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Studying the interplay between design and diffusion in standard making

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SUMMARY

The central activity in the process of creating IS standards is the creation of an artefact mirroring a problem area. Doing so, one aims to alleviate business communication and ensure consistency in performance of same. This thesis explores the reciprocal relationship between the conceivement, creation and development of IS standards on one hand, and the promulgation and dispersion on the other. Prior standards litterature are recognizing a gap in earlier research between the two. The theoretical reasoning on interdependencies between design and diffusion are anchored with the evidence found in the case scenario. This entails an endeavor in which a new IS standard for business communication is conceived, developed and implemented in a joint venture between a research institute and various actors in the telematics sector. The emerging characteristics of IS standards development call for novel tools to combat increased scope and complexity of standardization procedures. This thesis tries to mitigate the search for such tools through an in depth analysis of how standards design and standards diffusion influence each other. The results show an intimate connection with action, reaction and counteraction in between the two phenomena.

Keywords: standards, standardization, design, diffusion.

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1. Introduction

This paper is part of an ongoing action research project, "Value-creating IT for Road haulage Firms". The work is conducted at Viktoria Research Institute in Gothenburg. Partaking in the project are personnel at the Viktoria Research Institute, and a number of industry representatives admitting to the project (in some cases periodically or even re-entering in one) for the entire scope; five vendors of mobile embedded equipment (including two global actors in the industry of manufacturing heavy trucks) delivering telematic service provider systems (TSP), four systems vendors of applications servicing road haulage firms with transport management systems (TMS) and finally one umbrella organization for road haulage firms with fifteen transport company firms.

Today we have a situation in the road haulage industry with a multitude of actors delivering services using an equal amount of standards dedicated to data transmission and structure. Such a situation is, from a transaction and need for integration point of view, carrying constitutional high cost profile. More so, this state have been prevailing for a considerable period of time in perspective of availability of technology and investments. This is explained by the immaturity of the transport industry as such has some shortcomings as of today when it comes to the usage, maturity and development of IT. This due to the fact that the major part of road haulage firms consists of small bodied organizations. This order is created partly by the relative size of other actors in the transport business such as contractors with the likes of DHL and Schenker. Another factor is the increasing competition from nearby low pricing markets which renders smaller margins for investment. The comparatively minute size conveys a smaller action radius in terms of investment and competence acquisition. This has enabled the larger organizations to dictate the rules to abide by when implementing and utilizing IT systems and standards. They have also been able to postulate directives and consolidate markets or parts of markets, resulting in reactions aimed to endorse the possibilities for appropriation from their in house developed IT systems. Smaller organizations, on the other hand, can react quicker and have a significantly better ability to adapt to environmental change. This difference creates a tension between the roles of the small bodied, flexible fast-paced changing firms and the monolithic actors, burdened by tradition and large organizations inherent inertia. Larger firms historically have exhibited a tendency to use closed interfaces and protocols, maneuvering them in a position to control their smaller peers, subcontractors and customers. This has established an order where the smaller firms repeatedly need to integrate their systems with the larger. Further, tradition plays a significant role to position the transport industry in the lower layers of businesses' information technology maturity. This has led to a situation with a 'hub and spoke'-like construct of TSP vendors versus TMS vendors. The TMS vendors utilize the role of the hub and let the mobile vendors adapt which leaves them in a situation where they need to incorporate several dialects of data conveying protocols in their vocabulary simultaneously. This creates not only a more costly situation for development and integration but increase the loss of specific domain knowledge as new cases are initiated and older projects abandoned. (Andersson & Lindgren 2005, Markus & Steinfeld & Wigand 2006, Hovav et al 2004).

Organizations that benefit greatly from distributed computing expecting increased performance and organizational efficiency will benefit from the research done on standardization. Accrued values will invigorate mobile information technology markets and create novel sub strands providing hitherto unused information and derived services in the industry. Such organizations would be concerned with activities as transport, road haulage and other services requiring high geographic mobility. The two factors of aptness to distributed dynamics and changing complexity in informational flow and computing along with the said low maturity put together creates a potent mix of promise and potential to the prospect of research in this field. As the perspective chosen in the project is that of the road haulage firms among transport firms, the efforts have been focused

upon the creation and improvement of a mobile stationary interface(MSI), mediating the information flow between mobile and stationary, of which a standard for business interaction is an important component, with a protocol dictating the specifics in systems communication as a core essential constituent, aiming to alleviate the development of services made available to the road haulage forms as well as mitigating integration toil between different actors vending software and IT solutions. Vendors generally supply and control all parts including low level data capture hardware and high level analysis software. Therefore, road haulage firms benefit from a strengthening of the IT solutions delivered by this business (Andersson & Lindgren, 2005).

The intentions with this paper is to demonstrate how the conception and creation process of standards and the chain of events covering various modes of technology dispersion and adoption resulting in uniformity through promulgation of artefacts and specifications. Engaging in an examination of phenomenal interplay with far reaching ramifications for standardization procedures in contexts designated by mobility, complex dynamics and continuous structural changes. Described and interwoven are the most central concepts in the key elements' reciprocal interaction from a theoretic and empirical viewpoint. The main characters of said interplay are here referred to as design and diffusion and they will be given attention in a manner that enables the reader to invigorate their understanding of respective concepts, their mutual relations and their roles in the standardization process. Further, the intent is to describe what demands the latter must meet. The emphasis of the described demands expected on a standardized interface will be on conceived future conditions already unfolding at the time of the examination. The study also contributes an examination of factors enhancing the design of an already initiated development process. Enabling possibilities to pay apt attention to the mechanisms that initiate the structural changes in organizations enrolled in the standardization process observing the consequences for the standardization process related to the key elements and central concepts related above as well as acquiring a keen understanding of the technical aspects of development of the artefact and its ramifications for design and diffusion of standards development. The latter was achieved by actively participating in the project. Partaking in the design of the architecture of the core component of the standard itself which is a protocol based on an XML schema (to be described later), and through recording of empiric material and through comprehensive studies of data previously collected. (Markus & Gelinas 2006, Wigand & Steinfeld & Markus 2006, Damsgaard & Truex 2000).

In the development of standards and success of standardizations there are a vast number of factors influencing the unfolding of events. Making a study feasible requires delimitation in order to reduce complexity and encompassment to a level where the quality of acquired knowledge and experiences reaches a position that contributes considerably to contemporary research and as is the case here some force majeure factors are not to be taken into account. Examples of these include lack of risk capital due to extreme financial conditions on a macro level or due to key players or organizations going bankrupt. Business decisions pertaining to issues not ascending from elements being in consideration in decision making on standards and standardization initiations such as market strategies and concerns regarding legislation matters. Admittedly, there have been implementations in similar domains treating largely concurrent data and contextual information. However, as related above, the focal points of this examination concerns creation of standards and standardization which are domain specific in themselves although standards creation and standardization procedures in themselves are not. The particulars of respective domains of mobile and stationary for themselves will not be studied. Focus is only on the intersection of the actor-groups and the business communication conducted here from a social and technical viewpoint.

The structure of this thesis is as follows. First, literature studied on standards and standardization is accounted for. Second, the area of interest is described, attention is directed towards enhancing our

knowledge of the domain. Then we look into what were the specifics; time and place for the study. The manner in which it was studied and examined is detailed. Third is described how data was collected from the project and analyzed. The role the author played in the process and possible effects thereof. Then problems and challenges are recaptured and empirical findings and results are presented. Finally; thoughts and organizational structures conveying the essence of the authors reasoning are depicted and conclusions are drawn. Future possible implications visible at the time of writing are described at the end.

2. Theoretical background

2.1. Literature review

The literature review should give a summary of and a background to the collected knowledge in the research area chosen. This will help the author to formulate the problem or to prove the importance of the problem that has been given. The review is also able to give the author different alternatives to parse a problem. The literature review investigates the conscious and unconscious ideas of earlier scholars. It has been an ongoing process throughout the project. In my efforts to understand the inner workings of the project and study standardization processes in general I contrived some embryonic ideas. These theoretic implications laid the foundations of a mindset possessed scouring the literature on standards. As time progressed it became apparent that some initial thoughts had to be revised and that some articles had to be reread with a different approach. Literature and data collection have been deliberately bereft of interaction or kept to a minimum, so as to preserve the open mindedness in interpretation and assumptions. This has rendered an iterative process in the data collection where modification of the thought paths have been predominant. The earlier mentioned revised initial thoughts is an expression of this. In the start up phase, a search of literature on standards and standardization was done. A structured survey of the collected articles was made, illuminated by the strategic alignment previously construed in the efforts to understand the case scenario. The sources include some thirty publications from various journals and referenced literature in the articles found. Articles and papers were selected from a host of journals and conferences as detailed in appendix 1.

2.1.1. Literature table

Corollary tangibles originating from above related examination was compiled and condensated into figure one, a spreadsheet grouped according to theoretical implications. This is an attempt for categorization of earlier research and positioning same likewise establishing origins and relational concepts laying the basis for this analysis. Clearly distinguishing what questions need addressing and which areas of knowledge contemporary literature covers on standards and standardization in IS research. This enables us to elucidate phenomenon devoid of abstract accounting for them. Hence the choice of research subject for this essay was originally conceived through the preliminary stages of this analysis. Further, as future implications in said research mitigates the deductively construed analysis the sum of standards studies encompassment decidedly needs reinforcement. Referring to the table it is effortless to discover how the standards research can be coarsely grouped into conceivement phase, design phase and diffusion phase. This partitioning and the adherent need for integration have previously been observed by the first two examples of design/diffusion literature but their analysis ends there as will be detailed later on in this essay. Also worth noting in this arrangement is that all three portions of standards research are still actively developed by researchers judging by the year of publication on the papers. This only emphasizes the need for integration and broadening of perspectives. On the focal areas and models used compilation it is obvious that there exists a multitude of tools to further analyze and juxtapose the findings in this essay in the future (see future implications section). The core points presented below are all phenomenon that have contributed substantially to the analysis in this essay. They have provided a base for my reasoning which is described from section 2.3 and onward.

