consequence of changes in both the national and the international political economy but is also constitutive of those changes'.[31] Governments and intergovernmental institutions often support and fully recognise the power of non-state actors, who in turn may gain legitimate authority. The territorial basis of the state and the structural power of governments and markets remain beyond various forms of non-state authority. This explains the limits within which this phenomenon is transnationalised, whether these are purely private or based on informal and consensual forms of collective action.[32]

The analysis of how this authority can be effective requires a more detailed understanding than the shared assumption relating to consent and explicit or implicit state recognition. Despite a growing number of studies on the various aspects related to this phenomenon, scholarship on less conventional forms of international authority tends to focus too narrowly for a comprehensive understanding of framework conditions enabling such non-state power. The remainder of this section addresses this issue by examining how technical specifications upon which ICT training and certification rely reflect a distinct form of non-state authority in international affairs.

Three closely related dimensions merit further investigation if we want to understand how non-state actors become standard-setters for power configurations in the contemporary global political economy: i) the scope of issues concerned; ii) the range of non-state actors involved; iii) the reconfiguration of the scale and spatial scope of their authority. Together these points emphasizes how the hybrid form of authority represented by international standards is built on consent and gains recognition on a

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[27] Risse, Thomas (2006). "Transnational Governance and Legitimacy", in Benz and Papadopoulos, *Governance and Democracy. Comparing National European and International Experiences*. London: Routledge: 179-199.
[28] Graz and Nölke, Eds. (2008). *Transnational Private Governance..*, op. cit.
[29] Héritier, Adrienne, Ed. (2002). *Common Goods*. Lanham (MD): Rowman & Littlefield, Smismans, Stijn (2004). *Law, legitimacy, and European governance. Functional participation in social regulation*. Oxford: Oxford University Press.
[30] Gill, Stephen, Ed. (1993). *Gramsci, historical materialism and international relations*. Cambridge: Cambridge University Press; Holman, Otto (2008). "Public-Private Partnerships and Transnational Governance in the Uropean Union: The Case of the Lisbon Strategy", in Graz and Nölke, *Transnational Private Govenance…*, op. cit.: 171-184.
[31] Sassen (2006). *Territory…*, op. cit.
[32] Graz and Nölke, Eds (2008), *Transnational Private Governance…*, op. cit.

transnational level.[33] At best, these categories only capture some aspects of a rapidly evolving complex process. Nonetheless, they exemplify the multifaceted attributes of a new form of power in our societies.

i) Scholarship on the rise of non-state authority tends to have a narrow understanding of the scope of issues involved. Most studies consider a limited number of cases rather than the many domains affected by the phenomenon. Work has been published on risks associated with self-regulation in global banking and finance, the private governance system of cyberspace and the Internet, the rise of private military companies, the wide use of codes of conduct, benchmarking and voluntary schemes in labour, and ecological and consumers' concerns. Less fashionable subjects include professional training, insurance, business services and intelligent transport.[34] Small wonder, then, that most studies fail to conceptualise the full range of non-state authority. As Hewson and Sinclair suggest, new directions for global governance analysis arise 'in large part from the global changes associated with the technologies of the emerging worldwide knowledge order'.[35] The issues concerned in devising technical specifications cover a spectrum ranging from crystal-clear physical questions to highly contentious social requirements of a material civilisation.

The question is: to what extent do technical specifications include social values, and how does this impact upon the implementation of non-state authority? By affecting distinct classes of objects, technical specifications reflect what can be standardised. The growing scale of industry and rapid technological innovations of the Second Industrial Revolution instigated product standards defining performance and interoperability. Health and safety concerns linked to the welfare state prompted the development of standards related more to consumers than producers.[36] In the 1980s and 1990s, outsourcing in the development of global value chains and increasing concerns about environmental regulations potentially used as non-tariff trade barriers contributed to the shift towards quality and environmental management standards.[37]

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[33] Graz, Jean-Christophe (2006). "Hybrids and Regulation in the Global Political Economy", *Competition and Change* 10(2): 230-45.

[34] On professional qualifications, see Hartmann, Eva (2008). "The role of qualifications in the global migration regime", *GARNET Working paper* (39); on insurance, see Haufler, Virginia (1997). *Dangerous Commerce*. Ithaca: Cornell University Press; Paterson, Matthew (2001). "Risky Business: Insurance Companies in Global Warming Politics" *Global Environmental Politics* 1(4): 8-42; Ericson, Richard, Doyle, Aaron and Barry, Dean (2003). *Insurance as governance*. Toronto: University of Toronto press; Haufler, Virginia (2009). "Insurance and reinsurance in a changing climate", in Selin, Henrik and VanDeveer, Stacy D., *Changing Climates in North American Politics*, Cambridge (MA): MIT Press: 241-62.; on business services, see Du Tertre, Christian (1999). "Intangible and Interpersonal Services: Toward New Political Economy Tools. The French Case" *Service Industries Journal* 19(1): 18-34; Miles, Ian and Miozzo, Marcela, Eds. (2002). *Internationalization, technology and services*. Cheltenham: Edward Elgar; Amiti, Mary and Wei, Shang-Jin (2005). "Fear of service outsourcing: is it justified?" *Economic policy* 20: 308-348; Nicoladis, Kalypso and Schmidt, Susanne K. (2007). "Mutual recognition 'on trial': the long road to services liberalization" *Journal of European Public Policy* 14(5): 717 - 734; on intelligent transport systems, see Sussman, Joseph M. (2005). *Perspectives on Intelligent Transportation Systems (ITS)*. New York: Springer.

