Shaping User-side Innovation Through Standardisation

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Abstract:

This paper looks at the relations that exist between standardisation and user-side innovation, and how the former may shape the latter. The necessary background information will be followed by a brief discussion on how technology and standards are shaped by their respective environment. Subsequently, the impact of standardisation on user-side innovation will be discussed. The observation that the context-specific nature of user requirements represents an impediment to a meaningful participation of users in standards setting will then be discussed, and some conclusions will be provided.

1 Introduction – User-side Innovation

Two different 'categories' of innovations may be distinguished: those that make the media typically originate form a research lab and are the result of dedicated R&D efforts. Patents are a popular indicator used to measure a country's or a company's innovation potential. Yet, there is also another 'class' of innovations, which is less covered by media, maybe also less spectacular, but possibly as important: those that take place at the user side, where, for example, a company needs to innovate in order to adapt a newly purchased IT system to its particular environment. The former is very much associated with R&D and, to a lesser degree, with marketing activities, the latter is rather more concerned with implementation issues and, particularly, the effective deployment of an innovation.

Accordingly, activities following an original invention, particularly the adaptation process within the user's environment, have thus far been considered as being distinct from the invention itself. In particular, inventions have typically been associated with universities and research labs, whereas implementations take place at plant floors or within offices. Moreover, implementations are frequently regarded as being less exciting and, indeed, trivial when compared to the efforts that had to go into the original invention. The implicitly underlying idea basically is that invention equals innovation (at least as a first approximation). Any subsequent activities, such as transforming an invention into technology, and putting this technology to good use within a specific environment, have been held in low esteem. However, more recently *".... enterprises that consider innovation part of their strategy are beginning to realize that the implementation of technological innovations in particular is a complex matter in which ..... many interrelated factors play a role."* [Corzi 93].

The implementation of an invention (e.g., a new IT system) can affect almost all aspects of an organisation. In particular, organisational culture, its management and its specific environment are essential for a successful implementation. Given this considerable complexity, an implementation may in many cases well be considered an integral part of the overall innovation process. Users are well able to co-operate in, and provide constructive feedback on, inventions and innovations. In fact, the actual implementation of an invention itself is a major potential source of innovations.

Throughout the remainder of this paper we will have a closer look at the issues and problems that surround user-side innovation. Some background aspects, including the social shaping of both technology and standards, are discussed in chapter 2. Chapter 3 looks at the impact standardisation may have on user-side innovation. The notion that attempts to influence standards setting through massive participation of user companies would be hampered by the context-specific nature of user requirements will be addressed in chapter 4. Finally, some brief concluding remarks are made in chapter 5.

2 Some Background Aspects

Technological artefacts in general, and especially such powerful representatives as information technology (IT) systems, will exert potentially strong impact on their environment. Complex interaction can be observed, where technology may assume both an active and a passive role; that is, technological artefacts and their environment are mutually interdependent. The environment within which technology is used and employed has, among others, social, cultural, societal, and organisational behaviours, rules and norms. It is clear that technology cannot emerge completely independent from such external influences. However, the impact IT may have on organisations, or indeed society as a whole, has thus far attracted considerably more attention than the powers that shape this technology in the first place. Especially the impact of IT within organisational settings (e.g. on a company's performance, or its role as an enabler of business process re-engineering) has been subject of a vast number of studies and analyses. Keywords such as 'management of change', 'technology management' and 'organisational transformation' can frequently be found in the literature, typically denoting studies on how the introduction and subsequent use of IT have changed a particular organisational environment – for better or worse. Only comparably recently has the reverse direction of impact been studied, i.e. the one exerted from organisational and societal conditions on technology.

