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ICT Standards Development – Finding the Best Platform

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1 Some Background

These days, a web of SDOs (Standards Developing Organisations) operate at various geographical level. These include, for example, ISO[1] and ITU[2] at the global level, ETSI[3] at the regional level, and the national bodies issue what is commonly referred to as 'de-jure' standards – although none of their standards have any regulatory power[4]. Likewise, a plethora of industry fora and consortia (a recent survey found more than 350 [1]), such as, e.g., the World Wide Web Consortium (W3C), the Organization for the Advancement of Structured Information Standards (OASIS), or the Open Group, to name but a few of the longer standing ones, produce so-called 'de-facto' standards. In addition, one may also distinguish between voluntary, regulatory, pro-active, re-active, public, industry, and proprietary standards; this list is by no means exhaustive.

As a result, there exists an almost impenetrable maze of what is generally referred to as 'standards', ranging from company specific rules, over regional and national regulations, up to globally accepted norms. As Andrew Tanenbaum put it: "The nice thing about standards is that there are so many to choose from."

This highly complex structure implies that organisations wishing to become active in standards setting (for whichever reason) need to consider their options very carefully. For one, pros and cons of joining the standardisation bandwagon vs trying to push a proprietary solution need to be taken into account. Standards based products or services may imply price wars and lower revenues, but may also open new markets and widen the customer base. Offering a proprietary solution may

[1] The International Organization for Standardization.

[2] The International Telecommunication Union.

[3] European Telecommunications Standards Institute.

[4] It should be noted, however, that references to standards in EU Directives, for example, well may give them quasi-regulatory status.

yield (or keep, rather) a loyal customer base, but may also result in a technological lock-in and, eventually, marginalisation.

Once having decided to go for a standard, a firm normally wants to make sure that the 'right' standard emerges. Yet, different companies may well have very different views here, largely depending on factors such as, e.g., their respective own technological base, corporate strategies, business models, etc. These also determine the level of involvement in standards setting, and also the best platform for doing so.

The reminder of the paper is organised as follows: chapter 3 introduces an approach towards a classification of SSBs. The market for standards is discussed in more detail chapter 3. Finally, chapter 4 provides some concluding remarks.

2 Classifying Standards Setting Bodies

SSBs can be categorised according to very different criteria. The most popular, albeit not particularly helpful distinction is between formal SDOs and consortia. Typically, the former are said to be slow, compromise-laden, and in most cases not able to deliver on time what the market really needs. In fact, originally the formation of consortia was seen as one way of avoiding the allegedly cumbersome processes of the SDOs, and to deliver much needed standards on time and on budget. Consortia have been widely perceived as being more adaptable to a changing environment, able to enlist highly motivated and thus effective staff, and to have leaner and more efficient processes.

However, it is safe to say that this classification, including the over-simplifying associated attributes, are not particularly helpful for organisations who want to get a better idea of what the market for standards has to offer. This holds all the more as an organisation's requirements on an SSB very much depend on a combination of factors specific to this particular organisation. Accordingly, a more flexible approach towards classification was adopted. Rather than predefining certain categories, a set of attributes has been identified that can be applied to describe SSBs. This description can than be matched onto an organisation's requirements on SSBs, thus allowing companies to identify those SSBs that best meet their specific needs. These attributes fall into the four categories 'General', 'Membership', 'Standards setting process', and 'Output'. The attributes associated with each of these categories will be discussed below.

2.1 'General' Attributes

These attributes serve to provide some high-level information about the working environment an SSB has defined for itself. The form of governance chosen, for instance, provides information about which body, and who, is making the ultimate decisions, which in turn may help reveal the level of transparency in the SSB's decision making process.

Finance and staffing are important for an evaluation of an SSB's ability to survive. These are also valuable indicators for the commitment of the SSB's

(leading) members – if they are prepared to invest (heavily) into its activities they are also likely to try and make sure that the objectives are met.

The IPR policy adopted may have significant impact on the attractiveness of an SSB to holders of relevant IPR. An SSB needs to find a reasonable balance here – the policy must neither deter IPR holders (who may be afraid of loosing valuable assets) nor potential users (who may be afraid of implementing a standard with high licensing fees attached to it). Thus, this policy may also have implications on the level of openness envisaged by the SSB.