[35] Hewson, Martin and Sinclair, Timothy J. (1999). "The Emergence of Global Governance Theory", in Ibid., *Approaches to Global Governance Theory*. Albany: SUNY Press: 3-22.

[36] Krislov, Samuel (1997). *How Nations Choose Product Standards and Standards Change Nations*. Pittsburg: Pittsburg University Press.

[37] Hallström, Kristina Tamm (2004). *Organizing international standardization. ISO and the IASC in quest of authority*. Cheltenham: E. Elgar; Prakash, Aseem (2007). *Investing up: FDI and the Cross Country difusion of ISO 14001 Management Systems*, paper presented at the Conference *Non state actors as standards setters: The erosion of the public private divide*, Basel, February; Clapp, Jennifer (1998). "The Privatization of Global Environmental Challenge: ISO 14000 and the Developing World" *Global Governance* 4: 295-316, Brunsson; Nils, Jacobsson, Bengt and Associates, and associates (2000). *A World of Standards*. Oxford: Oxford University Press.

Technical specifications and certification programmes are likely to involve broader societal concerns implicit in intangible and relational features of a service economy. From this perspective, practices of standardisation include both the narrow sense of defining voluntary specifications on distinct issue areas according to the institutional framework with defined documents, and the larger sense of a self-reproducing domination through which a structure of thought and action becomes so internalised that it appears natural and inevitable. This broader scope of standardisation encompasses a more structural understanding of power, framing the way individuals and groups understand themselves and the possibility of changing their situation. In sum, regulatory policies related to technological change and innovation are likely to reflect broad social concerns and new configurations of non-state power that mix natural, physical and social dimensions of collective life.

ii) Technical specifications and certification programmes clearly remain embedded in constellations of power and political struggles. As Feenberg reminds us, rather than seeing technology as a neutral tool, it should be viewed as a 'parliament of things on which civilizational alternatives are debated and decided'.[38] This perspective emphasises the significance of having a proper understanding of the great variety of actors who have the authority to determine and certify technical specification. If studies on private authority in international affairs focus on cooperation between firms across borders, they limit the circle of actors who may claim such authority.[39] In their attempt to broaden the concept, Hall and Biersteker extend the types of actors potentially concerned by distinguishing between market authority exercised through cooperative arrangements among companies, moral authority expected from nongovernmental organisations or religious movements, and illicit authority exercised by organised crime or mercenaries.[40] While this approach is successful in exploring the authoritative dimensions of private non-state actors other than firms, the typology is misleading. Moral claims may underpin market authorities, just as growth and monetary concerns pervade moral authority claimed by NGOs and new social movements. Furthermore, the idea of illicit authority fails to differentiate between authority and power, forgetting that only the former can usually claim to be recognised as legitimate.

A better understanding of the range of private actors to be considered depends on the definition of the private/public distinction and its interplay with the sphere of civil society. Despite variations between societies, the separation between the modern state and the economy has shaped social relations by distinguishing between the private and the public sphere.[41] They remain closely related, reflecting two sides of the same coin. While the public sphere confers universal rights in the political domain, the private sphere brings into play such rights in order to provide limited contractual rights in the economic and civil domains. The range of private actors claiming authority in international affairs is thus larger than what we refer to as the 'private sector' in narrow economic terms. It may include non-state actors such as trade unions, activist groups, women's organisations, professional associations, cadres and experts organised in ad-hoc bodies, advocacy or policy networks, elite clubs and religious groups. This implies that the 'private' authority of non-state actors in international relations potentially includes any collective actor organised through formal or informal contractual relations within the ambit of civil society. As Colàs argues, civil society should not be viewed as a benign sphere of collective action outside the state system, but rather as a 'space of contested power relations where clashing interests

[38] Feenberg, Andrew (1991). *Critical theory of technology*. Oxford: Oxford University Press.
[39] Cutler, et al., Eds. (1999). *Private Authority…*, op. cit.
[40] Hall and Biersteker, Eds. (2002). *The Emergence of Private Authority…*, op. cit.
[41] Cutler (2003). *Private Power…*, op. cit.

play themselves out through analogous but unequal modes of collective agency'.[42] The struggles may assign authority to some actors while undermining the authority of others.