2.1 Social Shaping of Technology

Two mutually exclusive schools have dominated research on technology and organisations until the early eighties (and are still in evidence). Proponents of the 'organisational choice' model consider technology as a vehicle to both reflect and foster the interests of particular groups; the process of change can be, and indeed is, shaped entirely by policy makers or an organisation's managers; these actors have unlimited technological choices. *"Technology has no impact on people or performance in an organisation independent of the purposes of those who would use it, and the responses of those who have to work with it"* [Buch 85]. In contrast, 'technological determinism' in essence postulates that IT determines the behaviour of organisations, that the consequences of manipulating a given technology will always be the same, independent of who manipulates and within which context. It follows that, according to this view, organisations have little choice but to adapt to the requirements of technology; particular paths of technological development are inevitable; like organisations, society at large also has no other choice but to adapt [Will 97].

Research into the social shaping of technology (SST) largely emerged as a response to technological determinism. SST adopts a middle course between the two older approaches, acknowledging that technology indeed has an impact on its environment, but that at the same time it is well framed through technical, but rather more through e.g. organisational, societal, cultural and economic factors. In particular, SST attempts to unveil the interactions between these technical and social factors [Fleck 95]. Abandoning the idea of inevitable technological developments implies that choices can be made regarding, for instance, the acquisition, the use and particularly the design of technological artefacts. There may be a broad variety of reasons upon which these choices may be based. In an organisational context this may include purely technical reasons, as e.g. the need to integrate legacy systems, but decisions may also take into account company particulars, as for instance organisational or reporting structures. These choices, in turn, may lead to different impacts on the respective social or organisational environments. Thus, studying what shaped the particular technology offers a chance to proactively manipulate that very impact expected to result from this particular choice. At the same time this capability should also contribute to the prediction – and thus prevention – of undesirable side effects potentially resulting from a new technology. After all, technology tends to have other effects besides those actually intended, and these effects need to be explored as well. On the other hand, the respective environment shapes technical artefacts and systems during design and in use, i.e. at the site of the actual implementation. The overall process that comprises the first design stage (of an invention), its production and the final implementation can be referred to as 'innovation'. It is this process I will now look to.

The different factors and entities that shape technology and innovations include (but are not limited to):

- The context from which the invention emerges, including
  - designers' views,
  - vendors' preferences and strategies.
- The environment where it is to be implemented, including
  - work and organisational actualities,
  - end-user attitudes,
  - managerial guidance,
  - successful co-operation between stakeholders,
  - adequate innovation potential.
- External forces, including
  - advances in science and technology,
  - prevailing societal norms,
  - legislation.

This list includes a diversity of influencing factors, represented by stakeholders with different backgrounds, perceptions and interests. I would argue that a similar environment may be found in a standards setting committee.

2.2 Shaping Standardisation

Any invention is shaped by the environment from which it originated. For instance, if it originated from one particular research lab, it has been subject to, and formed by, this lab's context, including the local organisational environment as well as the broader societal and political culture. The same holds for an innovation that results from work in a standards committee. However, the influencing factors will be broader in the latter case, as many different backgrounds, beliefs, and ideas are represented in a standards working group.

That is, technological artefacts embody, and thus transfer, their respective environment of origin. This alone implies that adaptations will subsequently be required if an invention is to be exported to other markets, or user organisations, with different environments. "*The shaping process begins with the earliest stages of research and development*" [Will 92]. This observation points to the direct link that exists between innovation and standardisation activities. Especially since the advent of pro-active standardisation technological systems have increasingly been rooted in standards activities rather than, possibly modified, already existing products (as it is the case in reactive standardisation). As a consequence, it will no longer suffice if users talk to, and co-operate with, their vendors during implementation. Instead, co-operation will have to start far earlier. That is, accepting the above notion that shaping of technology starts at the earliest possible stage implies that users will have to look closer at standards committees if they do not want to risk being eventually stranded with a technology incapable of meeting their needs.

Standards emerge through the co-operation and joint efforts of different individuals in technical committees and work groups. Whilst in theory these individuals act in their capacity as 'independent experts', their views, beliefs, and prejudices have to a considerable degree been shaped by the environment within which they live and, especially, work.