The latter also holds for the number and types of an SSB's liaisons. They are a good indicator of an SSB's openness towards relevant work done elsewhere. Moreover, liaisons are one means of co-ordination (see above), thus at least somewhat reducing the risk of standardising on a technology that is at odds with other standards.

The level of competition an SSB faces indicates one aspect of the risk to be associated with going for its standards, with a high level suggesting a high risk of eventually being stranded with a loosing technology. Conversely, a 'monopoly' situation may indicate a reasonably safe bet.

Along similar lines, a good reputation of an SSB (albeit possibly somewhat hard to quantify) may suggest higher chances of its output to succeed in the market (see chapter 5 for a more detailed discussion relating to this aspect).

2.2 'Membership' Attributes

Information on the membership base of an SSB are relevant with respect to the level of its openness, and its decision making process (both formal and informal). A small number of hand-picked members, for instance, or membership levels with very different associated fees and rights suggest the idea of a rather more closed group of decision-makers (possibly despite a huge overall membership base). Likewise, it may reveal an SSB's support of the needs of a specific clientele (e.g., large manufacturers).

The overall number of members serves as a very rough first indication of the success factors of an SSB's output. A broad membership base may provide valuable support for a standard.

More important than the number of members, however, is the 'quality' of the membership. That is, an SSB's chances of being successful in the market are much better if large potential users and major vendors/manufacturers or service providers are among its members, and thus likely to support its output. In addition, the level of membership of these companies is of interest – it indicates whether they are only interested in e.g., intelligence gathering, or if they want to play an active role in the standardisation process, and in the SSB in general.

Who is actually working actively in an SSB is probably even more important. A company's active participation in an SSB's standards setting process is a very good indicator of this company's support of the SSB's standards setting activities.

Finally, the individual member representatives may be supposed to act as corporate representatives, or in an individual capacity. In the latter case the points listed above may become slightly less relevant, as it is not necessarily ensured that WG members actually represent the corporate goals of their respective employers.

2.3 'Standards Setting Process' Attributes

An SSB's standards setting process not only reflects its ability to quickly adapt to a changing environment and newly emerging requirements, to meet a window of opportunity, or to support real-world implementations. It also shows the level of 'democracy' considered desirable by the SSB, and again, whether or not certain stakeholders are more equal than others. A high a level of 'democracy', in turn, may be attractive for some stakeholders, but a deterrent for others.

'Time' is a crucial factor for many standards setting initiatives. That is, on most cases standardisation should be at least in sync with the technical development[5], maybe even ahead of it. Certainly, lagging behind for too long will make a standard irrelevant for most purposes. In fact, 'shorter time to market' has always been one of the major arguments in favour of consortia. In addition, meeting a window of opportunity is a crucial success factor for a potential standard. Accordingly, the time it takes from submission of a proposal to form a working group to address a specific topic until the final acceptance of the standard is an important factor. This time span, in turn, comprises three elements:

- the time it takes to establish a working group,
- the time it takes this WG to do the work, and
- the time for the final ballot.

Obviously, this depends very much on, for example, the level of consensus sought, and on the decision mechanisms adopted by the respective SSB.

That is, there are other aspects of an SSB's standards setting process that may be of interest to potential proposers, which may have a negative impact on a process' duration, and which need to be addressed as well. Particularly, these include the degree of openness of a standards setting process, its transparency, the required level of consensus, and the observation of due process.

Basically, these attributes describe the level of 'democracy' observed by a standards setting process. Are the elements of the process, the decisions taken, and the reasons for these decisions well documented and available? Does everyone have the right to speak, and to be listened to? Is there a way to appeal against a decision, and how does it work? Which level of consensus is required (e.g., at working group level, at membership level)? In many cases, it will be necessary to balance the requirement for speed and the need for a broad consensus.

In many instances a standards setting process should not stop once a standard has been described on paper. Other aspects may at least be as important as a base standard. Most prominently, these include the availability of interoperable implementations of a standard, and proof of an implementation's conformance with the standard. Whether or not an SSB's process requires the former, or if the SSB provides for the latter, may well be important aspects to be considered.