The question is: which actors within civil society, and what interactions with the system of states, are most prominent in constituting the authority of technical specifications and certification and so enabling the rise of a global knowledge-based economy? Distinguishing between the private and public spheres for technical specifications and certification determines who establishes recognised standards. Market mechanisms and policy choices both affect the agents involved, but they do so in various ways. Technical specifications belong to the private sphere of economic activities governed by market constraints and affect social and technological change from that angle. Nevertheless they are related to the public aspects of political action, for example by determining a certain level of risk or by establishing principles of liability. Conflicting interests within civil society organise themselves with the objective of becoming recognised standard-setters. In such cases, technical specifications involve standard-setting bodies with private or public statutes that can vary greatly.

iii) A third and often neglected aspect is the wide spatial scope in which non-state authority is exercised. While many studies stress that the logic of state sovereignty is being replaced by a logic reinforcing the transnational underpinning of capitalism, fewer highlight that what is significant is less the deterritorialisation of state sovereignty as such than the reorganisation of the logic at work in the production of space. Implementation of standards relies on conformity assessment procedures combining opposing principles of exogenous and endogenous standards recognition. Endogenous recognition applies the principle of 'country of destination', whereby foreign providers must meet the domestic requirements of the importing country. This can involve multiple replications of tests and certifications on common standards before clearance is given for each market. In contrast, exogenous recognition endorses the 'country of origin' principle for an international standard allowing suppliers to use a single test of conformity (whether self-declared or provided by a third party certifier) for the global market. As Nicolaïdis and Egan observe, 'domestic regulators accept unprecedented transfers of regulatory sovereignty by recognizing non-domestic standards as valid under their jurisdiction (…).'[43] A global market characterised by the principle of origin would inevitably result in a plethora of standards, all those used by the importers.

Increasingly international standards rely upon a distinct transnational meaning system that tends to blur the distinction between exogenous and endogenous principles of recognition. As Sassen emphasises in her studies of the 'denationalisation' of the U.S. state and the privatisation of norm-making: 'the rise of private authority is not simply an external force that constrains the state. It is partly endogenous to the state'.[44] By the same token, those rules partly depend on codifications provided by international organisations such as the International Organisation for Standardisation (ISO), non-profit private entities like the American Society for Testing and Materials (ASTM), and private companies like Cisco and Microsoft. The projection of technical specifications beyond the territorial basis of state sovereignty involves social relations between and across states. Nevertheless, major differences remain between sectors and these may have varying effects according to the scale and scope on which non-state authority is likely to be exercised. In considering the new spatial logic at work we can expect greater regulatory scope of private actors to coincide with more international

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[42] Colàs, Alejandro (2002). *International Civil Society*. Cambridge: Polity.

[43] Nicolaïdis, Kalypso and Egan, Michelle (2001). "Transnational market governance and regional policy externalities: why recognize foreign standards?" *Journal of European Public Policy* 8(3): 454-473.

[44] Sassen (2006). *Territory…*, op. cit.

authority and a wider geographical scale, whether global, regional or bilateral. The spatial scope affected by such transnational processes is likely to follow the main lines of fractures and hierarchies of contemporary capitalism. Thus, paraphrasing Brand, we should be reminded of the extent of a 'fragmented hegemony' that differentiates between what can be observed in the North and in the post-colonial world.[45]

In summary, the rise of a global knowledge-based economy involves a wide range of formal and informal regulatory practices, among which standardised technical specifications and certification programmes in ICT training set by non-state actors play an important role. In contrast to conventional accounts focusing on the new actors involved in the regulation of the current transformation of global capitalism, this paper also sheds light on the scope of the regulatory practices concerned and the reconfiguration of the spatial structure in which they are implemented. The rise of non-state actors as standard-setters for the global political economy thus entails the aggregation of three distinct categories: the object – i.e. what is standardised; the actor – i.e. who has the authority to set standards; and the space – i.e. where and whence standards become authoritative. The significance of such non-state authority rests upon its ability to assimilate, in one process, technical measures and societal values, to blur distinctions between private and public actors and, finally, to rearrange the spatial configuration of regulatory practices in contemporary capitalism. It is against this analytical background that the remainder of this paper attempts to identify different forms of authorities setting standards for technical specifications and certification programmes in ICT training. It examines the extent to which the issues concerned relate to both technical and societal dimensions, the range of non-state actors involved in the process, and the spatial scope of their authority. A brief section then examines present tendencies within ICT training and certification.

The authority of ICT training and certification programmes

What gets certified?

ICT training and certification in a knowledge-based economy reinforces non-formal types of education in order to secure a timely and substantial supply of skills on a wide range of issues such as storage, system or network design, and implementation or risk and security management. It offers programmes providing skills, quality standards for assessing skills, distinct standards for the corresponding assessment tools, and a wide range of mechanisms for tracking compliance, verification and recertification. The complex includes criteria and safety measures for standardising administration protocols in order to ensure that they are interoperable.[46] Accordingly, certifications may be closely related to skill requirements in a narrowly defined technical field, the proper, effective and efficient handling of ICT tools reflecting state-of-the-art software developments, and the integration of computers in the overall production process. But they have also broadened their scope assessments by documenting personal attributes such as motivation or traits such as being organised, ethical, diplomatic, observant or self-reliant.[47] In other words, ICT training and certifications not only include technical specifications but also define broader values which are

[45] Brand, Ulrich (2005). "Order and Regulation: Global Governance as a Hegemeonic Discourse of International Politics" *Review of International Political Economy* 12(1): 155-176.
[46] CEDEFOP (2006). *ICT Skills Certification in Europe*, op. cit.
[47] Market observers underline the increasing importance of additional business skills; see Lisican, Elizabeth (2008). "The Future of IT: Hybrid Jobs" *Certification Magazine* (November). See also Povalej and Weiß (2007). "Survey of ICT Certification Systems…", op. cit.

required, and thus have a societal dimension with a major impact on the relationship between capital and labour.