That is, various factors that may shape technology are also likely be channelled into the work groups of the international standards setting bodies. The respective corporate environments of the committee members' employers, for instance, will play a major role in this context. The different visions of how a technology should be used, and the ideas of how this can be achieved, are both formed by these local environments. It will exert a significant impact on the work of the committees. This holds especially in the case of anticipatory standards, which specify new services from scratch, and thus offer the opportunity to incorporate to some (a considerable?) degree the particular presumptions, views, and ideas of the members of the originating committee (and their respective employers).

A reactive standard will likewise transpose the environment from which it emerged; this will be the corporate environment (using this term very loosely) of its inventor (i.e. typically a manufacturer or a service provider) who originally specified the system upon which the standard will be based. Thus, this company's visions will implicitly be embodied in the standard specification, together with the individual ideas of its representative(s). The correspondence between technology and standardisation is obvious – both are shaped by a specific environment. Only in the case of standardisation the manufacturer's environment has a major impact, whereas in user-side innovation the user's environment exerts the influence.

2.3 Users in Standards Setting

Users may find that they stand to benefit from employing standards-based IT systems in several ways, apart from the obvious advantages that come with agreed-upon international standards and norms in a business environment increasingly characterised by the need to integrate, internationalise, and co-operate.

Crucial questions directly related to the issue of user participation in standardisation which need to be addressed are why, what, how, where, and when to participate? First, why participate at all? After all, such commitment implies major expenses on the part of the user, with a very uncertain return on investment. Yet, users need to recognise that they will suffer most from inadequate standards, which will leave them struggling with incompatibilities. On the other hand, they will reap major benefits from well-designed standards addressing real needs. In addition, at least large and/or well-off users may find a standards committee a very suitable platform for co-operation with vendors and manufacturers. Here, technical requirements can be mapped onto system capabilities at a very early design stage (in fact, this is rather more a pre-design stage), thus making the process far more efficient.

What could users contribute? Two areas may easily be identified, the most obvious one being their needs and requirements, the other one their experiences gained from real-life day-to-day work to the process (if the process catered for such contributions, that is).

Standards setting bodies must realise that only business users can provide this crucial type of input. Users, on the other hand, need to ensure that not only their compatibility needs are addressed, but also their overall 'computing' needs, i.e. those requirements that originate from their organisational and strategic environments. This yields the need to bring user managers and strategists to the standards groups (as opposed to engineers, who would know about the technical nuts and bolts, but cannot normally contribute organisational or business process related needs). A major obstacle here is rooted in a communication problem, and in the different perceptions of technology that are frequently held by engineers on the one hand, and managers on the other. To overcome potential communication problems these different perceptions need to be aligned. This requires learning by all sides; engineers need to gain some understanding of the necessary organisational and managerial considerations, and managers need to get an understanding of at least the technical basics.

Yet, user requirements are context-specific; companies from different sectors, of different sizes and different degrees of technical sophistication, and from different cultural backgrounds are likely to develop very heterogeneous needs and requirements. Against this background there appears to be a need for a mechanism to align these different, context-specific user requirements prior to and, particularly, during the process. That is, the only realistic way to achieve meaningful user representation in the process at all would be through a 'user coalition' [Foray 1995], i.e. a forum for users where the requirements could be specified, aligned, and subsequently fed into the standardisation process. This would yield the additional benefit of allowing small companies – which typically have requirements very different from those of the big companies – to be represented as well; for them, the costs associated with participation in standards setting are normally prohibitive. Otherwise, there is a real danger that increasing the number of 'user representatives' would primarily mean 'turf wars' not only between different vendors and service providers, but also between users.

The next issue to be considered is 'how to participate'. In general, there seems to be consensus that large users, especially those with an urgent need for standardised systems or services should participate directly in the technical work. In fact, some do. However, especially for smaller companies, there are obvious barriers to this form of participation which are largely rooted in the lack of sufficient financial resources and knowledgeable personnel.