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[5] This does not necessarily hold for infrastructural technologies (such as, e.g., ISDN), where getting everything right the first time is more important than speed (see e.g., [2], [3]).

2.4 'Output' Attributes

Finally, the types of deliverables produced also give an indication about an SSB's flexibility. For instance, full-blown formal standards emerge through a lengthy, consensus-based process, whereas technical reports or similar types of deliverables suggest a faster, more adaptable process with a lower level of consensus. Information about the number of implementations shows the relative 'importance' of an SSB, as does, to a certain level, the fact that it is accepted PAS submitter to ISO. The latter also indicates an SSB's willingness to meet the associated requirements on its process. A standard that is maintained, and possibly developed, over time suggests that it is envisaged to be long-lived, and also says something about the SSB's willingness to adapt its deliverables to changing environments.

In order to improve a standard's chances of success in the market it will help if it originated from a well accepted source. The number of implementations of other standards from an SSB may serve as one indicator of this SSB's 'credibility'. In some instances, it may be of interest whether of not an SSB maintains its standards, or whether it has adopted a 'fire and forget' approach. A standard's maintenance will need to cover, for example, the addition of technical corrigenda, of addenda covering additional functionality, and maybe eventually the release of a follow-up version of a standard. In each of these cases, backward-compatibility has to be ensured. A well-managed maintenance process is extremely helpful if longevity and adaptability of a standard are or concern.

Along similar lines – an SSB should make sure that a new standard does not contradict other, established ones. At the least it should have a mechanism in place to ensure consistency of its own standards, ideally this should extend to all standards (although this will be next to impossible to achieve).

3 The Market for Standards

The setting of standards is based on supply and demand. The 'supply side' of standards, the SSBs, tries to meet the requirements of the 'demand side', i.e., the standards users or, more generally, the market.

As the requirements of the market change, the 'supply side' needs to adapt to these changing requirements. To this end, new forms of SSBs as well as new SSBs have emerged at a sometimes alarming speed (see e.g., [4]). Likewise, the individual bodies have adapted the products and services they offer. These adaptations will be discussed in the following sections.

3.1 The Network of Standards Setting Bodies

Over the last three decades, the proliferation of SSBs has lead to an extremely complex situation in the market for standards in the ICT sector (see Figure 1).

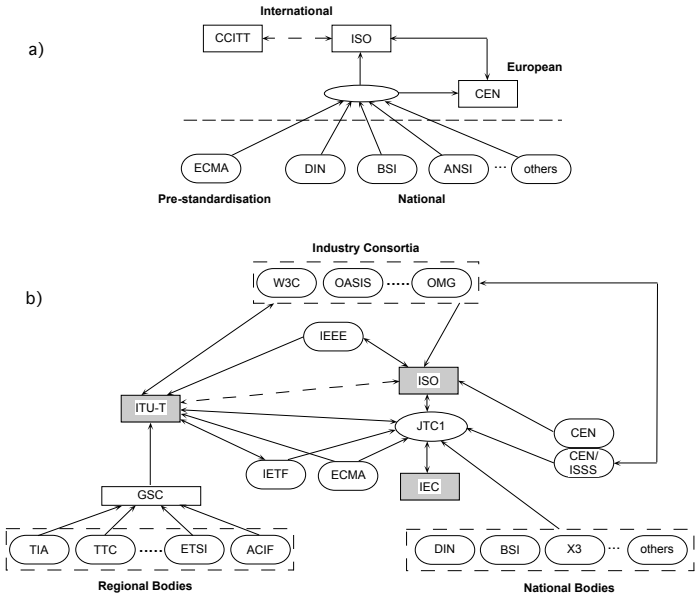

Figure 1: The ICT standardisation universe today (excerpt; adapted from [5])
a) in the seventies; b) today[6].

Two major aspects of today's standardisation are a direct result of this highly complex structure.

