Finnish standardization panel pilot: A progress report

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Abstract: *We provide a progress report of the Finnish Standardization Panel pilot project. The aim of the pilot is to evaluate the status of the Finnish standardization ecosystem and the role of standardization for Finnish companies by interviewing local stakeholders. Particular themes that have been discussed in the ca. 50 interviews conducted thus far include the scale and scope of standardization education in Finland, the role of intellectual property rights in standardization activities and opportunities and challenges related to the future of standardization. Currently, stakeholder interviews are ongoing, and this progress report describes the explorative preliminary observations as well as sets the plan for completing the pilot project. The pilot study provides one benchmark for the analysis of national standardization ecosystems in other (European) small open economies.*

1 Introduction

Standardization systems are arguably important components of national innovation systems despite the fact that their impacts on the rate and direction of technological progress seem to be chronically understudied.[2] Hence, there is a need to investigate how national, regional and international standardization ecosystems evolve and interact in the era of rapid technological progress and geoeconomic fragmentation (Aiyar et al. 2023).

Obtaining empirical evidence on the functioning of standardization systems can rely on various information collection techniques. German Standardisation Panel[3] is an important benchmark for obtaining survey-based results on the role of standards for stakeholders. Given the large number of responses it is possible to analyze statistical associations and observe trends in the importance of standards, for instance. However, in the context of a small country with smaller stakeholder population it is more challenging to obtain a large number of survey responses. Therefore, a more qualitative approach based on stakeholder interviews is justified.

This paper presents a progress report of the "Finnish Standardization Panel" pilot project that began in January 2024 and is an exploratory and descriptive qualitative study of the status of the Finnish standardization ecosystem and the role of standardization for Finnish companies. As the interviews with stakeholders are still in progress, we focus here on the discussion of methodological choices and present some preliminary observations.

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[2] For instance, leading researchers of Schumpeterian growth theory do not touch upon standardization in their recent book on the subject (Akcigit & van Reenen 2023) as they build upon existing economic growth theory that has remained silent about the role of standardization for technological progress (Heikkilä et al. 2021).

[3] https://www.normungspanel.de/en/ Accessed on 18 March 2024. See also Heß (2023).

2 Finnish Standardization Panel pilot

2.1 Institutional context: Finnish standardization ecosystem

Finland is a small open economy with 5.6 million population and GDP of ca. 278 billion euros in 2023.[4] Finland joined the European Union concurrently with Sweden and Austria in 1995. The year 2024 marks the 100th celebration year of Finnish standardization as the Technical Board on Standardization was established in 1924 (Åberg & Comment 2014). Figure 1 illustrates the evolution and trends in the number of approved standards in Finland since then. The strong period of globalization and European integration is clearly visible in the increasing number of international and European standards since the early 1990s.

According to the SFS Finnish Standards, of 29,500 valid standards in Finland, over 97% were of European or international origin as of 2022.[5] There is an analogy between the European integration related to standardization and intellectual property rights (IPR) systems where there has been a similar shift from national IPR filing channels to European and international filing channels (e.g., Hall & Helmers 2019). Heikkilä and Peltoniemi (2023) documented how an increasing share of patents and other IPRs in force in Finland are based on filings at the European IP offices (the European Patent Office EPO and the European Union Intellectual Property Office EUIPO) instead of the national Finnish Patent and Registration Office PRH.