Research	Focal areas, models used	Core points	Standardization Phase
Brunsson 2000.	Norms, directives and standards.	Increasing demand for standards. Processes that create uniformity.	Concievement
West 2003. Pember 2006.	Defining standards and standardization.	Standards taxonomy and types. Definition of standards/standardization research areas.	Concievement
Fomin & Kiel 1999.	Economic and Social theories.	Analysis of how strategizing, sense making and negotiation jointly explain emergence and success of technical standards.	Design
Spring Et Al 1999.	Formal standardization. Human dimensions of standards development.	Consensus versus speed. Importance of a standards taxonomy.	Design
Lee & Oh 2005.	ANT. Research streams; standardization or corporate strategies.	Standardization is alliance building. Integration of technical and social systems. Benefits of standards increase with scale.	Design
Hanseth et al 2006	Actor-Network Theory. Reflexivity.	Huge installed base creates severely complex environments. Traditional standardization cannot deal with extreme complexity.	Design
Hovav Et al 2004.	Diffusion of innovation. Internet Standards Adoption (ISA).	Voluntary adherence to open protocols standards success factor. Benefit is measured in number of adopters. Openness mitigates diffusion.	Diffusion
West 2003.	Intellectual Property Rights.	Switching costs. Adoption vs appropriability. Sharing vs returns. Ramifications of open standards.	Diffusion
Yoo & Lyytinen & Yang 2005.	Actor-Network Theory.	The role of standards in shaping actor networks. Sustaining path-dependencies. Business and technical innovation alike.	Diffusion
Wigand, Steinfeld, Markus 2006.	Vertical and generic standards.	Standards as a means to endorse equity. Lock in vs structural change. Voluntary waiving appropriability.	Diffusion
Fomin & Keil & Lyytinen 2003.	Simon's theory of design. Weick's sense-making. ANT. D-S-N-model.	Recursion and backtracking. Social and community depandant nature. Traditional standardizing cannot cope with increasing complexity.	Design/Diffusion
Markus & Gelinas 2006	Methodology lenses.	Standard theory lacks integration between development and adoption sides. Emergent and formal design perspectives.	Design/Diffusion
Aronsson 2006	Design and diffusion interplay. Indicated simultaneous implementation and creation.	Synchronous development of events in creation and adoption. Interwoven interdependant design and diffusion.	Design/Diffusion

2.2. IS

Clearly describing standards and standardization in theory and practice calls for an examination of its theoretical origins as well as delineating and clarifying the phenomenon. IS resides somewhere between natural science and social science. It finds it's place here due to the fact that mankind have created computer systems to meet our needs and demands. Along with the creation arise the want for knowledge about the artefact's we have brought into the world. The satisfaction of these demands and needs have not saturated them, instead the development of novel technology have willingly increased same. This leads to an even broader desire for knowledge concerning man's achievement. The focal issue for IS are the artefact's; something created by human hands. This procedure of human crafting resulting in development of an information processing product mediating human doings in biological, cognitive and social dimensions. In essence, it is an activity devoted to technology and technological achievements. Beheld in this perspective IS appears closely cognate with natural science but also something created by humans, and therefore social science. IS possesses a social and community dependent nature. It is a process of sense making and interpreting, of social interaction. Thus, IS ends up somewhere in no mans land between the technical and the social domains. A distinction to be made observing contemporary science is that the laws of nature appears to be inert, at least from what we can make out of them studying mainstream science and disregarding any unproven theories or speculations. This is not the case with IS. Collating with social science in general and social scientists in particular, the systems in themselves are not regarded as an integral part of reality at the same extent as an IS researcher does. In addition, technology affects people profoundly. This reasoning enables us to discriminate social science and IS. A salient characteristic of IS is its tendency to change. This can be expressed, somewhat paradoxically as one of few constants in IS. Reality is in constant flux and so is the focal objects of interests in IS as IS is concerned with the study of same (Orlikowski & Iacono 2001, Baskerville 2002, Fomin et al 2003).

2.3. Standards theory

As IS is a novel science with all the ramifications this confers, even more so is research on standards. Given that standards research is a subset of IS this is not surprising, the statement although in context is efficacious in characterizing and narrowing down the area to be studied in this essay. Furthermore, exposing the transitively delineated common denominators of the two can emphasize and enhance the understanding of the impetus innate to standards theory and research. Duly, the correlation stretches further than this; change is a constant factor in IS research and the same applies to standards research. Change being a fundamental constituent of any process as the word itself is defined; "a series of actions, changes or functions bringing about a result" (dictionary.com), and standardization being such in which striving for conformity is central, albeit a continuing process never reaching completion, thus ensuring change as the omnipresent constant. Studying standards predominantly consists of examining standardization procedures as the finished product rarely tells us as much about its origin and organizational construction as does the procedure of its creation. The development is at least held to be a vital source of knowledge. As related above, inherent characteristics of the area of interest in this essay in the very nature a process of reordering to mirror the part of reality it is functioning in (Lee, Oh 2005).

Defining standards theory as a bifurcated phenomenon consisting of emergence and explicitness, standards theory emphasize solutions to matching problems, deliberate design or selection, explicit recording and voluntary compliance. Standards are considered arbitrary solutions or best practice rather than the only way to accomplish goals. Standards theory express desirability of compliance and examines expectations of widespread adoption. Studies of dominant design and network effects appear frequently in the literature. Deliberate acceptance by a group of people and their role in standards creation is arguably the most central concepts in standards theory (Markus & Gelinas 2006).

2.4. Evolution of standardization practices

Establishing a depiction of standardization practices in the past by the traditionalistic methods and in the present. It is by no means an attempt to postulate a chronological order of work practices in standardization procedures, but rather a way to describe how standardization efforts react to the protean conditions and environmental circumstances that dictates standards contrivance modus. Granted, some states and circumstances tend to dominate in later cases and in some cases more clearly than others the more salient complexions of contemporary cases are those referred to as 'present' circumstances. The same applies to what is referred to as 'past'. What are then the present and the past respective characteristics? The past is dominated by an institutionalized thinking and expectations of a fixed start and definitive ending. The aim is to be able to regulate the standard itself, which puts high demands on revising the standard to fit the needs of the fast changing reality. The challenge grows when the scope increases as well. This puts even higher pressure on the mechanisms coping with complexity, since encompassment is more or less linearly dependent with complexity. (Fomin & Keil & Lyytinen 2003, Brunsson et al 2000). Further, during the development of a standard there are different phases. Traditionalistic methods use a 'divide and conquer' approach, trying to make sharp the borders between the identified areas discernible and delimitations in each activity to separate the constituent parts. This is one of the methods available to battle complexity; modularizing. Still, traditionalists strive for universality and generality, and as the aforementioned increasing demands caused by dynamically changing circumstances persist, these are forces in opposition. The rigid structures predominance is in waning. This is reinforced by the organizations mirroring the increased intensity in a reality constantly restructuring, changing and reforming. In addition to this, the centerpiece of top-down generated standards is the stringency. Highest priority for standardization conducted through a top down approach tends to aim to ensure that protocols and data conveyed through arbitrary standard adhering to said paradigm leaves no room for ambiguity. Emerging as a salient characteristic apparent in later enactments endowed with capabilities of conveying meaning. This implies a need for a more pragmatic approach. One that allows for dynamic interaction and let change the forms, dialects and protocols of business interactions in accordance with the organizations that perform them and their volatile environment and roles in same. (Damsgaard & Truex 2000).

2.5. Standards and standardization

When the literature available on standards and standardization today is studied, several modes of denominating phenomenon coalesces during the investigation of the alliance building process also known as standardization. One take on standards describes how they are created and the different approaches used in the process of development of the artefact itself. This process is referred to as standards creation, or development, or, as prevalent in this paper, design. Treated here as all activities concerning the idea on how to solve a problem consisting of an clearly pronounced want for uniformity among a group of people with the perceived goal to rectify the situation through design of a technical artefact with optional regulations surrounding same documented in print or established best practices.

Standards are akin to norms and directives. Norms differ from standards in the way that they can be followed without conscious thoughts. Norms appear to individuals to be self evident and non-problematic. From the perspective of an individual person, norms existence materialize upon violation of behavior stipulated by same. For instance, be it customary to shake hands when two people meet, a contact devoid of said action will have profound effects on that situation. Theoretically, norms are voluntary, but not in practice where it may be neigh impossible to indulge a behavior that is in conflict with arbitrary norm pertaining to a particular situation. Would be that any situation is devoid of social pressure, the normative aspect of same is forfeit. Switching focus to

directives they are not voluntary by nature. This is the key difference between norms and directives. Directives are issued by an authority and mandatory by nature. A prerequisite for being compulsory is correspondence to a specific group albeit this in contrast may be voluntary. Hence, it is possible for a directive to be voluntary to some groups of individuals while still exacting authority towards other groups. Hence, waiving group membership equals directive violation. Establishment commanders support directives issuing of sanctions. Standards, on the other hand do not carry the authorization of organizational leaders. Leadership is instead based on voluntariness and desire for group affiliation which is equivalent with compatibility and conformance on technical solutions. Another important difference between norms and standards is that norms lacks a clear source. Standards have behind them formal authorities, consortia or de facto conditions (I.E. They have reached a critical mass of installed base). Standards sources manifest themselves in artefacts, epitomizing the regulatory expressions of their advocates. The artefacts appear as protocols, prescriptions and rules. Conveyed in part or intermediated wholly by these manifestations there is also an explicitness about standards, absent in norms. Expressing this commonly do artefact's and documentation available for public access. Standards can be said to have a conceptual resemblance with a recipe or an advice (Brunsson 2000).