- Fragmentation and overlap
  With few exceptions there is no such thing as a one-stop-shop for a new standards-setting activity. Typically, several SSBs are active in similar and overlapping domains. As a result, there may well be competition either generally between SSBs covering similar ground (Rosetta-Net and ebXML would be an example here), or temporarily between SSBs working on similar projects (e.g., the IEEE 802.11a/b/g standards and ETSI's HIPERLAN/2). Consequently, there is an urgent
- Need for co-ordination
  Given the diversity of SSBs, this is extremely difficult to achieve.
  - A high level of co-ordination exists for the SDOs (ISO, CEN, national bodies; to avoid inconsistencies and contradictions between international/regional/ national standards).
  - The Global Standards Collaboration (GSC) represents a different approach – GSC provides for the regular exchange of work programmes and other information between its members, the regional Telecommunication standards bodies and the ITU.

[6] Please note that neither does this figure show all relevant SSBs, nor all links that exist between individual SSBs (which may change over time anyway).

- ETSI Partnership Projects represent a related approach to co-ordination. Covering both SDOs and consortia, such projects co-ordinate a group of regional SDOs and industry consortia working towards a common objective. The '3rd Generation Partnership Project' (3GPP) is the most prominent example.
- In most other cases in which co-ordination is attempted a liaison is the instrument of choice. However, being a fairly loose mechanism this is not a particularly effective means to avoid overlap – such statements do not necessarily go into great technical detail.

Finally, co-ordination of the activities of different consortia active in similar/overlapping areas is not always desired; some consortia were primarily established in the market to compete with others.

3.2 The Users of Standards

Individual companies are interested in standards setting for very different reasons. Their interests are largely determined by various factors, including, for example, strategic technological needs, respective business models, market positions, etc. In principle, all organisations use standards, albeit in different ways.

- Direct users of standards incorporate standards into the ICT systems they are building and selling, or into the services they offer.
- Indirect users of standards use these standards-based systems and services.

Unfortunately, the boundary between 'direct' and 'indirect' is increasingly blurred, as more and more formerly indirect users turn towards selling ICT systems. The automotive industry is a case in point – modern cars are equipped with complex electronic systems communicating via 'Car Area Networks'.

For a more helpful classification of standards users we need to look at the stakeholders' motivations for an active participation in the standards setting process in order to be able to analyse SSBs' capability to cater for actual market needs. This motivation is not necessarily related to an organisation's status as a direct or an indirect user of standards.

The respective levels of companies' interest to get involved in a standards setting activity will differ widely. For some, the nature of a standard, or even the fact that a new standard will materialise, may be a matter of life or death. For others, an emerging new standard may be of rather more academic interest.

Therefore, the following sections will introduce a categorisation by their respective motivations to actively participate in standards setting, and for joining – or maybe even establishing – an SSB (this has been adapted from [6]).

3.2.1 Leaders

These are companies for which participation in a certain standards-setting activity is critical. They may even create a new consortium to establish a platform for the standardisation work they consider crucial. They are prepared to make a large investment in such an activity. For these companies, the strategic price of not

participating in a given standards effort can far outweigh its costs. 'Leaders' aim to control the strategy and direction of a consortium, rather than to merely participate in its activities. Large vendors, manufacturers, and service providers are typical representatives of this class.

The decision whether or to join an existing SDO or consortium (the latter preferably as a founding member; in most cases founding members have a greater say concerning the goals and strategies of a consortium), as opposed to founding one, Leaders specifically need to analyse an SSB's governance – does it provide for the level of influence they want to exercise? Or is a strong group with incompatible goals already well established, and likely to block any new activities? Also, the IPR policy is of crucial importance – with too lenient a policy many important players may be hesitant to join, a too restrictive policy may prevent users from adopting any standards of this SSB.

In addition, Leaders will need to carefully analyse several characteristics of an SSB they are considering to join, and match them to their strategic goals. The most important of these characteristics are summarised in Table 1 below.