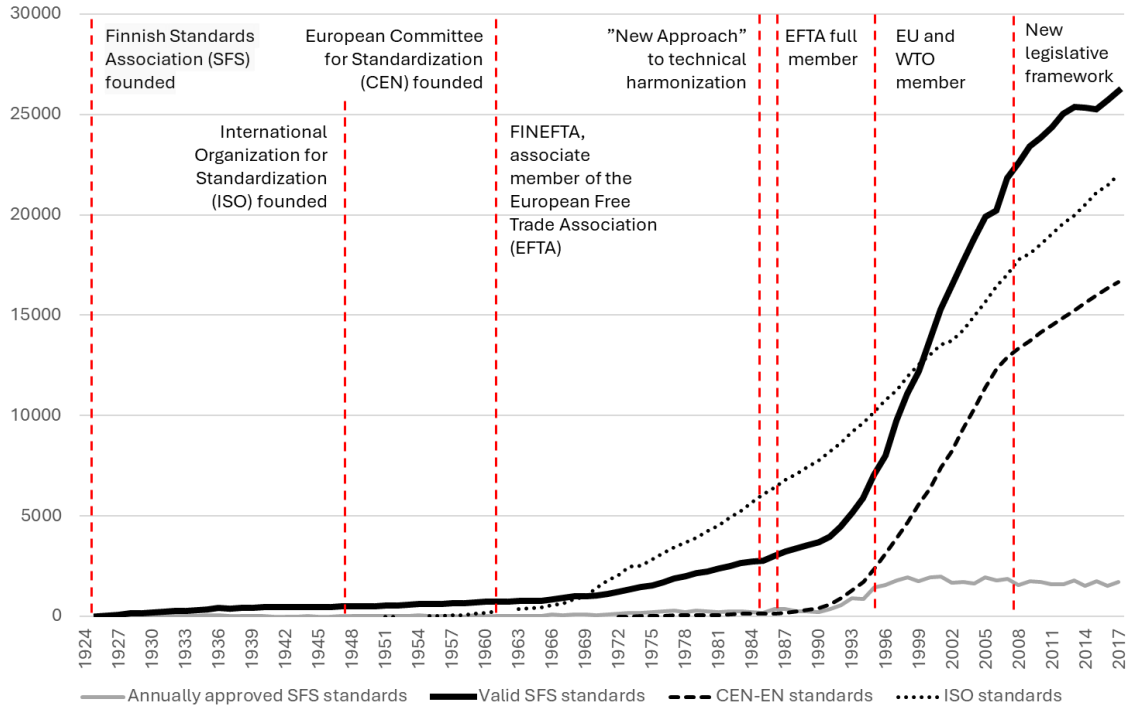

Figure 1: Finnish historical perspective on globalization, European integration and proliferation of standards. Notes: Amended from Heikkilä & Rajavuori (2024) based on data provided by SFS. The same data is utilized in Åberg & Comment (2014).

Table 1 illustrates the regional levels of standards development organizations by technical fields and regional levels from the Finnish perspective. Bradford (2020) has coined the term "Brussels effect" that refers to the capability of the European Union to create global

[4] Statistics Finland, https://stat.fi/en/database-tables Accessed 21 May 2024.

[5] https://sfs.fi/en/sfs-finnish-standards/ Accessed 18 March 2024.

regulation and standards. Heikkilä et al. (2024) distinguish between external and internal Brussels effect where the former, external Brussels effect, corresponds to the Bradford's concept while the latter, internal Brussels effect, refers to the need of local EU companies to adapt to the EU's regulation and standards. The arrows in Table 1 illustrate these mechanisms. As a country, Finland is a small player in the context of European standardization when measured by the weighted voting power at CEN-CENELEC that is relative to population size.[6]

Table 1: Standards development organizations by fields and regional levels from the Finnish perspective. Founding years in parentheses.

		Field		
		General	**Electrotechnical**	**Telecommunications**
Regional level	**International**	ISO (1947)	IEC (1906)	ITU (1865)
	European	CEN (1961)	CENELEC (1973)	ETSI (1988)
	National (Finland)	SFS Finnish Standards (1924)	SESKO (1926/1965)	Finnish Transport and Communications Agency Traficom

↑ "External Brussels effect"

↓ "Internal Brussels effect"

Anecdotal evidence indicates that European and international standards and standardization have played very significant roles for the success and scaling of several Finnish companies and multiple Finnish companies have been active in standards development (e.g., telecommunication standards: Nokia, elevator standards: Kone, fuel standards: Neste, to name a few). However, Heikkilä et al. (2024) provides exploratory empirical evidence suggesting that even relatively large Finnish companies do not have explicit standardization strategies. Since Finland is among the most innovative countries in the world (WIPO 2023) and Europe (Hollanders et al. 2023), it offers a particularly interesting case to investigate the role of national standardization ecosystem as a component of the broader national innovation system and as a component of the wider European and international standardization and innovation ecosystems.

One additional motivation to analyze particularly the Finnish standardization ecosystem, is the important role of standard essential patents (SEPs) for specific Finnish companies. The Finnish ICT cluster led by Nokia has contributed significantly to the development of Nordic, European and international telecommunications standards over the past decades (cf. e.g., Manninen 2002, Buggenhagen & Blind 2022) and Nokia has been the coordinator of the European 6G Flagship Projects Hexa-X and Hexa-X-II.[7] Historically, Nokia has been the biggest private R&D investor in Finland for decades and still represents very high share of total R&D investments by Finnish companies (cf. Ali-Yrkkö & Pajarinen 2019).

European Commission (2023, p.77) reported that Finland ranks as the EU country with the highest share of declared SEPs at the time. Therefore, presumably, any changes to the "rules of the game" related to the licensing of SEPs will impact disproportionaly (either positively or negatively) the returns of R&D investments by Finnish companies as a whole.