Also pertaining as declared above the research as a labor of construing the actual state of worldly phenomena. Analogously there are a social aspect and one adhering to the area of natural science. The later concerned merely with the creation of the artefact, rigorously examining the full length (full from a temporal aspect viewpoint still not including any social elements in the analysis) of the process exacted as innovation converging into process development through acquiring information, or, rather the existence of information in a certain connection enabling envisionment resulting in a tangible contrivance (Fomin et al 2003).

2.6. Norms connecting with standards

As mentioned on the evolution of standardization practices, arising a standards creation exigency whose countermeasures are greatly desired in order to combat environmental volatility and uncertainty regarding prerequisite presence. Embarking on such a transition bears resemblance of divergence further towards a state where utilization of a formal language becomes increasingly cognate with natural language usage. Further illustration of this transitive alteration of usage and inherent traits becomes feasible through comparing standardization with the emergence of norms, as the mechanisms of norms creating is argued to be a power tool for standards creation. Standardization efforts adapting to the described conditions are accommodated by contributions adroit enough to ameliorate adversities brought on by same. Norms are created through enhanced social interaction with protracted evolutionary revelations in comparison with standards creation where fiscal interests pressure the procedure towards a short-circuiting of the iterations. Norms can be said to possess a inherent impetus capable of combating complexity brought on by the numerous connections and interrelations of everyday social life. As the secured and orderly artificial environment created by man in the information science realms slowly crumbles and is replaced by a novel set of conditions resembling characteristics emanating from the social science (as is a prevalent strong strand in standards research of metaphors like the technical is social pointing to the fact that mirroring social life have been an overshadowing fact all along) standards creation procedures need draw upon these forceful mechanisms to withstand the evolutionary pressure. It is possible to speculate about that drawing on the power of norms creation, as a role model for the 'social impetus' is a component in the holy grail searching for an apparatus capable of bringing the monster of complexity to its knees (Brunsson 2000, Damsgaard & Truex 2000).

It is argued that the bottom-up creation of standards with a procedure allowing individuality and flexibility are to be preferred in standards creation. (Wigand & Steinfeld & Markus 2006) Discusses the need for appliance of vertical standards concept to a broader range of industries. Vertical

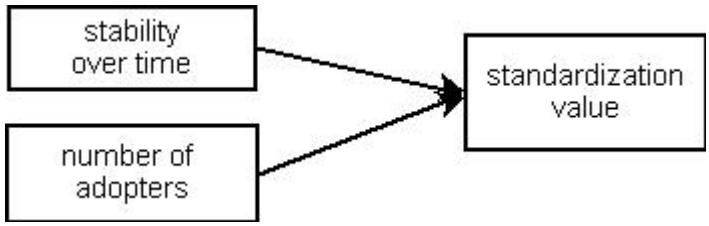
standards are a prescription of data structures and definitions, document formats and business processes for particular industries. The last is what discerns vertical standards from generic which apply to many and being less specific technically. Constantly in flux the responsive vertical standards may come to resemble the natural languages to a greater extent when it comes to behavior and tendency to rearrange over time. These characteristics allow for saturation of the described needs.

Science and the academic world have connections of growing strength to today's professions. Contemporary professional norms are in increasing degree created and instilled at universities by professors and lecturers active in those realms. The industrial applications of research and innovations conceived in the academic world are increasing as is the presence of market economy actors in the universities. This in turn stipulates a more pronounced need for standards. Academics are prone to develop standards and the influence they observe will only enhance the disposition prevalent in the industrial context as expertise and work procedures are improved and adapted to higher levels of abstraction and applied research. This implies that the maturity amongst industry expertise becomes more and more liable to incorporating standards in their business processes, as well as increasingly effectively adapt same to existing embedded standards (Brunsson 2000).

2.7. Markets and standardization

The concept of a standard resembles a modeling activity. Creation of a model depicting reality and alleviating exchange of information in business processes. Thus lubricating already existing processes and mitigating integration hale. This is presented here to point out that there are cases when standards can be instrumental or even a prerequisite for forming of markets. This extrapolates to parts of markets and subsets thereof to the minuscule granularity of services and is a very important aspect in this paper. As will be explained, the readiness among the actors and implementors to comprehend the connection between standards presence in business communication and emergence of new markets and further development of same. Further, the actors and implementors aptitude to appraise the importance of the role standardization plays in business communications. Whence come the originating impetus delivering and demanding novel services bequeathing and enriching customers and providers. As firms and organizations continuously war for appeal and esteem with customer base and potential patrons the similarity between standards and rules is brought into the picture. This is another conceptual analogy connecting the two phenomena pointing at conditions prompting adoption of standards. Rules come into effect as a status enhancer (Brunsson 2000). Boasting group affiliation or taking measures to display abidance to rules incorporated in marketing or sales locution are established tools utilized by companies even in this study.

2.8. Answering what standards are about



Structural metaphors conveying the essence of the author's reasoning depicted in one instance above. The figure attempts to describe the mechanisms behind one of the key incentives present in the conception and creation of standards. What factors are important for the development of the social networks and technical expertise and economic muscle to support stability in a standardization venture and the relations they experience. Be it in a societal context or individual adopters point of view, the switching costs associated with adoption decidedly are to be dwarfed by the promised benefit gained from exchanging behavioral patterns or industrial work procedures to instigate same. Hence, standards is mainly about accruing values. The incentive of standardization initiatives is to gain benefit. How is this benefit measured? Are there solely fiscal values associated with the emergence of new agreements between parts? This depends on the view taken, be it a perspective on a societal level the reasons are always greater growth and stability. In a smaller view, perhaps that of a single firm other reasons come into play such as coercion and social pressure (Wigand & Steinfeld & Marcus 2005), although the underlying factors are always survival. Examining the different groups with involvement in standards and standardization, benefit are the goal but the incentives have differing origins. Market actors admit that their motivations are of economic relevance albeit occasionally obfuscated by proxy arguments as openness and end customer benefit the factual reasons to adopt and develop standards in this group are expectations of economic benefit for the individual actors. Imposing legislative measures are part of a formal standardization procedure. The authorities constituting these standards and regulations contribute to societal benefit. First we take a look at how beneficent the creation of a standard is at the societal

level. Now, to be able to measure success in a simple way easily conceived there are quality in number of current and potential adopters. As diffusion proliferates in organizations and amongst individuals uniformity starts to establish itself and the generated values increases. The other measurable value is stability. Stability in the sense that is not only existent but something actually used over a longer period of time in business interactions. The longer the period, the greater the stability. Moving on to the individual small perspective granted the promises for an adoption decision will be in relation to the amount of expected benefit at the societal level, but in addition the consequences will be clear when taken into account the considerations of relative advantage to the existing standards used, how compatible versus same and also taking into account the complexity of the new technology. All things in place renders a state of viability to the standard prospect. The third and final major piece in building standards value is the political acceptance. This is the catalytic component providing reinforced stability and further increases the promised rewards due to enhanced usability and compatibility. The result is a fully fledged standard in a state dubbed embedded (FIG 2). (Spring et al 1999, Hovav et al 2004, Brunsson et al 2000).

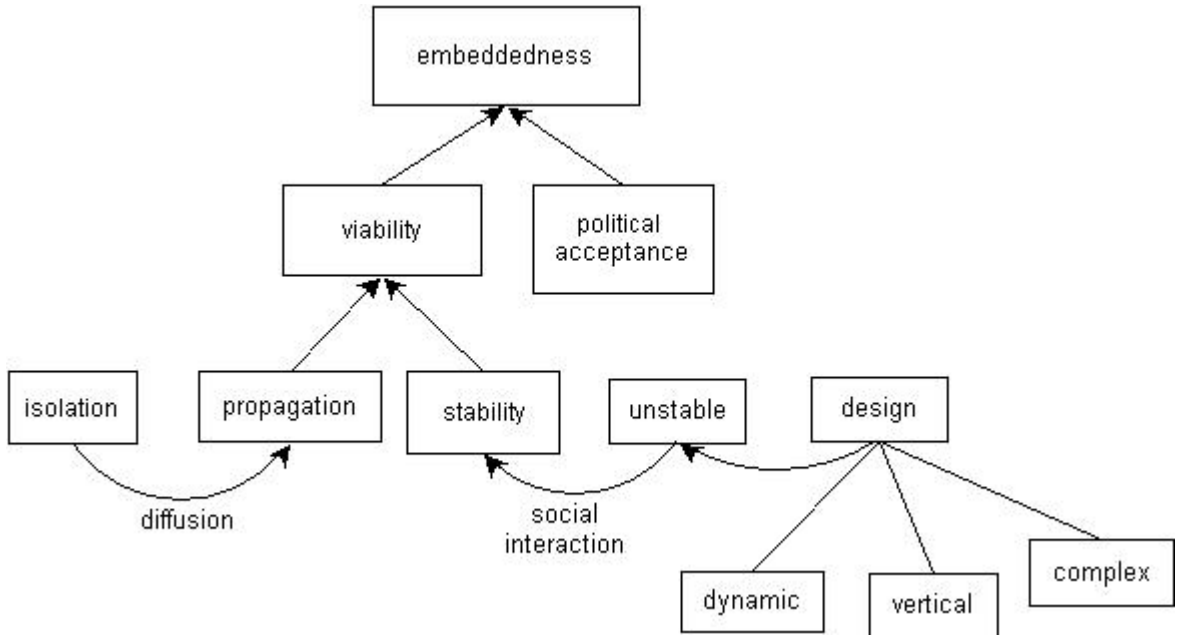


FIG 2

In an effort to highlight important phenomenon in standards creation in general and which elements in this process are subjects to major restructuring and replacement in particular, this pictures is presented. The figure is an attempt to clearly show the vertical standards inclination, role and effect in the standardization process. Now, as pointed out previously, with change being such a prevalent component in the realm of standards and standardization, it may be observed that it is a chief trait even in the way that they are created. Not only do they depict a changing world, and accordingly the model has to change with it, even the manner in which the modeling is performed twists and turns at its own pace. As can be seen in FIG2 there are fields below design, new elements exacerbating the unrest and volatility that have to be anticipated. The counterforce's are ameliorated by spontaneous rearrangement in one part, creating a bed more suited to utilize the new possibilities brought on by technologies like xml. The enhanced propensity towards susceptibility to the new conditions has its origins in the increased influence of the smaller actors and the novel possibilities of propagating contextual information, here referred to as real time data on vehicle performance and status, and the possibilities to process new orders signaled from the driver himself. Moreover, said counterforce's are comprised of a more explicit involvement of the implementors. This instigates an effect on the process with a more pronounced interaction between actors, implementors and the

anticipated customer base.