Table 1: Leaders' criteria

Strategic Goals	Most important SSB characteristics
To create a (successful) standard	*Governance:* Does it provide for strong influence of interested players? Or is it rather more 'egalitarian'? *Finance:* Are finances sound? Will the SSB have the stamina to survive the process? Does it depend heavily on individual entities/contributors? *IPR policy:* Is the IPR available inside the SSB adequate, or is licensing of third-party IPR necessary? *Reputation:* Is the SSB well respected in the area in question? *Membership:* Are there potential allies/ opponents? Is adequate technical expertise available, at both corporate and individual level? *Key players involved?:* Is the combined market power adequate? Are relevant stakeholders represented? Are important stakeholders absent? *Timing:* How long will it take to develop a standard? Will the window of opportunity be met? *Process characteristics:* Can the process be used against me; e.g., to delay the standard? For how long? What are the decision mechanisms? *Products:* Does the SSB offer an appropriate type of deliverable? *Dissemination:* Will the specifications (and possibly reference implementations) be available for free?
In addition: to create a market	*IPR policy*: Will the IPR policy eventually put-off users who are afraid of high licensing fees? Will it deter holders of important IPR from joining? *Competition*: Are there competing consortia? Are competitors likely to emerge, or are all relevant players members? *Membership levels*: does the highest membership level available guarantee the necessary level of influence? Who else is at this level? Are leading users represented in the 'upper' levels? *Key players involved*?: Who are the active players, and which roles do

	their representatives assume (individual capacity / company rep)? Are the 'right' companies represented? Are all relevant stakeholders represented? Are leading users on board? Are any key players missing? Is the combined market power adequate?

3.2.2 Adopters

Such companies less interested in influencing strategic direction and goals of the consortium. Adopters are more interested in participation than influence (although they may want to influence individual standards). Large users, SME vendors and manufacturers are typically found here.

Table 2: Adopters' criteria

Strategic Goals	Most important SSB characteristics
To influence standard development	*Governance:* does it provide for strong influence of interested players? Or is it rather more 'egalitarian'? *Membership:* Is a membership level available that provides for adequate influence? Who else is at this level? Who are the 'active' members? *Key players involved?:* Are the important players on board? Who are potential strong opponents or allies? *Individuals' capacity:* Do I need to know the individual reps and their views, and the roles they are likely to assume? *Required level of consensus:* Is it possible to exploit the consensus requirement in order to delay the process or to cripple the outcome?
To share development costs	*Membership:* Are enough (important) members with similar interests on board, at an adequate membership level (to indicate sufficient interest)?
To gather specific early intelligence	*Membership:* Is a level available that offers a good RoI; i.e. one that does gives access to all relevant information without costing a fortune

3.3.3 Observers

Such companies main motivation for participation is intelligence gathering; they don't want to invest any significant resources in the effort. Typically, this group comprises, for instance, academics, consultants and system integrators.

Many companies and individuals will have the desire to know what an SSB is working on but will not be interested – or will not have the means – to actively participate in any form. That is, their main interest lies in the gathering of general knowledge (Table 3; important, for instance, for consultants).

Table 3: Observes' criteria

Strategic Goals	Most important SSB characteristics
To gather intelligence	*Membership*: Is a level available that offers a good RoI; i.e. one that does gives access to all relevant information without costing a fortune?

4 Summary and Conclusions

This paper's aim was to provide some guidance for companies wishing to become active in ICT / e-business standards setting. To this end, a method has been presented to describe an SSB in such a way that its suitability as platform for a new standards-setting becomes immediately apparent. That is, this method can be applied by a potential standards-setter to identify the SSB that will be most suitable for its current needs. Obviously, the result of this exercise will heavily depend on the strategic goals of a company in a given sector. Therefore, a classification scheme for standards users has also been proposed. This scheme takes into account the overall goals of a company, its business model, and its strategies with respect to the sector in question. Taken together, these may require to

- strategically influence the market through standardisation,
- exert tactical influence on a standard,
- observe.

The interpretation of the description of an SSB heavily depends on these goals. For each of the above, a subset of the initial criteria was identified and described. It should be noted here that depending on the goal of a company a criterion may have to be addressed differently. Fort instance, for a company aiming to influence the market through a new standard – without any specific interest in its technical nuts and bolts – a group of influential key players (i.e., 'Leaders') who would also support this standard is essential. On the other hand, for a company wishing to influence the technical content of a standard it will be important not to have any strong potential opponents.

Thus, in order to optimise its standardisation activities a company needs to know its own goals, identify the key players in the sector in question, and apply the described method. This should at east lead to a reasonably good initial idea of which SSB to select for the required standards setting activities.

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