ICT training and certifications are part of a transition moving away from the routine tasks prevailing during Fordism towards new forms of production. They ensure the full exploitation of the ICT infrastructure and also of the intelligence and creativity of ICT workers.[48] By providing information on the knowledge required of individuals, they help employers to identify the right prospective employee. In other words, they reduce the information asymmetry of the labour market for the employers. Since ICT training and certifications are often expensive, this information also indicates that workers are motivated to upgrade their skills and have the means to do so.[49]

Coincidentally, ICT training and certification may also empower ICT workers by making visible their work experience and expertise beyond formal qualification certificates. A growing body of evidence shows that many employers take into account the certification of prospective employees, and that this has a positive impact on their future earnings.[50] Studies indicate that the highest impact seems to be at the lower end of academic qualifications, at Bachelor's and Master's degree levels, and less so with regard to IT professionals holding a PhD.[51] In other words, at this upper qualification level it is still the formal qualification that defines the position in the wage hierarchies and the labour market, but this is increasingly less so at the lower end where non-formal qualifications have become another means of distinction and social recognition.

Especially in the light of the emerging global labour market where recognition of formal qualifications issued in another country is still highly contested, the international dimension of ICT certifications is likely to facilitate the mobility of skilled labour. Some immigration authorities even use certifications alongside formal qualifications in assigning work permits.[52] Furthermore, international certification standards are crucial for harmonising the human resource development of multinational firms and may also facilitate companies' outsourcing strategies. The next section examines in more detail the major players of ICT certification.

Who certifies?

The plethora of certifications has resulted in a fragmented and confusing landscape, where the exact number of current certifications is difficult to determine. Analyses have found more than 850 certifications and 200 certification programmes.[53] The market is characterised by the presence of key and niche players. Some are related to specific platforms and products, while others focus more on skills, techniques and knowledge.[54] We can distinguish three (ideal) types of certifiers: formal post-secon-

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[48] May, Christopher (2008): "Opening other windows: a political economy of 'openness' in a global information society" *Review of International Studies* 34(1): 69–92.

[49] A lab exam for the Cisco Certified Internetwork Expert, for instance, costs about $ 1,250. Tittel, Ed (2006). "Certification Top 10 Lists Revisited" *Certification Magazine*(November).

[50] Bartlett, Kenneth R., Horwitz, Sujin K., Ipe, Minu and Liu, Yuwen (2005). "The perceived Influence on Industry-Sponsored Credentials on the Recruitment Process in the Information Technology Industry: Employer and Employee Perspective" *Journal of Career and Technical Education* 21(2); Povalej and Weiß (2007). "Survey of ICT Certification Systems…", op. cit.

[51] Tegan, Jones, Margolis, Daniel , Summerfield, Brian , Whitney , Kellye and Stone Wunder, Sarah (2006). "CertMag's 2006 Salary Survey" *Certification Magazine*(December).

[52] Whitney, Kellye (2007). "The International Market for Certification" *Certification Magazine* (May).

[53] Rowe, Judith (2003). "IT Certifications: Lessons From Other Industries" *Certification Magazine* (April), Tittel (2006). "Certification Top 10 Lists …", op. cit.

[54] Tittel, Ed (2003). "Studying for Vendor-Neutral Versus Vendor-Specific Exams" *Certification Magazine* (October).

dary education providers, vendor-specific certifiers, and vendor-independents.[55] Each type is positioned differently on a continuum from profit to not-for-profit orientation, with a strong vendor-relatedness on one side and a strong state-relatedness on the other side. Hence they stand for a different degree of independence from the market and the government respectively.

The first group is part of the formal post-secondary education system. Providers may be public entities or non-governmental bodies with delegated authority, often institutions of higher education. Companies offering apprenticeship training that leads to state-recognised educational titles can also be included in this group. This first type is closely related to state regulation with frequent involvement of civil society, either on behalf of the academic community or within the framework of corporatism.

Both the second and the third group are more or less industry-based. The programmes of vendor-specific certifiers, which clearly dominate the field, are directly linked to a particular product and thus to a distinct company.[56] Cisco, for example, offers programmes for network tasks with three levels of certification. Other vendors which offer similar services related to a particular product, platform, tool or console include Microsoft, IBM, SAP, Novell, Oracle, and Red Hat, to name but a few.[57] In such cases, standards tend to be extremely specific and related to one single software package. The move of software companies into the training market is part of their overall strategy to expand the service component in their business. They not only sell software and proprietary knowledge but also the verification of the appropriate competence to use this knowledge. Many of them do not provide the training themselves. They have outsourced this business to recognised partners while keeping the certification as their core business in this field. In other words, they keep the final word on the qualification standards underpinned by their software with a view to ensuring their supremacy in the training and certification market.

The third group of certifiers is engaged in vendor-independent and more generic certification programmes. Vendor-neutral providers focus on issues, techniques, skills and knowledge independent of a specific ICT product. Such certifiers are often organisations whose members include professional associations, IT companies, testing firms, consortia, and trade associations. One well-known vendor-neutral certifier is the Computing Technology Industry Association (CompTIA), with headquarters in Chicago, which offers certifications to individuals as well as to companies and instructors.[58] It claims members in 102 countries, including manufacturers, distributors, retailers, solution, application or Internet service providers, software developers, and e-commerce and telecom companies. A more Europe-oriented consortium is Career Space, which includes eleven major ICT companies and the European Information and Communication Technology Industry Association (EICTA), representing 39 national digital technology consumer associations from 27 European countries. Career Space aims at developing a framework for generic skills and competences required by the ICT industry in Europe. The profiles established so far are relevant for telecommunications, software development, services, and ICT management and sales.

