
Benefits of standardisation to the economy

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Standardisation for the gas sector: Is it worth it?

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Background

- role of institutional infrastructures for economic growth difficult to assess
- impact of regulatory framework, incl. Intellectual Property Rights, and physical technological infrastructures, especially ICT, has been addressed
- importance of technological infrastructure as an essential determinant of the economic performance of industrialized economies is generally acknowledged today
- **new:** assessing the impact of technical standards for economic growth
- undisputed that technical standards are very important for the fast and efficient diffusion of new technologies



Background

- diffusion aspect covers only one macroeconomic impact dimension of standards
- furthermore, the standardization process itself is a platform especially for the exchange of knowledge relevant for the implementation of new technologies among its participants
- this dialogue enables the generation of new incremental and more application-related technological know how instead of radical breakthroughs in basic research.
- in addition, the interface between research and standardization deserves a special focus, since it is beneficial both for the fast diffusion of new technologies, i.e. for growth, and for research, but we face still serious inefficiencies at this interface



Functions of standards and their economic effects

Type of Standard	Positive Effects	Negative Effects
Compatibility / Interface / Interoperability	<ul style="list-style-type: none"> • Positive network externalities (e. g. telecommunication) • Avoiding lock-ins (from old to new releases of software) • Increased variety of systems or products (e.g. IT systems) and more efficiency in the supply chains 	<ul style="list-style-type: none"> • Monopoly power by proprietary standards
Minimum Quality/ Safety	<ul style="list-style-type: none"> • Correction for adverse selection (no racing to the bottom in quality) • Reduced transaction costs (e. g. lower contract costs) • Correction for negative externalities (e. g. environmental standards) 	<ul style="list-style-type: none"> • Raising rival's costs (too ambitious standards discriminate suppliers of lower quality)
Variety Reduction	<ul style="list-style-type: none"> • Economies of scale due to mass production of one specification (also in earlier stages of the supply chain) • Building focus and critical mass in emerging industries and technologies 	<ul style="list-style-type: none"> • Reduced choice • Market concentration to suppliers of mass products
Information	<ul style="list-style-type: none"> • Facilitates trade due to higher transparency • Reduced transaction costs since specifications are defined 	<ul style="list-style-type: none"> • Raising rival's cost by too ambitious standards



Some theoretical issues on the role of standards for growth

- all types of technical standards codify technological know how
- besides the common dimension of non-rivalry in use we divide codified knowledge in two subsets distinguished by the degree in which property rights and excludability are attached to them
- whereas innovations protected by intellectual property rights like patents restrict others from using the technologies covered, technical standards are in general public goods and a form of technical infrastructure
- the faster and greater the diffusion of private technological know how by technical standards, the greater also the pool of this publicly available information and the stronger its impact on growth



Some theoretical issues on the role of standards for growth

Compatibility and interface standards: The argument, that infrastructure has positive impacts on growth, can be applied, because our transport systems, the networks supplying us with water, **gas** and electricity and finally the telecommunication infrastructures depend crucially on this type of standard.

- + Since all the services sectors based on these physical networks are both the most dynamic sectors in highly industrialized countries and enriching also the development in the manufacturing sector, overall growth can be positively influenced by efficient compatibility standards.
- If central compatibility or interface standards are in the ownership of a single company or a small group of companies, their monopolistic behavior can decrease consumer surplus, inhibit innovation and therefore hamper economic growth in the short and long run.



Some theoretical issues on the role of standards for growth

Minimum quality and safety standards: Growth-enhancing, because they reduce transaction costs especially respective to markets for complex and "risky", but also innovative and high quality products and services.

- + Positive impact on the development of new markets and high quality segments of existing markets. These markets are decisive sources for growth, especially for highly industrialized countries.
- + Finally, safety standards are means to restrict negative externalities damaging health and the environment.
- Negative for growth is the misuse of minimum quality or safety standards by suppliers, which try to manipulate the specification of these standards in a way that raises their rivals' costs and allows them to behave like monopolists.
- Too restrictive quality and safety standards.



Some theoretical issues on the role of standards for growth

Variety-reducing standards: It remains open whether these standards are growth-fostering or -hindering.

- + Variety reduction allows mass production
- + Variety reduction facilitate the development of new technologies and markets, because a dominant path or trajectory for technologies or markets has to be found in order to reach critical masses, which make it attractive for companies and customers.
- Variety reduction restricts the choices for customers.
- Growth in variety is a necessary requirement for long-term development, but also a phenomenon for growing economies.
- Variety reduction facilitates the concentration to a smaller number of suppliers, who are able to realize mass production on the one hand and to misuse their market power on the other hand.