2.9. Design - creation of standards

As previously covered in IS and standards research change is central. A changing environment, changing working partners and altering forms of collaboration puts new demands on organizations that must be met. As contexts transform, partially or alter completely, some of the modifications enforce sublime pivotal values across thresholds which ensues decision making towards preferring alternate standards and may even create a void that need to be filled by new standards. These chains of events translates to aspects of standards creation and the process thereof. Development of standards in itself has two subsets of interesting facets; the first regards standardization as a social process and negotiation where the artefact or standard itself is merely an expression of the need to communicate and this conceives the inherent problem solving mechanisms. The other is a technical creation or innovation enabled by an amassment of information and knowledge. The result is therefore a publication in some form, be it expressed in a formalized language as an artefact or documentation on a regulatory set of rules. An integral part of standards are always expressed in a natural language as documentation find its natural place in any technical document although the central components are not always expressed in this way as shown above. This is preferably the case with extra-artefact entities as rule sets and regulatory directives. Other instances, subsets or part entirely in a formal language as demanded by the intended communication participants as they consist to a varying degree of machines and not human beings (Brunsson 2000, Pember 2006).

2.9.1. Creation as a social activity

In standardization, the technical is social. Constructing a conceptual bridge from social activities through shaping of networks of actors through social interaction and adoption intertwined. This transgresses to adoption and diffusion playing together. Finally acceptance is the inevitable end result of pervasive diffusion. In a social context with concerns pertaining to social ramifications of the interactions with peer organizations, competitors and mandators there are in most cases two or more selection alternatives present granted that there exists at least one viable standard, embarking on a novel standardization process is the other option, in any business process involving standardization. As standards and standardization are intimately concerned with change in heterogeneous and complex contexts veering towards development of systems and the creation of services, the commitment to standardization procedures becomes in effect a funnel of social interaction. Seen from this parochial perspective of social interaction, the reciprocal relation of creating connections and associations and defining roles visa vi standardization parent a possibility for the actors to align the comprehension of their surroundings and motivational incentives. Thus heavily influencing the composition of the relationships and hierarchical ordering between actors the consequence being substantiation of a central object of examination in creation as social interaction endorses the element of path-dependency epitomizing the combination of built up business connections, socially aggregated connectivity and technical compatibility. Standards are in this way reinforcing path-dependency which is a factor leading to lock-in effects. This has a recursive consequence in that it is strengthening standards in a de facto precedent. This occurs in the presence of some particular expedients which unravels a circular intra dependency of these phenomena. It is with difficulty one is able to discern between IS research technical and social aspect, and standards research. Consensus emerges as a phenomenon concomitantly meaning everything, and nothing (Yoo Et al 2005, Lee & Oh 2005).

In the standardization process, negotiation is an important and pervasive element. As negotiations are enrolled decision making is enacted through disagreements between parties, wholly or in part mediated by participators in general although the chairperson incumbent plays an important role in these cases. Transpiring events under the presence of high stakes on account of esteem and important business decisions tends to imbue inordination. Moving forward means relinquishing by

one part or reaching a consensus. This is a highly time consuming process. Consensus is in contention with speed in any negotiation and when it comes to the creation of standards these perturbing circumstances are exacerbated as standards always have an element of voluntariness and as the temptation of constructing legit claims through appropriation prevails an exacted impetus obstruct progress. Hence, we can see that consensus is severely time consuming in standardization. This in spite of being destitute of value in this aspect. Consensus is merely necessary to satisfy political demands on the procedure itself if standardization efforts are regarded as a production efficiency problem this is concluded since developing standards is getting very well educated people with strong opinions to agree on very simple things. Simple in this frame would be agreed to be a subjective analysis as it is regarded from the view of individuals with said characteristics. The connection between high competence and need for consensus would be nonexistent as a consequence. Again, the economy aspect and marketing strategies exacerbate the impediments present in standardization (Spring Et al 1999, Hovav Et al 2004).

2.9.1.1. Representatives with an agenda

In standardization procedures, we have identified three different groups of actors. They have their own agendas, incentives and their motivation stems from different interests. Coincidently, there exists as many strategies or inclinations towards various stances towards the standardization process. Actively supporting standard, openly resisting or something more similar to apathy. The latter would perhaps surprisingly pose the greatest threat to process advancement. Actually the group resembles a vacuum that if allowed to grow will throttle the dynamics of a standardization in progress. Attending to various meetings, workshops and interviews are of course representatives from the actors in the network along with functional staff as chairpersons and official representatives. They perform as expected in the majority of cases except when it comes to the group actively resisting the standardization procedure. Openness and open standards are the antecedent of perilous involuntary waiving of appropriability. Strategic concerns have a constraining effect on their actions, making them refrain from stating publicly their unmitigated antipathy towards the standardization procedure or delaying taking hostile actions against the standardization body. Be there slightest proof of violating any intellectual property rights they may momentarily or eventually initiating legal proceedings. In the initial state an organization that perceives the actions taken by the standardization initiative as threatening, which is quite often the case with organizations that have acquired a substantial part of a market and are observing the effects of tendencies or mature de facto standards in their own proprietary interfaces, behavior is designated by caution and tentativeness. Taking an apparently active role in standards creation sending representatives imitating the behavior of a supporting organization. The differences are not vivid in start up stages as no exceptions actors motivation is intelligence gathering. Manifesting such a modus operandi are "bag-men" as a means to impede consensus building. The behavioral pattern materializing is that statements emanating from this position in the negotiations are expressing the posture of the organization represented by this incumbent instead of partaking in the standards creation procedure. Partaking is in effect impossible due to the constitution of the knowledge base comprising the individuals ability to contribute. Referring to the resident organization represented, describing the internal workings of same is in fact a statement intended to declare independence and implicating the superfluousness of the standard to be created. A secondary effect is that they are displacing knowledgeable people. In the presence of a representative with antipathy follows the possible void of an invigorating contribution provided by a highly competent individual. A more menial instance would be intelligence gatherers. A kind of market research is possible while no commitments are made which can be a quite prolonged period due to a number of factors. The most important one being that in the initial stages of adoption a substantial part of the activities is the awareness in the mind among potential and actual actors in the standardization procedure, benefactors and end customers. Second, actors group adherence in

the classification of actors as passive, active and openly resisting inherits a very loose coherence which denies the process any fast advances as long as the perceived volition is unlimited (Spring Et al 1999, Lee & Oh 2005).

2.9.2. Creation as an intelligence obligated initiative

The other branch of standards theory and creation of same concentrates on the decision making based in information available on what is expected to incur or emerge in the changing environment. Drawing conclusions from knowledge attained through inductive analysis of data collected in the pertinent domain. One obvious reason to react speedily and spend resources to bring about change and adopt new behavior is the economic driving force. As organizations participate in market competition, the strategies they bestow to reach their goals vary. The intent though is to outperform their peers in order to secure survival. The position in which any market participator finds itself in the most secure position and can reap the greatest rewards with least effort is the monopoly position. As the digital age unfolds it has become obvious that seizing any new technology, through patent acquisition or trade secrets or any other intellectual property rights or digital rights management regulation, or intellectual innovation that is widespread enough this enforces effectively a monopoly position as the organization can regulate access to the utilization or incorporation and dispersion of the technology. While highly desirable for a capitalist, legislation has to be enforced to restrict the actions of same lest monopolizing organizations do harm to the economy in which it is active (West 2003). As stated by (Hovav et al 2004), competing successfully for adopters among other standards is comparable with the way innovations rise to domination. Hence, it is possible to draw upon the theory on diffusion of innovation to understand diffusion of standards. This said, the factors that influence adoption reinforces the arguments on relative advantages as compatibility, level of complexity and observability playing only a small part influencing the decisions on selection of technologies and standards. Installed base, network externalities and resources available for communication, marketing and providing availability strengthens the position of the organization that possess the most of named resources. Contemporary technology markets have its obvious examples today, albeit it is but a result of long term development. This is an evolutionary view of the phenomenon. Beheld from this point, the various firms strategic patterns and behavior becomes apparent. Another element of attraction for organizations to exact influential forces on the market is the normative aspect observed by directives and rules. A de jure role modeling effect decidedly consist an advantage in a competing market. Enhancing the status of any artefact will make public preferences veer towards the choice intended by the endorsing firm. (Brunsson et al 2000). Playing such an integral role in the everyday actions and influencing decisions, conveying meanings and being used as a tool to increase economic efficiency in the fight for survival usage of standards as a means to compete come to epitomize much of the essence in the organizations views and how they regard their environment. Standards come to be a conceptualization of thoughts, aims and ambitions of same (Lee & Oh 2005). This in turn makes standards a suitable token or symbol of interests of the participants or establishment of standards as equivalent with successfully competing in a free market. The different aspects of creation are not at all separate phenomenon or existing on their own. *Au contra ire* the unfolding of events can be influenced or steered by impetus with a fluctuating origin. An intricate mixture of module recursion and backtracking. (Fomin, Keil Lyytinen 2003, Spring Et al 1999).