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[55] The is a simplified typology derived from: Povalej and Weiß (2007). "Survey of ICT Certification Systems…", op. cit.

[56] Adelman (2000). *A parallel postsecondary Universe…*, op. cit.; CEDEFOP (2006). *ICT Skills Certification in Europe*, op. cit.; Anderson, Sheldon, Hey, Jeanne A.K., Peterson, Mark Allen and Toops, Stanley W. (2008). *International Studies*. Boulder: Westview Press.

[57] For a good overview on vender-specific certifiers see CEDEFOP (2006). *ICT Skills Certification in Europe*, op. cit.

[58] Companies certified include BT, Cisco System, IBM Europe, Intel, Microsoft Europe, Nokia, Nortel Networks, Philips Semiconductors, Siemens AG, Telefonica. See <http://certification.comptia.org>, [accessed 11 July 2010].

Although this third type of certifiers may be independent of a particular ICT product, they are not independent of the overall interest of the IT industry. They often represent the IT industry's interests in legislative procedure, before the courts or in the media. Some providers belonging to this third group deliberately reach out to include interests from government, research and academia. Vendor-independent certifiers with wider memberships, however, primarily target prospective clients with considerable purchasing power, such as a particular industry or public administrations. Unsurprisingly, trade unions have rarely been included in the definition of job profiles and the related standards which inform training and certification programmes, and most groups in civil society are even less closely involved. A major exception is KIBNET, a German joint project funded by the Federal Ministry for Education and Research (BMBF) and involving the trade union IG Metall and the German Association for Information Technology, Telecommunications and New Media (BITKOM).[59] The objective of this initiative, whose funding came to an end in 2008, was to bring together a broad range of different actors with a view to improving ICT skills in all the different sectors. This network was to be integrated into the European e-competence framework to which we will turn later on.

The public funding highlights the role of the state, whose aims in setting norms lies beyond pure market orientation. This type of certifier is more inclusive than the vendor certifiers. Public funding plays a role in many cases where industry-based certification aims at setting standards for formal education. The consortium Career Space, for instance, received financial support from the European Union when it drew up some ICT curriculum development guidelines for universities.[60] Public funding also plays a major role for the European effort to establish a European e-competence framework. A major driving force of this initiative, which is part of the e-skills strategy of the European Union (EU), is the Information Society Standardization System (ISSS) of the European Committee for Standardization (CEN).[61] The project builds on existing standards, such as those of the Career Space consortium, and seeks to broaden its stakeholder base. It defines procedures for linking ICT skills to generic qualification standards for formal education in order to strengthen the relationship between non-formal and formal education.[62] Public funding also plays a role at the international level with the ISO, establishing a wide range of standards for e-learning which are also relevant for ICT training.

This overview demonstrates the mixture of different private providers involved in the standard-setting process with regard to ICT skills and certifications. The more inclusive they are, the more generic their standards are. Many of these more inclusive bodies receive public funding or even involve public entities.

Where and whence does certification become authoritative?

The non-state authority of various certifiers is exercised on multiple scales with a differentiated spatial scope. The certifications of the formal post-secondary education providers focus on ICT skills in a more general educational framework. Their authority is closely related to a societal consensus organised by government together with

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[59] For more information see http://www.kibnet.org/english/index.html [accessed 11 July 2010].
[60] Career Space (2001). *Curriculum Development Guidelines: New ICT Curricula for the 21st Century*.
[61] See "Education for all", *ISO Focus*, November 2007; CEN (2008). *A common European framework for ICT Professionals in all industry sectors European e-Competence Framework 1.0.*, Brussels: European Committee for Standardization, European Commission.
[62] European Parliament and Council (2008). *Recommendation of the European Parliament and the Council on the establishment of the European Qualifications Framework for lifelong learning, 29 January 2008 , PE-CONS 3662/07*. Brussels: European Union.

the national parliament and the teaching profession. As higher education institutions, these providers are part of a public recognition regime. However, the ability of these institutions to respond adequately and rapidly in the light of the new skill requirements introduced by the knowledge-based economy has been challenged in recent years.[63] In reaction, many higher education institutions have started to outsource part of their IT training and testing to industry-based trainers and certifiers whose reputation is closely related to their software and the general assumption that they know how to make best use of it.[64] A good illustration is Cisco Campus where Cisco, a vendor-specific certifier, collaborates closely with universities. This result is a new form of commodification of public education, with industry-based certifiers benefiting from the public funding of the universities to which they offer their services.[65] The blurring of public and industry-based certifiers has gone even further. Some higher education institutions have agreed to waive some of their general entrance requirements for holders of IT certifications.[66] Such cases illustrate how formal and non-formal types of education are diverging in the knowledge-based economy where a timely, reliable and constant renewal of skills has become instrumental. While post-secondary education providers still have formal authority, they often lack the reputation for expertise of what Adelman designated the 'parallel universe' of industry-based certifiers.