A variety of different types of organisations, commonly and collectively referred to as 'Standards Development Organisations' (SDOs), are active in the standardisation arena. This term refers to official voluntary organisations such as ITU-T and ISO. In addition, industry consortia like the World Wide Web Consortium (W3C) or the Object Management Group (OMG) also play a major role. Thus, 'Where to participate?' is another question to be addressed. Yet, in most cases 'the standardisation process' is viewed in the literature as something akin to an atomic entity, which cannot be subdivided any further. Participation in profile development, for example, would be the option of choice if interoperability of implementations were to be assured. On the other hand, there is little point in specifying a profile for a base standard that does not meet the requirements in the first place.

Finally, when should users participate? This problem is closely related to the question of what users can contribute to standardisation. The two genuine user domains, requirements and operating experience, seem to suggest that the crucial periods of user contributions are prior to, or at a very early stage of, a standards activity (requirements). Yet, earlier studies (e.g., [Jak 99] seem to suggest that meaningful requirements are not necessarily available prior to system use. For example, critical requirements on corporate e-mail systems only emerged once the system was used outside its originally envisaged application domain (i.e., e.g., when a company found that e-mail could do more than just provide for convenient interpersonal communication).

2.4 Configurational Technology

In today's networked environment technological systems are becoming increasingly complex. Some of these systems evolve into what has been called 'generic technological systems'; prominent examples include railroads, power supply and telecommunication networks [Fleck 95]. Such systems are not a coherent whole, rather, they have been established through the interconnection and interoperation of a large number of smaller systems, which are easier to handle, to manage and to modify. These smaller systems then need to be integrated into the overall system; often they are interconnected through dedicated interworking units. There is an obvious need for standards in such environments, which typically involve different technologies from different vendors. Without standards it would be impossible to achieve interoperability at the required scale. On the other hand, high-level standards may also emerge from such complex systems. These standards will be at system level, incorporating the single component and interface standards. The need for the single components to co-operate smoothly also leads to 'natural trajectories' of development (as e.g. mechanisation or economies of scale). Here, a technological bottleneck in a certain area can hamper the progress of the overall system. Thus, this bottleneck will attract the attention of a number of entities trying to solve the problem. This, in turn, will lead to progress in this particular field, possibly leaving behind others, on which interest and innovation efforts will subsequently concentrate. These gradual improvements are characteristic for generic systems, which typically exhibit their high degree of standardisation not least due to such technological 'path dependencies'.

Some large systems, however, may not follow such trajectories. Typically, each of them is particularly well integrated into its local environment, and closely follows this environment's particular contingencies; that is, these systems are configured to optimally meet the respective local requirements. Such close adaptation to a local context is likely to lower the general interest in such systems, which implies that they will not generate any large-scale standardisation activity. Implementation of such systems requires considerable efforts, and would be next to impossible without far-ranging input from users, who are the only ones to know their environment sufficiently well. It is especially in those cases that the site of an implementation at the same time is a site of considerable innovation; in fact, the implementation itself becomes a source of innovation, as additional innovations become necessary for the adaptation to the local context. As a result, the distinction between innovation and implementation becomes meaningless in this environment, and the processes of invention, innovation and diffusion collapse into a process coined 'innofusion', with feedback occurring primarily through internal learning processes [Fleck 93]. Such systems are referred to as 'configurational'; they have been configured from a wide range of components, from different vendors to optimally meet the need of their local environment.

3 Standardisation and Innovation

3.1 Different Categories of Technology

Large organisations deploy technology in very different contexts for very different purposes. This holds for technology in general, and all the more for IT. IT artefacts can be found on plant floors, in R&D labs, and on desktops; the different purposes they serve include, for example, production automation, number-crunching, knowledge management, word processing, and accountancy. Despite these different application areas, at a very general level IT systems may be categorised as being either 'configurational' or 'generic', i.e. 'business relevant' or 'infrastructural'. A car manufacturer's robot may serve as a representative of the former, a desktop PC as a typical example of the latter. In particular, a company's communication system (e.g. the internal telephone network, or the corporate e-mail system) is typically considered as being infrastructural technology [Jak 01].

For each company technologies that relate to its core business – and its core competence – will naturally attract most interest, particularly if they hold the prospect of a quantifiable return on investment.