2.10. Diffusion – towards uniformity

Defining diffusion is essential as a prerequisite to comparison with other phenomenon and investigating the relations and dependencies with same. "The spread of linguistic or cultural practices or innovations within a community or from one community to another." or "the spread of social institutions (and myths and skills) from one society to another" (dictionary.com). Therefore, the concept of diffusion has two main parts; one adheres to the physical dispersion of technologies,

innovations or technical artefact's in cultures, societies or organizations. The other is behavioral and refers to knowledge and thus awareness. Behavioral patterns change and skills acquisition and honing originates in increased conceive and knowledge. The conclusion of this is expressed as diffusion as a presence of the concept of an artefact, innovation or technology in the mind. (Damsgaard & Truex 2000).To expand the population of Internet standards used looking at internal and external factors influencing the adoption of Internet standards becomes necessary. Internal factors contains aspects regarding usefulness of the standard itself. Actually, one needs to pose the question "Can the benefits be measured?", as this is not axiomatic at all. It is important to decide if it is at all possible to observe the effects. Other considerations deal with the relative advantage adhering to the standard, as an adoption stems from a reason to be conducted this may very well be the single most important factor in the decision making process of adoption. Another, perhaps more secondary of nature is how compatible the standard is with installed base as a social and technical legacy with very few exceptions remains. Externally, the considerations covers all factors that influences the standards adoption through environmental influence. This is examined assiduously, looking at network externalities, which is comprised of the effects of related technologies. How the current organizations characteristics responds to change. How much backing the adoptions gets in terms of sponsorship and resources (Hovav Et al, 2004). The actors play a lesser role during the adoptions phase. This is why standards theory focuses hard on the actors, since the design phase is in the center of attention actors receive the most appraisal of conceive (Markus & Gelinas 2006).

2.10.1. Processes that create uniformity

When firms enroll in business interaction activities arise a need for coherent communication devoid of ambiguity. For strategies to function as intended and to create possibilities for same mediation and coordination requirements arise as multiple actors present themselves. This leads to a process shaping roles and relationships in between actors. The molding of the networks of actors is greatly influenced and the configurations steered by the path-dependent nature of action and cognition. (Yoo & Lyytinen & Yang 2005). "Social scientists seeking to understand why similarities arise have often started with the similarities themselves. They have wondered why a particular practice, form of organization, or other phenomenon has become commonplace. Often a special metaphor is used for this process - diffusion". (Brunsson Et Al, 2000). Thus, the result of an adoption or the ramifications thereof as is the case with uniformity is referred to as diffusion. this is the core in the structural metaphor conveying the authors reasoning on design or developmental interplay with diffusion. What is pointed out is the reciprocal recursive connection between the two phenomenon. Recognizing this affinity brings a deepened understanding on how business decisions to adapt to a certain locution is contingent on the extent of technology promulgation. Briefly, directing attention towards exacted influence on standards diffusion by conceptual and factual adoption, factual adoption is the most obvious example. In fact, distinguishing between factual adoption as in usage of a technology or an artefact is particularly difficult as it is an integral part if diffusion of IS technology. As uniformity is achieved mediated through events circumventing innovation I.E. a large number of actors autonomously implementing the same ideas, and, more importantly for this discourse, the independent ex ante conceivement of ideas, concepts, innovations or methods. (Brunsson et al 2000). As actors and organizations manage to grasp concepts of novel technology and in addition prove themselves to be able to recognize the economic implications of the consequences of incorporating new technical artefact's or methods, they are actually exacting a part of the adoption process (Fomin & Keil & Lyytinen 2003).

Fomin et al (2003), however puts diffusion subsumed into the creation process. It is visible in the recursive aspects of negotiation and sense-making. Diffusion plays a protruding role in the interplay with the development process. Diffusion needs to be studied as a phenomenon in its own right, and when juxtaposed design interesting connections and implications are unveiled. Diffusion is argued

to originate in the acceptance and new knowledge among the actors. This is in turn affecting the behavior, resulting in a range of events from decision making to increased resolve. The novelties in the business of combined telematics and ERP systems creates impressions in the way business is conducted and hence impacts the business communication rendering reactions in internal production decisions creating a state of uncertainty and instability in business dealings. The counterforce rising to combat this is a social phenomenon.

2.10.2. "The quest for stability"

Increasingly present in IT industry today are emergent organizations who constantly seek stability, never reaching their goal (Damsgaard & Truex 2000). Standardization and creation of standards processes have been compared with survival of the fittest as the competing for adopters scenario resembles that of innovations. Coming into existence as a standard, granted that the described state of embeddedness is a prerequisite for same, demands stability as a key ingredient. It can be argued that disequilibrium guarantees utter deprivation usage in long term perspective. This fact renders a standard completely useless and devoid of value, and value here in the sense explained earlier. Were standardization procedures viewed as tasks to be completed it is a matter of stabilizing or facing failure. The standards as such loses or never acquires a raison d'etre because it lacks the ability to add values to the context it is presumed to be active in. (Fomin & Keil & Lyytinen 2003). Then, how does standards and standardization procedures reach their goals? As argued, achieving stability is absolutely vital for viability. Stability in turn is intimately associated with social interaction. Enhancing stability in standardization is achieved through social actions as negotiation, adoption and alliance building. Technical excellence applied to create an artefact able to function in accordance within required parameters confers completeness. Meaning that in standards creation processes the technical merits of any technology is but a formality to achieve as the obligatory is a prerequisite itself in its own value although ability and resources are obviously always accessible as long as the political acceptance and adhering driving forces is present. If the perceived fiscal values exceeds the expected strain the needed inputs from implementors and actors will exact on same, resources sufficient will come into presence. Granted that cases where this particular unfolding of events fails to occur exists but this is outside of the scope of this study. Now, as standards and their alternatives set out to survive in their respective potential environments, their advocates methods (here referred to as the implementors and decision makers behind same with interest and goals perceived to be ameliorated through development and adoption and uniform behavior conveyed through arbitrary standard that meets those needs) to attain their goals vary depending on their respective backgrounds, resources and traditions. Following a description of two main paradigms followed in the struggle to obtain dominance namely competing successfully and maintaining control through endorsing appropriability and wielding legislative measures (Hovav et al 2004, West 2003) or, as a more robust and long term more successful strategy (augmented by theoretic implications) through embracing openness (Lee & Oh 2005, West 2003). As standards are created they recruit a following through adoption and advocates using the standard, either chosen through free will or through coercion or sheer necessity. When these decisions are results of business interactions and ramifications of competition strategies they are a result of competitive actions in the business branch. This course of actions is favored by very strong actors as mechanisms of increasing returns are a cornerstone in standards creation. Increasing returns means that the rewards of using a certain technology or standard increase with scale and pervasiveness of same. The number of potential adopters increase at the same time as the switching costs decrease due to enhanced compatibility towards existing technologies and environments and maturity among implementors and adopters. The results are exponentially increased pace in change, convergence and ensuing uniformity. Today, the most obvious examples of this strategy applied is found in the desktop operating systems vendor business . The alternate paradigm relies on the inherent traits of successful standardization processes and by which they acquire value in the sense that they

contribute on a societal, organizational or individual level to accruing fiscal values or ensuring the survival of the entity in the current context. Building values in the realm of standardization includes propagation and temporally prolonged presence. Propagation means adoption by a large number of implementors and actors as well as use and utilization of large organizations or legislative institutions as adoption in this sense penetrates multiple dimensions both on a de facto and de jure manner as the former is reinforced and perpetuated by both head count of single individuals and number and size of organizations. Counteracting the proliferation of any of these factors impedes growth and diffusion acceleration pace. Therefore, embracing openness is considered a powerful component in any standardization strategy. Openness, although a highly complex issue in itself containing several dimensions and the word as such is plagued by ambiguity and misuse, is defined as a practice abstaining from restricting access in any way to protocols and documents constituting the standard at hand. This openness is emphasized by exemptions of balks towards influencing the protocols and recommendations endorsed by same.

3. Research setting and method

3.1. Background

3.1.1. Characteristics of road haulage firms

The typical road haulage firm coordinates a workforce mainly consisting of drivers of trucks who are geographically distributed and constantly moving, providing timely pickup and delivery of goods. As a geographically dispersed and highly movable host puts high demands on the flow of information. Messages needs to be conveyed to and from drivers and sometimes between drivers. Late arriving orders and refactored priorities on the fly further complicates the situation and exacerbates the viciousness of demands on communication *par excellence*. This has incurred a want for coordination in these organizations which traditionally has been addressed with notes handed over to the drivers, communication over radio and later communication has included the cellphone. The main part of the coordination functions is performed by a dispatcher. The need for communication between the individuals in the mobile workforce and the dispatcher is substantial and absolutely vital to the business. The traditional ways of communicating between dispatchers and drivers and among drivers renders some undesirable consequences such as wasted resources, repeated messages, error prone receiving, waiting time, insufficient availability etc. Today the organizations are small but the tendency are to merger and growing fragmentation concerning activities and transport products sold.

3.1.2. Road haulage firms and IT

Recent advances in mobile and wireless technology have enabled the development of a wide range of sophisticated applications supporting the daily activities of road haulage firms. Tactical information technology support includes positioning of trucks and cargo, recording of performance parameters from the vehicle, and wireless communication of data from some or all of these tools. The positions of individual trucks can be presented on maps, offering the dispatcher a quick overview of the geographic distribution of the mobile resources, as well as providing the driver with guidance and navigational information. Route calculation done by the driver in the field or by the dispatcher in combination with navigational guidance is intended to minimize the cost of a transport assignment in terms of time and fuel expenditure. The dispatchers information aide (the TMS) consists of applications catering to the need for order data collection and correlation, change of order status reporting and billing of various assignments pertaining to goods haulage for the main part but also various tasks not involving haulage of goods as snow ploughing, digging and drilling etc. Other services and functions supported by the TMS'es include personnel rosters and staffing and economic systems for bookkeeping. As a missing link to obtain a firm grip of the data needed to take control of the entirety of total costs in the firms is the vehicle data. This includes measured fuel consumption, distances traveled, equipment such as breaks, trailers and environmental regulators' status and state. Fuel consumption for example, is important not only from a strict fiscal concerns but to adhere to emission regulations as well. Further regulatory restrictions includes vehicle inspection related needs such as usage and status on breaking systems, who today have the embedded software providing the capacity to satisfy this information need. Real time data in this area can be utilized in a vast number of cases, surely of many not yet fathomed. Dispatching replacement vehicles in cases of breakdowns is but one example.