[6] https://boss.cen.eu/reference-material/guidancedoc/pages/votingpolicy/ Accessed 21 May 2024.

[7] https://cordis.europa.eu/project/id/101095759 Accessed 21 May 2024.

The national target in Finland is to increase R&D investments to the level of 4% relatively to GDP (of which ca. two-thirds are R&D investments by the private sector) and, presumably, no other country's total returns to R&D investments rely relatively more on the functioning of the SEP licensing market.

2.2 Designing the interviews

While the obvious benchmark, the German Standardisation Panel, has focused on gathering a large number of responses and analyzing general patterns and trends, the Finnish Standardization Panel aims to dig deeper into the functioning of the Finnish standardization ecosystem. With flexible semi-structured interviews it is possible to obtain more in-depth qualitative evidence and explore more flexibly different perspectives of various stakeholders. Table 2 compares the methodological approaches of the Finnish Standardization Panel pilot and its benchmarks, the German and the recently piloted European standardisation panels (Blind et al. 2024).

Table 2. Comparison of methodological approaches

	German Standardization Panel	European Standardization Panel Survey	Finnish Standardization Panel pilot
Since	2012	2023	2024 (in-progress)
Population	German standardization experts	European standardization stakeholders	Stakeholders of the Finnish standardization ecosystem
Targeted population size	>32000 (in 2023)	?	ca. 200 stakeholders
Data collection method	Online survey questionnaire	Online survey questionnaire	Stakeholder interviews, using snowball sampling and iteratively developed questionnaire
Sample/Responses	1806 (in 2023)	3700	>100 (target)
Response rate	5.6% (in 2023)	Ca. 10%	>50% (as of May 2024)
Other information	Annual themes (e.g., climate change, clean energy, SDGs, COVID pandemic)	27 respondents from organizations headquartered in Finland.	The 2024 pilot is utilized in developing the Finnish standardization panel survey questionnaire to the Finnish context

Snowball (network) sampling is the selected non-probability sampling approach. There, known experts in the field are interviewed and they are asked to provide contacts of and recommendations for the next informants. The choice is justifiable because there is no common concept of "standardization ecosystem" and related actors and stakeholders. A significant disadvantage of this non-probability sampling and information collection method is that the eventual sample will not be representative of the population related to the Finnish standardization ecosystem questioning the generalizability of the findings. However, the objective is to be as inclusive as possible in interviewing the stakeholders.

Themes of the first pilot interviews are listed in the Appendix. These topic lists have been shared with the interviews before the actual interviews. During and in the end of the interview sessions, the interviewees have been given the chance to discuss and raise any additional perspectives and themes that, in their opinion, should be part of the following interviews. One such a topic that has been mentioned by several interviewees is the public financial support for standardization activities and how it has recently decreased (see Section 3.3).

2.3 Primary data collection

First, we contacted Finnish standards organizations for the initial first interviews and asked them to suggest further interviewees who have then had the chance to recommend further interviewees and so on. The invited stakeholders and actors of the Finnish standardization ecosystem represent the following categories, thus far: standards development organizations, industry associations, academia, research institutes, universities of applied sciences, financiers, ministries and companies (both large and small). Ministries and accreditation and certification organizations have not yet been comprehensively

interviewed and also small and mediums sized companies and startups are underrepresented. As of mid-May 2024, we have invited 104 interviewees to participate the pilot interviews and conducted 54 interviews. The response rate is above 50 % (51.9 %) as expected (Table 2). Figure 2 reports the progress with the interviews thus far.