Furthermore, post-secondary education institutions are confronted with major difficulties in the international reach of the recognition of their degrees. Mechanisms enabling the international recognition of formal qualifications only exist to a very limited extent. Many governments are still reluctant to recognise any degrees and certifications other than their own.[67] In this international vacuum, the international certification procedures established by private bodies are gaining momentum. However, their authority essentially rests on their reputation and lacks regulatory authority in a legal sense. As voluntary standards, they are soft law.[68] Their standards provide a 'right-to-title' but no 'right-to-practice' in the sense of a mandatory licence in regulated professions. Accordingly, the ability to enhance the transnational credibility and reputation of this type of certification is pivotal. In the end it is mainly the employers who determine the level of recognition of a particular certification, even though some immigration authorities have started to use this type of certification alongside formal qualifications in assigning work permits.[69] This spotlights an important shift in the form of recognition, one that blurs both the distinction between exogenous and endogenous principles of recognition and that between public and private.

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[63] Wood, Stirling and Revill, Peter (2004). *The inclusion of vendor certifications in national qualifications*. Paper presented at the Workshop on e-skills industry certifications, Brussels; OECD (2006). *Information Technology Outlook 2006. Highlights*. Paris: Organisation for Economic Co-operation and Development.

[64] Adelman (2000). *A parallel postsecondary Universe…*, op. cit.

[65] Hartmann, Eva, Haslinger, Sebastian and Scherrer, Christoph (2006). "Liberalization of Higher Education and Training: Implications for Workers' Security", in Rosskam, Ellen, *Winners or Losers: Liberalizing Public Services*. Geneva: International Labour Organisation; Schiller, Dan (2000). *Digital capitalism. Networking the global market system*. Cambridge (MA): The MIT Press.

[66] For instance, the Western Governors University, founded by the governors of the western states to expand access to higher education for working adults through online programs, waives up to 25% of its degree requirements. See http://www.wgu.edu/cm14 [accessed 11 July 2010].

[67] Hartmann, Eva, (2007). "Does the WTO empower UNESCO? An emerging form of global governance in the global knowledge-based economy", in Martens, Kerstin, Alessandra Rusconi and Kathrin Leuze, *New Arenas of Educational Governance*. Hampshire, New York: Palgrave Macmillan, 55-119.

[68] For the distinction between hard and soft law see Abbott, Kenneth W. and Snidal, Duncan (2000). "Hard and Soft Law" *International Organization* 54(3): 421-456.

[69] Whitney (2007). "The International Market for Certification", op. cit.

The spatial scope of authority for industry-based certifiers differs significantly between vendor-specific or vendor-independent brands. Initially, vendor-independent certifications, developed by professional associations as a form of self-regulation, played the leading role in ensuring standards and competences in the computing profession. However, as studies show, none of these certifications gained broad recognition by the industry.[70] The birth of networked computing and the growth of the ICT industry in the late 1980s tilted the certification landscape in favour of the vendor certifiers.[71] The reputation of this second type of certifiers is closely related to their software and technology. Their knowledge of their own new software and technology allows them to provide the required training and certifications in a timely manner. This clear comparative advantage in the training and certification market explains why such certifiers pulled ahead of vendor-independent certifiers in the 1980s and dominate the market today. The authority of these providers is also based on their market share. Many of the vendors are located in the United States, where they benefit from a large domestic market.[72] The bigger the market share, the more likely employers are to know the certification, which in turn increases the value of the certification. Once widely known, certifications attract even more clients including companies and public administrations that outsource the ICT training of their staff.[73]

The internationalisation of the software market increases the international reach of vendor certification, fostering the winner-takes-all dynamic. Once well established in the ICT training and certification market, certifiers benefit from other mechanisms strengthening their market position further. In the light of global migration, widely known certifications benefit from the attractiveness of the labour market of their home country. IT professionals from low-income countries may take an exam offered by an internationally known certifier with a view to improving their access to high-income labour markets. Certifiers also benefit from the international activities of other service providers, as multinational companies setting up new affiliates abroad may prefer employees with certifications they know from their country of origin. Internationally known certifications also play an important role in the offshore outsourcing of skilled tasks.[74] They may become seen as trustworthy indicators of the subcontracting companies' quality, notably when these countries are situated in countries with a formal education system substantially different from the one of the outsourcing companies' country of origin.

However, there is evidence that vendor certifications have attracted major criticism in recent years for being too biased towards their own solutions and technology, and are seen as only being interested in building a pool of trusted individuals who know how to implement and support their product. The criticism, put forward by consumers' and the IT professional associations, highlights the limits of an oligopolistic provision of services integrated into infrastructure.[75] Critics fear that purely market-driven incentives lead to an expansion of the certification market even if this is detrimental to quality control.[76]

In contrast, vendor-independent certifiers, being less-market driven, build their reputations on well-established mechanisms for consulting members, including a wide range of associations and industry groups, before establishing specific

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[70] CompTIA (2004). *The situation and the role of e-skills industry certification in Europe*: The eskills Certification Consortium (eSCC).
[71] Whitney (2007). "The International Market for Certification", op. cit.
[72] Tittel (2006). "Certification Top 10 Lists …", op. cit.
[73] Tyler, Kathryn (2004). "Carve Out Training?" *HR Magazine* 49(2).
[74] Ibid.
[75] Wyrostek, Warren E. (2008). "*The Top 10 Problems with IT Certification in 2008*", *InformIT*, 14 March.
[76] French, Matthew (2010), "Why IT certification matters", *TechCentral,* 6 April.