Moreover, a company is likely to have developed very specific requirements and processes primarily in the areas of its core business interests, which, in turn, stand in the way of a straightforward implementation of a system. It is here where long-standing, time-honoured traditions characterise the environment, and where technical systems as well as production and business processes have been designed to optimally meet the demands of their specific environment. A new system to be implemented here will have to be customised to a similar degree as have been the other artefacts in this environment. It is unlikely that standard components will provide the required functionality. Accordingly, it may be concluded that innovations are most likely to occur when 'business relevant' technology is to be implemented (similar to configurational technology; see above).

'Infrastructural' artefacts may come from a wide range of items, their major common characteristic being the fact that they are not, or only to a very small extent, integrated into business processes. Typically, they are more or less equally useful for everyone, irrespective of a particular background or a specific environment. Consequently, they are not normally subjected to well specified context-specific requirements. This, in turn, holds the prospect of a higher degree of freedom for the designers and implementors, possibly to the extent of reducing implementation to a mere installation of components, without the need for any further innovation.

3.2 Standards' Influence on User-Side Innovation

In those cases where a suitable combination of standardised components meets the needs of a particular environment standards establish the sole framework within which an implementation takes place. This is most likely to happen in case of 'infrastructural' artefacts or systems, with only a small likelihood of, and indeed need for, specific innovations. Alternatively, especially if 'business relevant' systems are concerned, standards may be considered as contributors to system implementation. Yet, standardised components will only play a minor role in the overall implementation, as the major efforts will (have to) go into the implementation of the overall system, and into the adaptation of the system to its environment.

To accept the proposition that future IT systems will to a considerable extent be based on international standards implies the need to look at the ways how standards are formed and established in order to understand what is going to shape future technology, and especially IT. As a consequence I would suggest that the site of the user's implementation as the current major locus where social shaping accordingly takes place, will to some extent be complemented by activities of the standards committees, where the underlying groundwork has to be done.

In any case, standardisation processes are important for innovations, and they must not be ignored when discussing implementation processes. Now we would like to go one step further and suggest that major similarities exist between implementation and innovation processes on the one hand, and standardisation processes on the other. Indeed, it may well be possible that lessons learned from the well-researched field of innovation may be applied to standardisation processes, and vice versa. This proposition may appear to be a little far-fetched; after all, it could be claimed that there is a major, decisive distinction between the processes of standardisation and innovation – their respective scope. Whilst this is certainly true there are indeed also major similarities between the two processes as well.

For one, users have a considerable influence on innovations; a user may have commissioned a technological system the development of which requires innovations, or an innovation emerges on his premises as part of an implementation project, or he develops a genuine innovation in an attempt to overcome identified deficiencies of the available technology. Yet, it is frequently overlooked that users (could) have a similarly strong hold over the industry simply because of their purchasing power. It follows that they could establish themselves in a position to dominate innovation and standards setting processes alike. As it currently stands, however, users' different needs prevent them from playing the important role they could play – at least in standards setting.

Committee members from user companies tend to see themselves as company representatives (as opposed to e.g. representatives of the user community). Accordingly, they only contribute specific requirements that originated form their respective environments. That is, we can observe here that the single local environments already have a major – albeit implicit – impact on the standards setting process in that they heavily influence the user requirements that are actually fed into the process. This impact in fact represents another correspondence between standards setting and innovation.

Moreover, both standardisation and innovations are major platforms for co-operation between vendors and users. Without this co-operation the outcome of the processes would most likely be far from satisfactory, due to the complementing roles users and vendors play, which are equivalent in both processes: it is the vendors' task to provide for the technical knowledge and expertise. Users, in turn, contribute their specific knowledge about their requirements and environments, respectively.

These complementing roles imply that communication between the two parties is crucial in both processes. The 'technology-centric' view of the vendors needs to be aligned with the organisational and technical requirements of the users, a process that has to happen during implementation and standardisation, albeit with somewhat different foci. During implementation vendors need to gain a good understanding of the particularities of the context within which an innovation is to be implemented. Consequently, an active learning process has to take place on the side of the vendor. In standardisation users need to generalise and align their specific requirements which can then contributed to the process. This is rather more a teaching process with the users assuming the active role. Still, the underlying common need for communication remains.