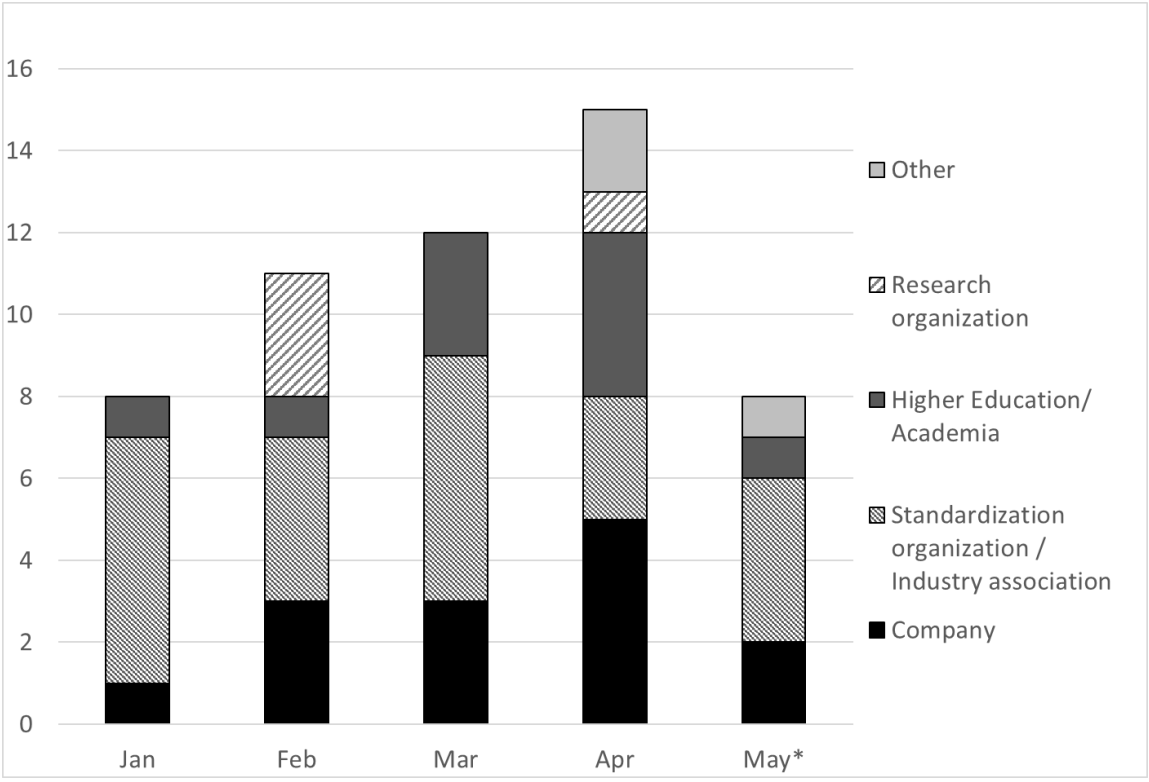

*Figure 2. Interviewed standardization ecosystem stakeholders. *4 Jan – 17 May, in-progress.*

Out of the 104 contacted persons, 33 (31.7%) are considered "non-responses" as of May 2024. It is important to distinguish between the reasons for non-response. Non-responses can be categorized into two: 1) no response to email invitation and two remainders (within two weeks from the second reminder) (18 persons), 2) declined due to low level of knowledge about standardization or replied that there is no time to participate (15 persons). Some declined persons recommended other persons that could be interviewed and, thus, contributed to the snowball sampling.

3 Preliminary observations and next steps

The data collection plan is to continue interviewing stakeholders using snowball sampling method until the observations saturate, no new themes emerge in the interviews and, thus, we have collected enough data to draw conclusions on the status of the Finnish standardization ecosystem as of 2024. Some preliminary observations have begun to saturate after the first 50 interviews.[8]

3.1 The role and impacts of standards and standardization

Standards are viewed particularly important as enablers of compatibility, market access and scaling as well as (product) safety and trust. These lead to increased efficiency. Cybersecurity was raised as an important current standardization topic in multiple

[8] The transcription of interview material is concurrently in-progress.

interviews. Standard essential patents are not so familiar to interviewees that are not operating in the telecommunication sector. When asked about the association between standardization and regulation, multiple interviewees considered that standards can prevent overregulation in the European Single Market. However, the concept of co-regulation is not well-known. The descriptions regarding the associations between standardization and innovation and standardization and regulation varied a lot across interviewees and by industry.

3.2 Status of the Finnish standardization ecosystem and standardization know-how in Finland

Generally, respondents did not view the status of the Finnish standardization ecosystem as very strong or positive, but rather reported multiple weaknesses and raised areas for development. Generally, standardization education in Finland is not viewed as systematic and standardization experts' learning paths related to standardization are quite diverse, even random. Standardization experts often "learn by doing" in organizations which requires long-term commitment. Here the fragmentation of career paths was seen as a risk; some interviewees claimed that young experts change employers more frequently which hinders the development of new standardization experts.

Majority of the interviewees reported that they did not learn about the role of standards for business during their studies (most often in Finnish universities) and the Finnish universities do not offer any basic courses on the role of standards and standardization. Here, it is important to distinguish between A. the technical substance know-how related to standards (what information standards provide and how they are interpreted and used in practice in specific industry contexts) and B. the process know-how related to the development and production of standards as well as C. the know-how related to the strategic role of standards and standardization for businesses. Most of the interviewees have reported that particularly the learning of the role of standards for businesses has happened via "learning by doing" in companies and other organizations and/or by participating technical committees. Hence, the know-how related to the use of standards seems to be on a higher level compared to standardization process know-how or the strategic use of standards.