The basic macro econometric model

- **basic idea:** Economic growth is driven by the production factors capital K and labour L and the technical progress A
- $Y(t) = A(t) [F(K(t),L(t))]$.
- $A(t) = A[Z(t)]$.
- technical progress A is divided into
 - technical progress which stems from domestic innovative activity, the role of domestic diffusion of technology,
 - the import of technology from abroad,
 - the role of domestic diffusion of technology.
- $y(t) = a + \alpha k(t) + \beta l(t) + \gamma pat(t) + \delta lex(t) + \varepsilon std(t) + u(t)$.

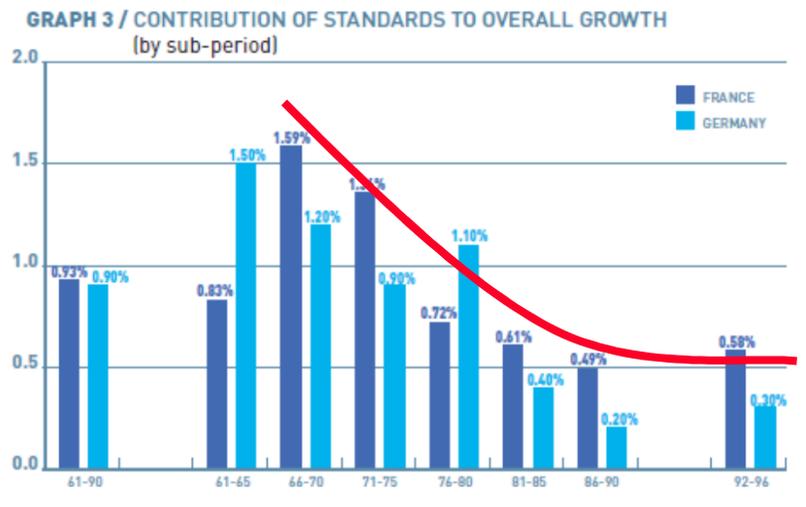


Summary of macroeconomic studies

Country	Source	Period	Growth rate of GDP	Contribution of standards
Germany	Blind/Jungmittag/Mangelsdorf (2011)	1992-2006	1.1%	0.7%
Germany	Jungmittag/Blind/Grupp (1999)	1960-1990	3.3%	0.9%
France	Hakima Miotti (2009)	1950-2007	3.4%	0.8%
United Kingdom	DTI (2005)	1948-2002	2.5%	0.3%
Canada	Haimowitz und Warren (2007)	1981-2004	2.7%	0.2%
Australia	Centre for International Economics Australia (2007)	1962-2003	3.6%	0.8%
China	Rengang Huang (2008)	1978-2007		Production elasticity 0.079
Denmark	CEBR (2007)	1966-2003		No significant contribution, only for selected industries with elasticity of 0.06 leading to 42% contribution to growth

Interpretation of results

- similar result of high impact for countries with comparable economic structure and size, but also significant national standardization activities (Germany and France)
- lower impacts in countries with lower national standardization activities (United Kingdom, Canada, Australia and Denmark) or emerging economies (China)
- trend towards lower impacts of standards also for Germany and France