programmes. Some of these members may gain their authority from an exclusive and close relationship with industry, while others have government, research and academic connections. Nevertheless, they face a dilemma which puts them at a disadvantage as compared to vendor certifiers. Their effort to differentiate their offer from others in a proliferating market has resulted in a highly fragmented and confusing landscape of vendor-independent certifications often lacking transparency and comparability.[77] The growing confusion makes it difficult for prospective trainees and employers to distinguish between good offers and mediocre or frankly bad ones. This has considerably undermined the reputation of a number of vendor-independent certifiers.[78] In such a situation, vendor-independent certifiers cannot benefit in the same proportion as vendor-certifiers from economies of scale. However, in the future consolidation may provide a favourable option for vendor-independent certifiers.

Towards the consolidation of ICT certification

ICT training and certification currently seems to be following two different routes towards potential consolidation. This reflects conflicting perspectives on the definition and role of certifications in sustaining a timely, reliable and constant renewal of ICT skills. Rather than a public/private or state/market divide, we are looking at a split between those who favour commodification of technical market-based certifications on industry products and advocates of the further socialisation of ICT certifications by professional associations and standard-setting bodies.

The first group, driven by industry consortia, is the prevailing model in the United States and to a lesser extent in the European Union, the second largest market for ICT certifications.[79] The sheer number of certifications and programmes offered by these consortia fosters a search for market-based economies of scale reinforcing a harmonisation of profiles and standards. The second group – professional associations, employers' organisations and official standard-setting organisations – benefits from public policy support and has been developed mainly in Europe, often with an international orientation. A well-known example is the European Computer Driving Licence (ECDL), known outside of Europe as the International Computer Driving Licence (ICDL), established in 1995 with the support of some EU funding.[80] The standards of this licence have been elaborated by the Council of European Professional Informatics Societies (CEPIS), which represents 37 member societies in 33 European countries.[81] In 2002 CEPIS launched the European Certification of Informatics Professionals (EUCIP), which complements the more end-user oriented ECDL.[82] EUCIP is a pan-European qualification scheme for people entering the ICT profession as well as for advanced ICT training.

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[77] CEDEFOP (2006). *ICT Skills Certification in Europe*, op. cit.

[78] Tittel (2006). "Certification Top 10 Lists …", op. cit.

[79] Whitney (2007). "The International Market for Certification", op. cit.; Adelman (2000). *A parallel postsecondary Universe…*, op. cit. A major exception in the U.S. was the now defunct National Skill Standards Board.

[80] Stucky, Wolffried, Dixon, Matthew, Bumann, Peter and Oberweis, Andreas (2003). "Information technology practitioner skills in Europe: current status and challenges for the future", in Klein, Six and Wegner, *Computer science in perspective*. Berlin: Springer: 304–317; Calzarossa, Maria Carla, Ciancarini, Paolo , Maresca, Paolo , Mich, Luisa and Scarabottolo, Nello (2007). "The ECDL programme in Italian Universities " *Information & Education* 49(2): 514–529.

[81] For more information see www.cepis.org. Italy for instance has introduced EDCL at most of its universities, see Calzarossa, Maria Carla, Ciancarini, Paolo , Maresca, Paolo , Mich, Luisa and Scarabottolo, Nello (2007). "The ECDL programme in Italian Universities", *Information & Education* 49(2): 514–529.

[82] PR Newswire Europe (2002). *CEPIS to launch market validation for pan-European IT skills vocational training system*, 9 October.

Involving more generic standards and a wider international reach, the second strand also includes official standard-setting organisations. The most ambitious initiative has been launched in the framework of the EU and has led to the creation of the European e-competence framework. One driving force of this initiative has been the Information Society Standardization System (ISSS) of the European Committee for Standardization (CEN) collaborating with a number of professional associations, universities and European institutions, and also private companies such as Airbus, Deutsche Telekom, Cisco Systems and Microsoft.[83] What distinguishes this initiative from many others is the involvement of workers' representatives, though only through IG Metall and the European Metalworkers' Federation. The standards of this framework have been related to the European Qualifications Framework (EQF) of the EU strategy on life-long learning.[84] In this sense it further blurs the distinction between formal and non-formal certifications.

International standard-setting organisations have also become involved. Over the last few years the International Organization for Standardization (ISO) has developed a wide range of standards for e-learning which are also relevant for ICT training. Most of the ISO standards have so far focused on narrow technical specifications.[85] However, a number of standards address broader issues, aiming at controlling the controller.[86] In recent years ISO has also started to address the control of providers of non-formal education and training, which has also become, as shown, a major issue for the ICT sector. The standard ISO 29990 on Learning Services for non-formal education and training is currently under development.[87]

Hence, state and inter-governmental cooperation remain important for establishing more generic, product-independent standards. Their organisational and financial role helps counter the oligopolistic standard-setting practices of the advocates of a commodification of narrowly defined technical ICT certifications based entirely on industry products.