Some interviewees referred to the small number of leading standardization experts. Several standardization experts have retired (and some still participate standardization) or are close to retirement age. This aging standardization community is a risk related to continuity management in national as well as European standardization consistent with the observations of the European Standardisation Panel (Blind et a. 2024).

3.3 Future of standardization

When asked about opportunities and threats related to the future of standardization, the interviewees identified multiple challenges: standardization processes are too slow, decreasing national financial support to standardization, aging standardization experts and geopolitics.

There were some concerns that the production process of European harmonized standards is "too slow" or "broken" in the current context where technological progress is faster than ever. For instance, one interviewee complained that the HAS assessment process can take very long and the reasons for delays are not transparent.

The respondents had the opportunity to raise standardization topics that they considered as important, but which were not included among the themes template (see Section 2.2 and

the Appendix). One such a topic that was raised by multiple interviewees was the public support for standardization – or the lack of it. Increasing participation costs (reduced support from the ministries) have led some monitoring participants to drop from standardization groups. About 70% of SFS's revenue come from the sale of standards documents and there were some concerns what will be the implications of the recent judgement by the European Court of Justice in the case C-588/21 P concerning public access to specific Harmonized Standards under Regulation 1049/2001.

Another topic discussed in some of the interviews was the link between public R&D funding and standardization. Should standardization be considered more systematically in public R&D (mainly Business Finland) funding applications and reporting? Some interviewees noted that participating and contributing to standardization is not an acknowledged merit in academia like research publications. This observation is in line with the findings of the European Standardisation Panel survey (Blind et al. 2024).

3.4 Limitations and next steps

While observations are beginning to saturate, the interviews and content analyses are still ongoing. The qualitative primary data collected in the interviews is very rich and diverse, but the findings are not directly generalizable to represent the perspectives of the whole Finnish standardization ecosystem. For instance, small and medium sized enterprises and start-ups are underrepresented thus far.

On the basis of these pilot interviews, we plan to develop a tailored survey/interview questionnaire for higher education institutions to analyze further the status and development opportunities regarding standardization education. Also, we are planning to design a company survey questionnaire following more closely the methodological approaches of the German and European Standardisation Panels (Hess 2023, Blind et al. 2024). Once the study is completed, the results and the future scenarios of the Finnish standardization ecosystem shall be discussed in stakeholder workshops.

4 Discussion

The economic success of small open economies such as Finland is dependent on the functioning of multilateral trade institutions of which standardization systems (as well as intellectual property rights systems) are prominent examples. Hence, it is important to investigate how stakeholders from small open economies integrate to these institutions. The topic is highly relevant in the context of the European Single Market where standardization activity on its part defines "who drives the Brussels effect" (standard-makers) and who follows (standard-takers).

The Finnish Standardisation Panel pilot reviews the status of standardization activities in Finland. This paper has described the design and methodological choices of the pilot study and reported some selected preliminary observations. The pilot study will be completed by the end of 2024 and its methodology and results can be utilized as a benchmark alongside the German and European Standardisation Panels if the status of national standardization ecosystem is studied in other countries, in particular, in a small open economy context.

The concept of standardization ecosystem is vague, and we have aimed to be as inclusive as possible in inviting stakeholders to provide their perspectives on the subject (Section 2.2). Future studies would benefit from clarifying the relation of "standardization ecosystem" to the more established – but still vague – innovation and knowledge

ecosystem concepts and literature (e.g., Scaringella & Radziwon 2018, Granstrand & Holgersson 2020).

Standardization capabilities of local stakeholders and the national standardization ecosystems can be promoted via raising standards awareness and by more systematic standardization education. However, if the goal is to develop and strengthen the European standardization ecosystem, then there is a need for the standardization of European-wide standardization education.

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Appendix

Interview themes

1. The role and impacts of standards and standardization

- A. For society B. For the industry C. For the company/organization/entity (depending on the interviewee)
- Which standards are the most effective ones?
- Which standards have you been involved in developing?
- Is there too much or too little standardization?
- Relationship between standardization and 1) regulation? 2) innovation?
- Special topics (depending on the interviewee):
    - Digitalization, data, AI, IoT, cybersecurity
    - Sustainability, responsibility
    - The role of IPRs, licensing and standard essential patents

2. Status of the Finnish standardization ecosystem and standardization know-how in Finland

- Current status, learning paths, education, information sources
- How should the system and know-how be developed further?
- Challenges and opportunities related to education

3. Future of standardization

- How the role of standardization will evolve in the future (opportunities, challenges, geopolitics?)
- How the standardization ecosystem could function better and be more effective?

4. Any other topics and themes raised by the interviewee