Another aspect of standardisation should not be forgotten either: not only will technological specifications be done in the committees, but other factors that may shape technology will be channelled into the work groups of the international standards setting bodies as well. The respective corporate environments of the committee members' employers, for instance, will play a major role in this context. The different visions of how a technology should be used, and the ideas how this can be achieved are both formed by these local environments. They will exert a significant impact on the work of the committees, thus preceding, and possibly complementing the local implementation context as a major source of influence. This holds especially in the case of anticipatory standards, which specify new services from scratch, and thus offer the opportunity to incorporate the particular characteristics of the originating committee to some degree. In a more extreme case, work within the committees may even anticipate innovations that would otherwise result from a local implementation. This may, for instance, happen if a strong user representative succeeds in promoting the particularities of his local environment as the basis for a standard. Yet, reactive standards will likewise transpose the environment from which they emerged; this will typically be the corporate environment of the inventor who specified the system upon which the standard will be based. Thus, his visions will implicitly be embodied in the standard specification. Again, the correspondence between implementation and standardisation is obvious, only in this case it is the vendor's environment that shapes the standard. It therefore comes as a surprise that this close relation between standardisation processes and innovations has so far been largely ignored.

Related to these observations, although on a personal rather than organisational level, we note that the processes leading to both, technical design and technical standards are typically developed by engineers, who in many cases lack an understanding of the non-technical components that need to be considered for both, designs and standards. The accordingly rather 'technology-centric' outcome of both processes has frequently been criticised.

We can now identify two distinct activities which have a major impact on innovations, namely the work done within the standards committees and the actual implementation itself. As we have seen, these activities are not unrelated; even implementations of individual, customised systems are likely to include standards-based components. Thus, standardisation will always influence innovations, either:

- directly, e.g. if an implementation is done via integration and configuration of standards-based components, or
- indirectly, in case of a customised solution comprising some standard elements being implemented, or
- as the actual locus of innovations.

This observation suggests that the term 'standardisation' has to be introduced into the innovation equation:

Innovation = Standardisation + Design + Implementation (see also Fig. 1).

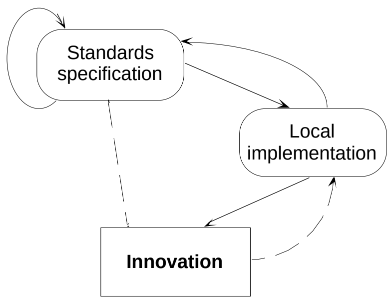

Figure 1: Processes Contributing to a User-Side Innovation

In fact, given the large number of standardised components available, every innovation in the IT sector will in part be influenced by standardisation. This, in turn, suggests that a *meaningful* user representation on the standards setting bodies is essential, particularly to convey requirements.

4 The Context-Specific Nature of User Requirements

The contribution of specific knowledge regarding the characteristics of the respective implementation environment represents the major role users have to play during an implementation process. That is, they have to feed their intimate knowledge of local particularities, which nobody else can possibly possess, into this process. In standards setting, users are typically assigned an equivalent task, again to optimally exploit their unique knowledge. For standardisation purposes, this knowledge ideally takes the form of functional requirements, which then establish the basis from which standards can be developed.

Yet, in most cases specific functional requirements are not normally available at the beginning of a standardisation project. If users are not in the position to contribute requirements, the standards setting process will not benefit very much from their participation. We may conclude that in such cases it will make little, if any, difference whether or not user representatives participate in the process, since they could only assume the role of technical experts - rather than that of a contributor of requirements.

Moreover, 'requirements' is a very broad term, that not only refers to the technical domain, but is also closely linked to the particularities of the respective local environment. Very specific requirements and processes are most likely to have been developed by a company over time. These, in turn, stand in the way of a straightforward installation of an IT system. It is here where long-standing, time-honoured traditions characterise the environment, and where technical systems as well as production and business processes have been designed to optimally meet the demands of their specific environment. A new system to be implemented here will have to be customised to a similar degree as have been the other artefacts in this environment.