Source: AFNOR 2008

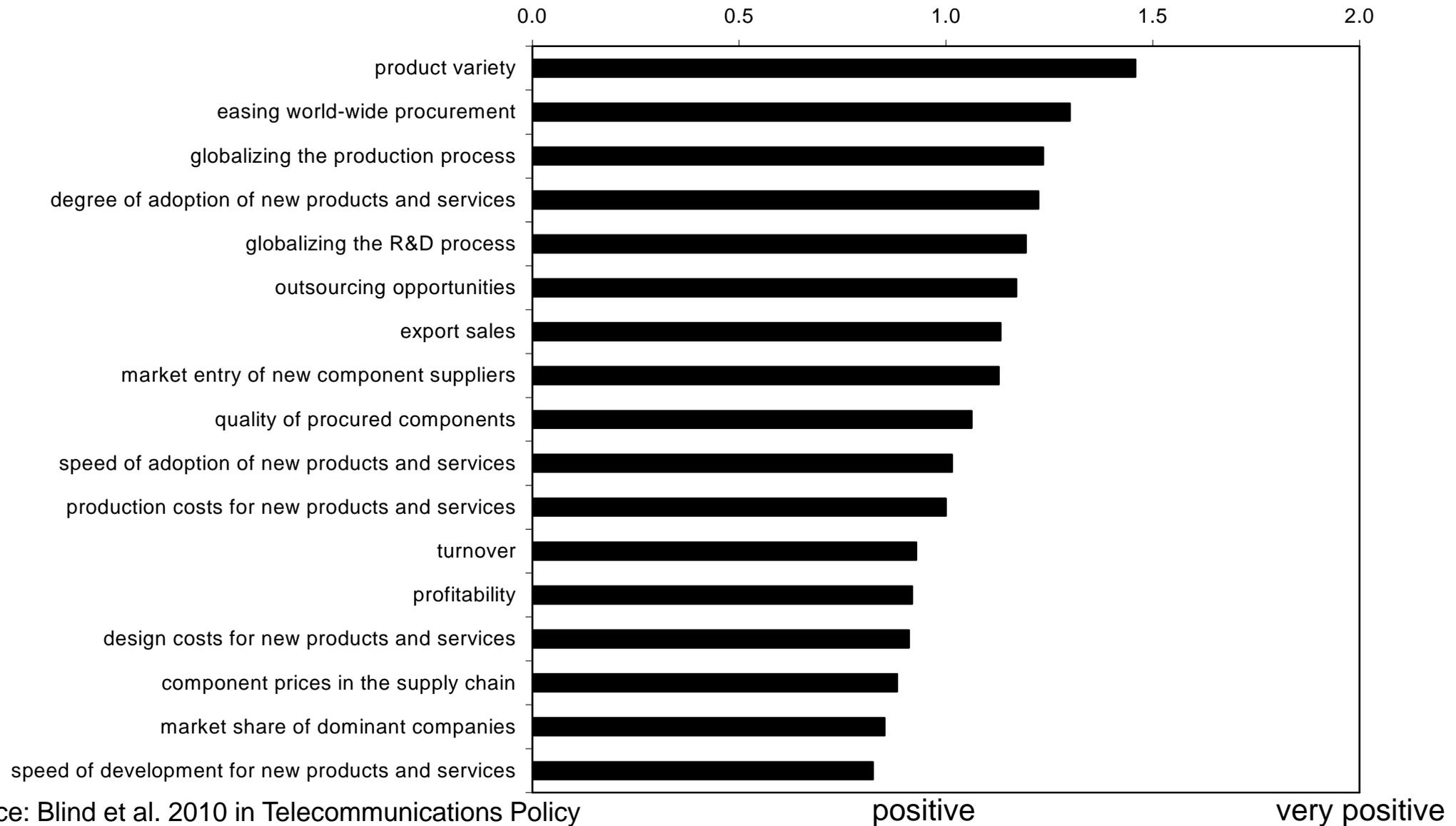
- obviously differences between industries in the same economy

Industry-specific impacts of standards

- mostly significant impacts of the stocks of standards in sectors characterised by low and medium R&D and technology intensity, whereas the stocks of patents have higher impacts the increasing R&D intensity of sectors
- very rough structure of a stronger importance of the knowledge base measured by patents in high-tech sectors and a dominance of standards in low- and medium-tech sectors can be explained by the economics of innovation and technology:
 - in dynamic R&D intensive sectors, short technology life cycles make production of standards difficult and lead to relatively low impacts
 - sectors with low R&D benefit more from standards due to their cost saving effects