3.1.3. IT in the road haulage business

Road haulage firms have started to implement a wide variety of distributed support tools to conduct their day-to-day business. There are two distinct (or not so distinct as will be explained) groups of systems vendors; stationary vendors or TMS, and mobile or TSP. TMS is the Transport Management System, and are delivered by actors such as Hogia, IBS, Transware and Locus. TSP is

the Telematic Service Provider and are delivered by Vehco, Scania, Volvo, MobiOne and Mobistics. Vendors of stationary software (TMS) would be the actors contributing to the dispatcher's work in terms of route planning, creating and handling orders etc. They consist of administrative and coordination systems handling business data related to work orders but also personnel and equipment at an atomic level such as gantt schema for trucks. It is not unusual for them to be closely related or used in conjunction with various economic transaction systems and other office applications. A mobile vendors (TSP) products are comprised of PDAs and embedded hardware, designed to be aides for the truck drivers, delivering information processing and presenting capabilities. The mobile and embedded computing devices are designed to service specific predefined needs. The roles these plays in respective organization is twofold; the management can monitor fleet performance and the drivers are able to communicate with the dispatchers. One way to measure this is in terms of fuel usage for example and the drivers can respond in real time to metrics produced by the embedded systems. Services also includes status reports on tasks as well as assignment of same along with vehicle performance measurements. Messages are sent back and forth between the two regarding measures and correspondence on assignment details and instructions. Geographic data is also utilized for navigational services and tracking of shipments and individual pieces being serviced with a digital information trace of geographical movement as a convenience for end customers of transportation services and utilized for improving work practices and delivery precision in the transportation industry. It will be described the organizational construction, the characteristic denominators and behaviors of the different groups. The movement of individual actors in between groups and what reasons that sparks the initiatives. This is inferred from motives and the way they recognize themselves and their respective organizations. How they purport their role in the standardization procedure. This is originating from knowledge, awareness of the environment and influences imposed by fellow actors and alike. There are also actors that really do belong in both groups as they are actively implementing solutions to service either side. In a second abstraction layer it is significant to segment the two sets into three due to the behavior of some of the actors as they as will be accounted for below are readily delivering solutions that are covering both the TMS and the TSP areas of services.

Service development and business activities in this area are severely impeded by integration workload. The perception of technological investments in the minds of decision makers relevant to this issue could be superficially characterized as "wait and see". An investment is not deemed necessary as long as competitors refrains from stepping forward, creating a competitive advantage for those firms. Another factor contributing to hesitation towards IT investments are the previously described immaturity. The fragmented service providing marketing combination with their lack of competence for acquisition undermines the erection of a sound knowledge base to support viable decisions.

The TSP providers are the new players on the scene. Many of them are in a start up situation or in a developing phase, both product-wise and customer base-wise. Immaturity in business models and experience. Hence, it seems sometimes in the light of the interviews conducted with these subjects that the TSP vendors are not always fully aware of the whole picture, which in turn explains some of the case-based thinking that seems to be so predominant among the employees in the TSP firms. The TMS providers have in general a long tradition and substantial experience. The product portfolio of these companies is well developed. The venture into providing services for road haulage firms introducing vehicle data and alike is the element of novelty in their case. The two in conjunction are referred to as 'the project members group', or 'the actors and implementors' or 'the systems vendors'.

Accordingly, the picture that emerges when you look a bit closer at the project members group is a

blurred one. The actors themselves does not always have a clear definition as to what their role is, sometimes they seem to be under the impression that they could provide for all the needs of any road haulage firm, this is especially true about the TMS vendors. The reason for this seems obvious as their role traditionally have been that of the sole provider. In addition to this, the TMS vendors have been selling solutions to both road haulage firms and other customers for a considerable amount of time. Their experiences and culture stem from the development of enterprise systems and the like. This background and perspective along with installed base and organizational drag puts them in a powerful position, both elevated by solid competence, but also command superior customer relations as their business relations are established and running for longer periods, reaping the benefits of consistency. Their lengthy customer relations have provided them with substantial experience and with systems integrated into their customers organizations. This incurs a varying degree of vendor dependency which creates rigid structures distinguished by high inertia and sunk, further endorsing the conceptual self image evolving into an approach intending to appropriate and enclose areas of markets and domains of customers (Andersson & Lindgren 2004, Hovav et al 2004).

3.2. The artefact

In informatics and science, candidness about the artefact is of utmost importance. This is due to the fact that we dwell in a land that is at the same time very far and very neigh our own reality. Very far in that the symbols, dimensions and concepts appear unnatural to the human mind. Close in that concepts and truths are mirrored and modeled. The strivings of information technology creators is an ever quest to fabricate applications and artefact's that more closely resemble what the human brain perceives as amenable. This strangeness demands explicit explanations to erase every doubt about the domain we are investigating.

In this study, it is twofold; one story is about standards and the other concerns the xml technology. When two components connect and communicate, it is conveyed through an interface or protocol which can be symmetric or asymmetric, in the asymmetric case the ordering is hierarchical as when the two components belongs to two different abstraction layers. Stratums may constitute operating systems and applications or communication in accordance with the OSI model. In the other case the information flows between two peer layers such as two different applications (West 2003). In this study we center the attention upon the latter. This correspondence has a set of demands it has to adhere to in order to suit the information needs. Two strands is discernible here; one adheres mainly to the conception of conveying meaning as its prime directive, the other centers its attentions upon achieving unambiguity. It is obliged to express the information needs of the members proprietary interfaces particular to respective group affiliation.

3.2.1. EDI and XML

Business communication have a relatively long history with the usage of EDI. This confers a EDI heritage. This heritage includes effects on the organizational construction of the business communication interfaces. This makes for an explanations for the stationary vendors benightedness towards static perceptions of contextual constitutions. EDI and the business communication processes intertwined has been compared with the procrustean bed. "EDI is a transaction format and needs to be renegotiated in the stern, procrustean way" (Damsgaard & Truex, 2000). Business communication on the other hand is a constantly ongoing, evolving and on consensus converging of same much like the evolution of the natural languages which effectively proves that the demands EDI put on an interaction between two parts requires a strictly controlled environment with very few common denominators with the former. As the evolutionary impetus propels procedures and processes towards a behavior that resembles the rules of social interaction to a higher degree, EDI will be cast into oblivion. (Damsgaard & Truex, 2000). This entails, as the nature of things has been with this older technology. The introduction of XML usage in the forms of schema appliance is affecting the playing field in a large number of ways. As a technology with such characteristics dissipates into a business, its organizational characteristics are stirred a profound way. EDI have previously had impact on the businesses it has been implemented in the same way, and a critical mass of size had to be achieved before the traits of EDI technology began to play in the particular organizations' favor. The large scale was a prerequisite for successful adoption of the technology and implementation of same. As things were when EDI was predominant, smaller adopters became such through a procedure echoing coercion (by the larger actors) in many cases as switching costs were burdening the smaller firms the transition was made anyway due to demands from the larger firms. Enter XML and with it standardized data definitions. This confers drastic reduction of parallel processing and multiple electronic interfaces. Dynamics of XML-based schema enables not only dynamic data definitions, but also inherent modularity through application of object oriented design (Wigand, Steinfeld, Markus 2005). This is held as a entry point to a possibility to utilize the design as a springboard into melding design and diffusion as theoretic concepts. The emergence of applied XML schema validation and the ramifications thereof enables smaller organizations more

room and possibilities. When used in conjunction with XML in this manner standards in the vertical sense can become a means to endorse equity in the free market. (Wigand & Steinfeld & Marcus 2005).

3.3. Problems and challenges

Lack of competence posed a threat all along as well as it was difficult to convey the information, and in particular, to reap any information from the feedback requested. Lack of comprehension, time available to be spent studying the work in progress. Especially the absence of a deeper understanding in some cases was leading to time wasted discussing irrelevant matters and most of all confirmation of needed facts. This challenge, although time consuming, proved to be strengthening the case as the time and energy spent on these issues diminished drastically as the actors and implementors became increasingly aware of the values the standard were expected to contribute and as adoption progressed in respective organizations the exacerbated absence of decoys hence litigated, the design process was mitigated, increasing the pace of development.

3.4. Data collection

The project which was used as a primary source of empiric material was started 2003-07-01. The project was first introduced to me in autumn 2004, and I entered as an active participant as 2005 began. Spending twenty weeks working with and participating in the project, and then reentering in May 2006, spending an additional four months studying standards, standardization and the project itself. In the first period, the analyzed information came from three sources. One was collected through revision of earlier research conducted in the project, a second from interviews and attended project meetings and a third from active participation in the development of the artefact itself.
The written and recorded information consists today of twenty four interviews with road haulage firms, one workshop group, fourteen interviews with system vendors and eight project meetings. Even more material was collected through mail conversations with system vendors.

Ensuring a solid base of domain understanding was considered vital at the time of my entry into the project. Therefore, a review of earlier empiric material was conducted. This material consists of the initial protocol versions along with the produced proprietary interfaces of the participating firms and the body of interviews relayed above. The work in progress artefact was thoroughly studied and revised, the technical part consisting of a protocol marshaled by one tentative xml schema design. Pushing on, we executed nine more semi structured interviews and two project meetings which was attended in person. Pretty early on in the process of interviewing technical staff at the actors it became evident that the idea behind this architecture was inherently flawed due to the lack of flexibility. The reason behind this was an erratic perception of the demands on a vertical standard, or rather the inability to perceive the concept of a vertical standard at all. The preceding notion was based far too much on the needs and demands of the stationary actors thus, disregarding the needs and demands of the mobile actors. This dichotomy come into existence in large parts due to the static view of context recognized by the stationary vendors.