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[83] See "Education for all", *ISO Focus*, November 2007; CEN (2008). *A common European framework for ICT Professionals in all industry sectors European e-Competence Framework 1.0*., Brussels: European Committee for Standardization, European Commission.

[84] European Parliament and Council (2008). *Recommendation of the European Parliament and the Council on the establishment of the European Qualifications Framework for lifelong learning, 29 January 2008 , PE-CONS 3662/07*. Brussels: European Union.

[85] ISO/IEC 24751-2:2008 focuses for instance on the individualised adaptability and accessibility in e-learning, education and training. ISO/IEC 19778-1:2008 establishes norms for collaborative technology in this sphere.

[86] ISO/IEC 17024:2003, for instance, has established standards for the certification of persons, for more information see IAF (2004). *IAF Guidance on the Application of ISO/IEC 17024:2003 Conformity assessment - General Requirements for Bodies operating Certification of Person*, Cherrybrook: International Accreditation Forum 2004. ISO/IEC 23988:2007 provides recommendations on the use of IT to deliver assessments to candidates and to record and score their responses. ISO/IEC 19796-1:2005 which establishes a description scheme for quality management and describes a process model defining the basic processes to be considered when managing quality in the field of ICT-training. As such it provides generic quality standards for certifications which have to be taken into account by the certifiers if they want to become ISO certified, see Pawlowski, Jan M. (2007): "The Quality Adaptation Model: Adaptation and Adoption of the Quality Standard ISO/IEC 19796-1 for Learning, Education, and Training", *Educational Technology and Society* 10(2): 3-16. The interest in other generic ISO standards for non-formal education has resulted in establishing in March 2007 a new Technical Committee on *Learning services for non-formal education and training*.

[87] ISO (2009). *ISO Focus* November/December, Geneva: International Organization for Standardization: 31-34.

Conclusions

This paper has analysed how the ICT infrastructure for the tradability of services in a global knowledge-based economy relies on the continuous adjustment of ICT expertise standardised by non-formal education provided by companies and associations. Such non-formal education in ICT training and certification is part of an emerging market with its own standard-setting authority. The conceptual framework brings together three closely-related dimensions of hybrid authority for international standards. It situates the role of technical specifications in the current power configurations of the emergent knowledge-based economy within the broader perspective of the issues concerned, the range of non-state actors involved, and the scale and spatial scope of their authority. The argument provides evidence that ICT training and certifications tend to include a broader range of societal values than usually expected. Whereas programmes rely to a great extent on the state of the art in computer and software developments, the analysis shows that the definition and accreditation of ICT skills and reliability also affect working conditions, solvability assessments and future salary expectations. Regarding the non-state actors, the analysis substantiates the assumption that two types of standard-setters are currently superseding the traditional formal education systems: vendor certifiers and vendor-independent certifiers. Finally, assessing the scale and spatial scope of such new forms of non-state authority, the article has identified limits to the private authority of vendor-certifiers in ICT training. Acknowledging the rise of broader and more inclusive coalitions including wide interests within civil society, the paper suggests that two routes towards a potential consolidation of ICT training and certification are superseding the public/private or state/market divide. On the one hand, vendor-certifiers will definitely keep on supporting the commodification of technical market-based certifications of industry products claiming global market recognition; on the other, however, vendor-independent certifiers are ready to endorse a certain degree of socialisation of ICT certification by bringing professional associations and standard-setting bodies into the picture. However, even the most inclusive initiatives remain selective by targeting groups with considerable purchasing power, usually excluding trade unions and other less powerful actors in civil society.

A base line from which the argument could proceed further is the necessary trade-off between scope and reputation for such non-state authority to become effective. The power of vendor certifiers to set ICT training standards is closely related to the assumption that the market share of their software reflects past and present expertise and therefore an ability to provide timely and tailored adjustments of ICT skills. Once well established in the certification market, major vendor certifiers can easily bank on a 'winner-take-all' logic, which in turn reinforces the scope of the market share sustaining their authority. As we have seen, however, such practices have encountered increasing criticism for being too exclusive and biased towards oligopolistic interests. By contrast, the reputation of vendor-independent certifiers rests on their claim to have achieved greater independence by including professional associations, research bodies, academia and governments. However, as the study has shown, there seem to be intrinsic limits to their reputation. The lack of comparability may undermine a reputation built upon the claim of independence. The role of formal international institutions such as the ISO and the EU in the consolidation of non-state authority becomes obvious when advocates of more generic, product-independent standards join forces in their attempt to overcome the trade-off between scope and reputation. The analysis has provided evidence that the more societal and generic the standards are, the more they depend on public policy support, which may paradoxically limit their international reach. The tension between profit orientation and reputation underlying non-state forms of authority in international relations will always persist. This will generate contestations about the nature and level of trust required

for market transactions. As emphasised by Callon and his co-authors, the qualification of products in a service economy is likely to lead to a 'profound transformation of the rules by which markets function … The organisation of markets becomes a collective issue and the economy becomes (again) political.'[88] In this light, future research should appraise in which direction the pendulum is swinging, the degree to which this varies according to different classes of objects - and what the actors involved make of it.

[88] Callon, Michel, Méadel, Cécile and Rabeharisoa, Vololona (2002). "The Economy of Qualities", *Economy and Society* 31(2): 194–217.

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