Impacts of ICT standards on companies

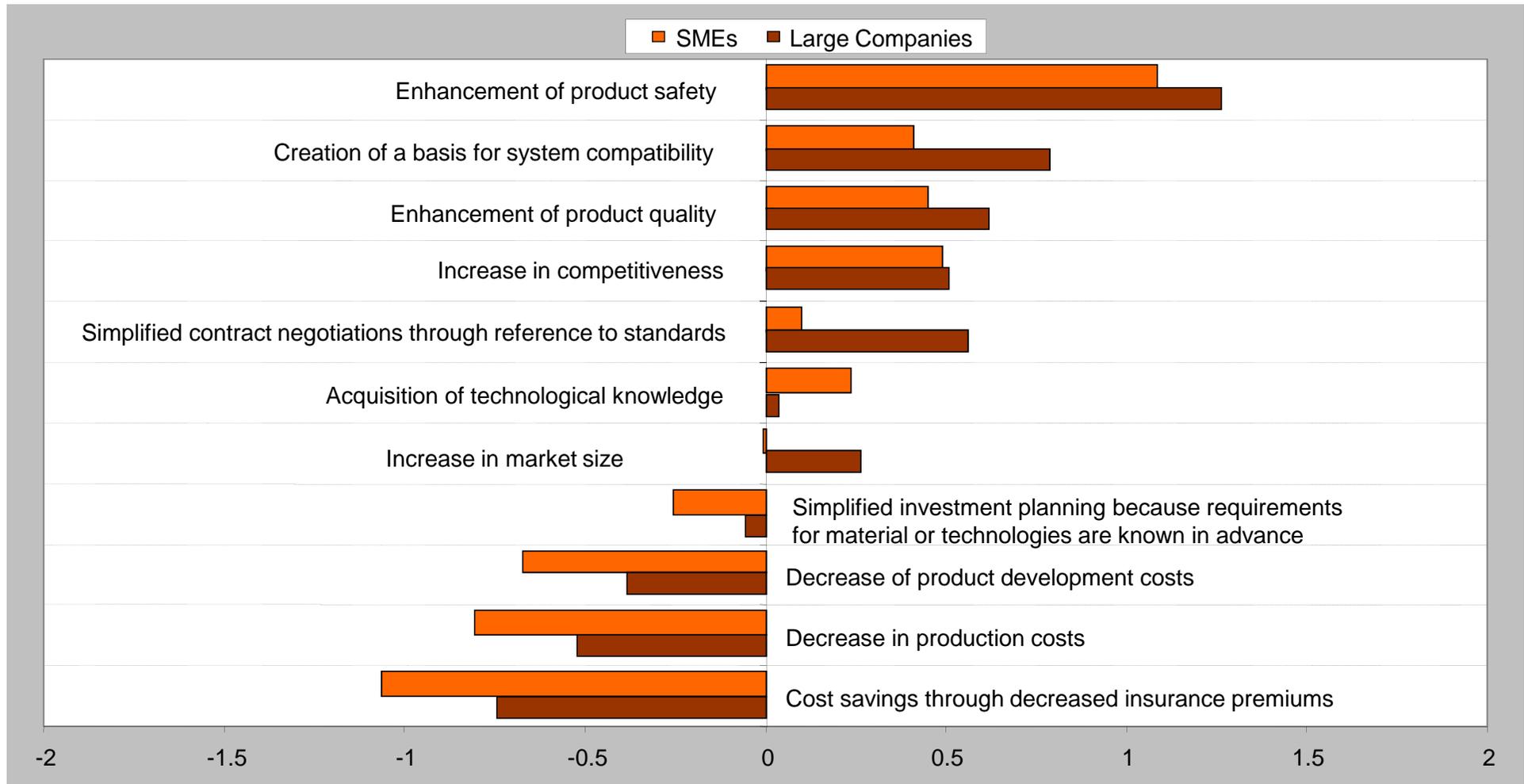


Source: Blind et al. 2010 in Telecommunications Policy



Impacts of formal standards on German machinery and electro-technical companies

(-2 = low significance; +2 = high significance)



Source: Blind and Mangelsdorf 2009



Summary of macroeconomic studies

- all studies do not reflect the fact that standards just like patents are endogenously determined by research and development activities and innovation, but also some social demand regarding health, environmental and safety issues; this endogeneity has to be taken into account in multistage regression approaches also reflecting the virtuous circle between innovation and standardisation
- trade enhancing effect of standards has to be acknowledged, especially the market integration effect of European standards for the completion of the single market in Europe
- studies just rely on formal standards, whereas especially in the information and communication technologies informal consortia standards, but also some de facto standards are more relevant than formal standards (Blind, Gauch 2008)
- studies are based on the publications or the active number of standards (not even differentiating the amount of their content), whereas their diffusion and implementation is not taken into consideration



Summary of microeconomic studies

- impacts of standards on companies differ depending on
 - type of standards (formal, consortia, company-specific)
 - type of sector and technology
 - type of company
 - active involvement in standardization
- active participation increases the benefits of standards for companies and reduces their implementation costs
- macroeconomic studies also show stronger growth impacts for countries with significant national standardization activities



Outlook

- positive benefits of standardisation and standards to the economy as such and companies empirically proved
- identification of specific impacts and quantification of impacts are still a challenge
- future challenges
 - by converging research, innovation and standardisation
 - by converging technologies (e.g. smart grids etc.)
 - growing demand for service standards not only by service industries
 - by creation of further standardisation organisations, e.g. consortia
 - by further internationalisation of standardisation



Thank you for your attention!

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