The population of interviewees consisted of the 'gatekeepers' and 'technicians' at each actor in the network of participants. The interview was based on a fixed protocol relating in detail to the information architecture previously produced in the course of the action research project. The architecture was thoroughly examined and explained so as to ensure that the interviewees acquired as good an understanding as possible. They were encouraged to speak their minds about strengths and weaknesses the structure might have had at the time. As a result, a discussion was interleaved with the perceptual processing of the architecture. Meanwhile, important aspects and opinions were noted. This in addition to the recordings to furthermore ensure that fast feedback could be produced to enhance the sense of involvement along with a strengthening effect when it comes to the participants confidence in the researcher.

At this point, a solid base of domain understanding had been built up and this led to a major revision of the xml schema contributing greatly to the artefacts usability though introduction of context adaption abilities. These improvements was presented to the actors and approved by same. The participation in the design work on the xml schema was done in spring 2005. Re-entering the project summer of 2006, yet another revision of empiric material in form of transcribed project meetings and interviews was done. Prior to actually being accepted back into the project, I devised a model to analyze and understand standardization procedures which was used throughout the writing of this essay. During this period one project meeting a consortium was formally fashioned to govern the maintenance and development of the industry standard. Two test cases is also implemented during the ending period of this study and last but not least a sharp business implementation led to the standard conveying information about its first live orders in August 2006.

4. Findings

The data collected was thoroughly analyzed. As the design and diffusion interplay model was brought to life, the evidence of these implications was divided into a four groups where two groups detail design concerns and the other two are connected to diffusion. On design there are dealings with decision making on design issues. The purpose of these quotations are to illustrate how design decisions are made showing that there is a palpable participation of the involved firms on the business level.

There is a profound effect on the implementors behavior due to their respective roles. Taking a more active role furthers the involvement in the design process which commands even more attention from the actors representatives. The first set of citations covering this papers points about diffusion removes any doubt that the standard is actually being actively spread and dispersed among the developers in the respective firms. They represent evidence that supports the statement that the artefact produced and the interfaces and agreed protocols are en route towards embeddedness as a standard.

The second group of quotations describing design are concerned with the ramifications the design process and its characteristics as it is affecting the diffusion of the standard. Lastly, the effects diffusion is incurring into the design process are portrayed. The reactions in the design process vis a vis the participation by the implementors and designers. They are both reinforced or hampered and this is comprehensively covered in the last section, which is also covering the design related evidence showing how dedicated the project members are and how they perceive the protocol produced in the project, and how they imagine the role it will play in the future.

4.1. Design

The particulars of the case scenario is mirrored in the the standards development methods. As described earlier there is a shift in the modes of organization of standards and the creation of same. The more recent standard efforts have been distinguished by high actor and implementor involvement. Evidence of the highness of the technical specifications between the standard in development and the different proprietary interfaces are described in this section. Moreover, as to clearly depict the high involvement of the participating firms, several examples are brought forth to illustrate this. First off is a representative from a truck manufacturing firm (20050419)

> "I think that this also is in accordance with what we have done in this area [producing protocols for communication. Authors remark.], and I don't think that it is a major issue for us to conform to these specifications"

obviously, this individual believes the integration costs to be small which in turn means that their development of their proprietary interface have been affected by the projects development. Moreover, it means that their organization can easily adapt to, and participate in the further development of the protocol in the project. These similarities point to a funneling effect during the course of development. As this statement is done after the thorough run down of the technical details done in winter of 2005. Continuing, at the same particular meeting one vendor of stationary systems expresses his view of the future of the standard:

> "We should realize the fact that the interfaces we have been working with are not thrown away over night and replaced by this standard. They will be coexist under a period of time. What happens next remains to be seen, there are disadvantages with these standards as well. Hence, we should not believe that this will be any salvations for everyone. But, in the long run it is really something to strive for"

It is expected to be coexisting standards and proprietary solutions which in turn points to the fact that the organizations have already adapted, technically in the former case and conceptually in the latter. At this point, the actors and implementors became increasingly aware what the potential promises of the standards contribution were, as well as what a standardization procedure entails and demands. The main reason, though are the percieved intensity in customer demand which provokes statements like the ones from one of the smaller players, a vendor of mobile equipment:

> "But will ever the general fit that suits everyone less than perfect be better than the specific tailor made part that suits the individual actor better... That is if you want to wear a pair of trousers in which model are all the same for everyone, noone will find them just perfect. Then you have to go to a tailor. And this problem will always exist. I do not think that we can hope for a standard better suiting our needs than our own interfaces do already. But what will be improved are the customers situationas they will be able to cooperate"

Discussion on irrelevant issues diminishes as the commercial solution comes into being. This type of statements diminishes as mindset conformity is pursued and attained the actors become aware of the forces behind a conceivement of a standardization procedure. As to how the reactions to the protocol as it is presented from the implementors another example comes from a vendor of embedded mobile systems (20060328):

> "Exactly, I have already said that I think this is a standard. I think so, honestly"

Clearly stating that the technical viability is as complete as can be expected from a standard. These quotes show the ability to contribute and matureness of the actors, the perceived viability of the standard and the dedication of the implementors.

4.2. Diffusion

Illustrating the promulgation of the standard and the protocol, evidence is brought forth of how the process have affected the actors and implementors, their view of the standard, their thoughts about the role of the standard. How they perceive their interactions and adaptions to it and what the ramifications will be for their organizations. Their customers will also comprehend the standards effects and the possibilities it brings. This will in turn influence their behavior and demands. Evidence of their changed mindsets and ability to conceive is brought forth. Another tell tale sign of diffusion is the reactions the existence provokes. These reactions may be hostile or benign depending on a number of traits of the reacting organization or their representatives. A large player may, as described above be expected to conclude that anything that threatens the de facto attributes in their own protocols and the further promulgation of same, be openly or covertly hostile. Beginning with hostile reactions patterns is put forth a quote from a systems vendor, considering itself to be in a market dominating position as displayed in earlier section. (20050419) a major vendor of stationary systems:

> "...our picture of this [their proprietary interface, authors remark] is that it is somewhat a de facto standard since we have so many customers that use our XMLSchema already today"

Major actor regarding itself to be in a monopoly position, lest it would not be possible to make such a remark in the presence of peers and potential and factual collaborators in the branch, attending a project meeting and disclosing their attitude openly make a clear statement that diffusion is taking place and provokes reactions. Advancing in time, five months later (20050915) the same firm again expresses the superfluousness of the standard development process:

> "...but I think that your turn point there, your scheme is rather interesting if it is regarded only from a standard perspective. It is sound firstly to think hard about taking action at all to

> realize a standard, how are we going to go about it to develop it, in what manner are we going to conduct this work? I do not think that anyone in this room really want to abstain from having a standard. It is a sound turn around to say that we want to have a standard. “

The entire projects existence is questioned, the representative wants to clarify to everyone in the room that they do not want anyone to discuss the creation of a standard without them being asked to participate, they regard themselves as overlooked. From their point of view, they are way to important not to be decision makers in this matter. As the project continues, this player eventually draws the conclusion that the standard is reaching completeness and viability. As a consequence, the ramifications of the contingent promulgation reaches a level that the same player decides to regard as a threat to their proprietary standard. The following quotes illustrates the issues on intellectual property rights raised by same. Representatives from this firm make their first statement on a meeting raising these very issues. (20050915):

> “...it is discussed on high levels in our group, this...” “...and what has been developed, is based on our interface in large parts...” “...there are some copyright related questions....” “...the commercial objection is rights in this issue...” “...who is actually the owner of the development this is based on? Who owns the right to appropriate this?”

This major vendor raises intellectual property rights about the protocol. These reactions are driven by diffusion, the standard and its constituents' presence is decidedly affecting its environment. And the major vendor takes this very seriously.
This leads later on to the official departure from the project from this firm in the form of an official mail sent to the project manager. This has some interesting ramifications not only for the departing firm but the remaining actors and implementors react strongly (20051205), a small mobile system vendor:

> “It is also the case that an external enemy can unite the remaining proponents so this might increase the chances that we get a standard.”

The effect from increased awareness about the technical details leaves the project with one less participant. This in turn welds the remaining project members together. This is an expression of increased resolve and higher hopes that comes with it. At the same meeting a discussion commences about going public with the standardization effort. Press releases and such are mentioned. A small mobile systems vendor observes the turns the projects are taking as the withdrawal renders its effects on the state of things. The fact that the project are taking major steps towards an active promulgation and focused actions are taken are signs of an impediment being dislodged from the development process (20051205):

> “Actually it was them [the firm that recently left the project authors remark] who were the ones most reluctant to go public with this project. They were the ones that had the most to say about this subject about going public.”

The firm was using bag-men to put forth their opinion about the project as such and it what way it was conducted. Hence, withdrawal of a major actor sparks increased standardization speed.
As project members participate in the development process, lessons are learned and knowledge is procreated. An expression of attaining of new knowledge is a stationary systems vendor (20051205):

> "We want to be in this project as we can see the advantages with standardized systems but we also want to share the risk taking. Say that we stand here and the standardization project falls. Then we will have put in some money and what have we achieved – we have learned something from this example..."

Thus, learning from participating is adoption to standardization procedures in general and this standardization in particular and diffusion of the technology. At about the same time (20050419), two vendors of mobile systems, one also a major truck manufacturer, describe in interesting ways how their respective interfaces have been affected by the development of the standard and their participation in same. We let the smaller systems vendor begin stating that they have close to nothing in integration costs were they to participate in a piloting project:

> "...we have worked with this for a pretty long time. We have reached a point where we possess a fair amount of excess time as we have started with this already"

This firm stating clearly that their organization have implemented the standard in detail. This is also after the thorough run down of the technical details done in winter of 2005. Prior to this, the technical staff did receive the technical specifications of the protocol thus the time, political interest and resources were available. The other vendor is more specific when it comes to mindset and less explicit on the technical detailing:

> "We already have an XML very soon. This obligates us to be compatible with both variants until they are established. Evidently we have to promote this if we believe in it after we have made our tests. The result is the important thing here. We should be careful not to make too much noise about this until we have verified that this is better that what we have ourselves."