Accordingly, contributing only functional and technical requirements does not suffice. Rather, organisational and other non-technical needs have to be considered, and user representatives need to be in a position to identify these needs. Thus, it does not make too much sense for users to send only technical people to the committees. Rather, corporate strategists and managers also need to get involved, to make sure that the non-technical issues are adequately covered as well.

However, given the huge variety of business sectors, organisational forms and business philosophies, the many different intra- and inter-organisational interdependencies, and all the differences that come with varying company, not to mention regional or national differences in culture and legislation it is most unlikely that coherent requirements will ever materialise, apart from some very generic ones.

That is, thanks to this context-specific – and thus very diverse – nature of most user requirements in standardisation an increased number of users is not a desirable goal per se. Instead, ways need to be found to achieve meaningful user representation. 'Meaningful' here refers to the requirement that users representatives should be knowledgeable, have a clear mandate from a user community committed to the emerging standard, and that they should represent this community (as opposed to representing just their employer).

5 Conclusions

Accepting that standards – like technology – are influenced by the respective environment from which they emerge implies the need to have a closer look at the processes that eventually lead to international standards. On the one hand, lessons that have been learned from innovation studies may be applied to the standards setting process, which should eventually contribute to a better understanding of this process. On the other hand, playing a more pro-active role in standardisation will help users to improve their potential for innovation through standards more heavily influenced by their specific requirements.

However, if users are not (yet) in the position to contribute requirements, the standards setting process will not benefit very much from their participation. Therefore, we may conclude that in this case it will make little, if any, difference whether or not user representatives participate in the process, since they can only assume the role of technical experts – rather than that of a contributor of requirements – many of whom will be on the committee anyway (representing vendors). It follows from the above that this situation may easily occur in case of 'infrastructural' technologies, where users do not see any business incentive to contribute to standards setting. This additional lack of incentive comes on top of the reluctance caused by the general perception of the standardisation process as slow, inefficient, costly and yielding uncertain results.

The generally accepted principal role for user representatives in standards setting is to provide real-world requirements. Yet, in most cases specific functional requirements – which can only result from previous experience with at least a signaller system – are not normally available at the beginning of a standardisation project. Consequently, unconditional user participation in standardisation is not a desirable goal per se, thanks to the largely context-specific – and thus very diverse – requirements that are to be expected. Instead, ways need to be found to achieve meaningful user representation.

Given the huge variety of business sectors, organisational forms and business philosophies, the many different intra- and inter-organisational interdependencies, and all the differences that come with varying company sizes, not to mention regional or national differences in culture and legislation it is most unlikely that coherent requirements will ever materialise, apart from some very generic ones. Moreover, representatives of user companies do not necessarily see themselves as user envoys in general; rather, they are representing their respective employers. Therefore, there is a need for a mechanism to align the various requirements.

These considerations suggest that users should seek representation through a dedicated body (a 'user coalition'), responsible for voicing its stakeholders' needs and concerns in the appropriate standards committees. Great care needs to be taken to ensure that such a body actually represents as broad a variety of users as possible, of all sizes and from all sectors, rather than acting as something similar to, say, a trade association representing only a single market sector. This broad market coverage is crucial for several reasons. For example, even basic requirements will differ between SMEs and large enterprises.

There is also an economic dimension to this way of user representation, in that it offers the almost only realistic chance for those user companies which cannot afford direct participation to have their requirements filed with standards committees. Again, this holds particularly for SMEs, almost all of which currently stay clear of any standardisation-related activities. Finally, it will serve to reassure other committee members (i.e. representatives from vendor companies) that indeed a broad base of users is represented. Clearly, the alignment of requirements has to take place prior to actual standardisation to enable the user community to file an agreed set of requirements, and to speak with one voice, rather than engage in turf-wars during the actual standards setting process.

The observations above should trigger some further thoughts regarding the general desirability of direct user participation in standards setting, and indeed on the overall structure of this process.

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