The representative is prepared to adapt and adjust to the standard due to the emergence of same.

4.3. Design procedure approach affects standards diffusion

In the particulars of the development procedure of this standard there are elements and details in the approaches where a profound effect of the adoption speed and promulgation can be observed. The diffusion is facilitated by these events and characteristic states. The relationships among the actors and between the actors and the mediating research institute have a profound effect on the dispersion of the protocol as well as the conceptual evolvement of the actors. How intrusive the influence have been and what perks have acquired in the process were decided by the relatively exclusive manner in which the case analyzed conducted their processes.

A customer demanding implementations of the protocol or access to certain services (20050915):

> "For us on XXXXXXXX is in out IT-strategy that we want open systems. For a road haulage company it is essential to become liaisons with other haulers and worth with many different collaborators. We cannot be locked to a certain vendor and say that you have to have THAT or we will not be able to work with you. It is just not possible, then we have to start using the phone again and revert to sending notes."

This is one of the factors that sparks some commotion. At the very least the motivational factors for

the implementors was considerably reinforced. We have two truck manufacturers and adopters from the customer base that helps us to illustrate these facts.
Two separate quotes from the same truck manufacturer at two different times relayed here chronologically, first (20050328) :

> "There is a need, that is certain. I have been around the world, more or less, preaching about this and everybody thinks that it is well that we are developing a standard. I have not heard anything else."

Knowledge about the artefact is being actively spread by one of the participants. Missionary activities bearing witness about how important this specific participant regards the project and its outcome. Actively working to enhance diffusion and adoption due to an active role in the design work. (20050610)

> "...in two weeks time we are rolling out our new XML-protocol, which we haven't had prior. Then we have been looking a lot at what have been produced here, of course. This is rolled out now and we are educating 30 individuals in all of Europe, because we are selling in 19 countries..." "...but I have made budget reservations for an adaption of the XML-protocol. I can see how we are to implement this. We have a forms application that supports this"

The design process influences the technology diffusion as the proprietary solution with a major vendor is a priori adapted to the forthcoming protocol agreement. An additional quote from a second truck manufacturer stating (20050610):

> "...we can say that we are supporting the standard, we belong to the standard, we can participate in it to increase the credibility and lubricate the market to conduce the customer increasing aptness to invest"

The vendor is willing to actively work with introduction of the concept to the prospective customers.

4.4. The diffusion-driven design decisions made by participants

The promulgation and adoption in its early stages of the standard and parts thereof radiates in ways illustrated by the next section of quotations. The main part of the evidence consists of end customers expressed wants and demands and the incurred reactions and decisions made by participants, implementers and adopters. The first quote is a major vendor of stationary systems which later in the project also embarked upon a total solution including mobile services as well. (20041108):

> "Important that correct information reaches the road haulage firms about what is in progress. Have earlier received answers from certain companies that they anticipate investments due to the expectancy of a standard application that solves all problems."

Here is expressed the concern about information about the standard being spread in the right way to potential adopters.
Enter end customers of UTS services. Presence in formal meetings delivers a profound effect on the prevalence of the standard, rendering a very clear signal to the actors that the intention of

investments are a reality. This sparks a test case scenario proving that that the work is up to par. The important question is raised among the actors "What does a proof for successful implementation in the eyes of our customers look like?". (Mobile vendor market representative).

The following quote is a major end customer to vendors of both mobile and embedded systems as well as stationary systems vendors addressing the attendant systems vendors at a project meeting. (20050915):

> "But there are none of you stationary systems vendors or mobile systems vendors that are able to deliver what we need as customers right now. That is why I would like to see that we have a chance to choose freely, which we do not have today."

The fact that customers are participating and realizes the benefit of successful adoption and, in addition, demands that the protocol is to be implemented points to the heavy impact the design process in this particular manner have had. Further, given that customers sees the need at such an early phase, I.E. prior to existence of mentioned services, belongs with the expressions witnessing about diffusion in progress. Learning and adapting confers awareness as adoption and diffusion are interwoven. At the same meeting, the systems vendors reactions are instant. (20050915):

> "One wants to find things that customers actually are prepared to buy. And that you want to build. For my part this is turned around in an instant when customers are at the same table. Because there is nothing better to say from the customers that we are interested in coming here to discuss this. I think this has been missing hitherto."

The vendor recognizing that the physically present customer representative sees and understands the implications of the technology usage which leads to an increased interest for same.
Continuing with a mail excerpt from a mobile and stationary vendor to the project manager himself. (20060602):

> "Renewed interest in the project "Value creating for Road Haulage firms" from [systems vendor]. As NN departed from the firm, our interest in the project waned, which we lament. As our customers are coming ever closer to utilizing mobile equipment we recognize the need to resume our participation in the project. Inquiries from X X [road haulage firm] about our engagement in the project have led to us contacting their representatives in the project and the project manager as well, hoping that we once more are welcome to contribute to the development process."

Hence, due to pressure from customers the former participant makes a decision to request to reenter the project and take active part in the design process.

5. Discussion

There are uncertainties as of which criteria is to be fulfilled for a complex IS innovation like a standard to be standardized in practice. It is clearly a subjective and judgmental issue. This paper aims to mitigate at least part of the bereftness of integrating knowledge about development and knowledge about adoption that have been observed in the existing literature (Markus & Gelinas 2006). Why is it important to study design and diffusion? In the light of the knowledge acquired from the articles read and the conclusions drawn, a picture emerges of the results of the previous efforts as such dominated by the effects of studying a phenomenon too closely, or even from the inside of the phenomenon itself. As it is only possible to view one side of a problem at the same time when analyzed in this manner, this confers a construct comparable with a single sided coin. Emanating as the question, which has several facets, substantially lacking attention hitherto would be a take on the standardization process in its entirety. Examining what is not a constituent but using a holistic approach. A very clear pattern is the propensity to study one of the two major subjects of standards research, namely creation and development on one hand and implementation, promulgation and dispersion on the other. There is an explicit need to make studies of the missing link between economic and marketing aspects contra social networking. Standards efforts are rarely studied from conceivement to dispersion into the market (Markus & Gelinas 2006, Fomin & Kiel 1999). Still pursuing and examining this area of interest delving deeper into the question at hand, it suffices not to state that there exists a gap, but standards theory has a nontrivial deficiency regarding integration of development and adoption (Markus & Gelinas, 2006). The lack of interactivity dynamics is unobfuscated by previous research done on standards stating that the standardization through institutional forms have degraded under the increased pressure of extended average scope and incremented pace in standards making procedures and process workflows. In addition, complexity is ever expanding. (Markus & Gelinas 2006, Fomin & Keil & Lyytinen 2003) It is even held unattainable and unrealistic to create universal, stable and regulated standards (Damsgaard & Truex 2000). There is value in combining a focus on both the development/evolution of standards and on their adoption and dispersion. This is urgent both in novel industry application as well as with established markets where the picture is even more complicated as backwards compatibility traits causes organizational drag (Markus & Gelinas, 2006). Mobile services bring heterogeneity, change and complexity. The development brings deliverables in the form of systems and services utilized by a growing market and emerging firms. Entities construed by the adapting market are materializing through a funnel constructed of social interaction bridging the gap between ambition and attainment (Yoo & Lyytinen & Yang 2005). Creation of these entities are capacitate by novel technologies as xml and vertical standards (Wigand & Steinfeld & Markus 2006). A central question regarding standards development and usage concerns its very existence and defining of borders and delimitation. The demand for definition and rules to ensure the smooth operations of everyday work creates the question when is a standard standardized? Which criteria are to be fulfilled? Which prerequisites should be met? (Markus & Gelinas, 2006). Consensus is everything and yet nothing. Consensus is at the same time vital and superfluous when regarding standardization as a phenomenon. In the cases where creation is conceived through a de jure procedure, the role consensus plays may be exceedingly peripheral. It is of utmost importance when the entire process relies unabridged on voluntary adherence. The singular case where the importance would play a diminished role would be the de facto standards case. The market strategy creates a situation where conformance relies on competition and deferral in isolated instances. This makes that particular standardization occurrence the antecedent modus operandi contra voluntary adherence due to its inherent qualities. Founded on a reversal issue factuality is unraveled consequentially in this manner. Instigation of consensus can also be enforced through increasing the incentives for a certain participator. Contrived by the prevailing diffusion of

the application of a standard to the pertinent context as a concept in the case shown. There is an evident trace from Viktoria institutes attempt to procreate a vision, where networking efforts conceive awareness among the actors which enables a further development of the conditions needed to lay a foundation for a standard document. This is mainly on a conceptual level still. As work progresses increasing returns from building competence in the chairperson function along with same dispersed among the actors. Through word of mouth and formal channels of intelligence the reaction starts to procreate proliferation when it reaches the intended benefactors of the services enabled by the realization of a standardization effort. This operation is iterated through several refinements where an increasing wealth of conceivement and revelations is built up veering towards a critical mass. This combined with the omnipresent stochastic elements tipping the scale in favor of necessary to take a leap on the ladder of evolution towards a fully fledged standard in practice. The analysis in this essay of the interplay between design and diffusion suggests that the two phenomenon are highly reciprocal and interdependent and implies that it is possible to draw upon this to enhance the power and pace in standardization efforts. The benefits of this is highly dependent upon the manner in which the standardization efforts are conducted. High involvement of the actors and implementors and high levels of competence in the incumbent chairperson role are of essence.

The dedication of the project participants have throughout the project been of variant intensity. As previously observed (Lee & Oh 2005) the different stances towards the standard in itself include three varieties, one is supportive, which is exemplified in this project by the firms present at project meetings, openly advocating the idea of a standardization attempt at those meetings and contributing with technical expertise in the development of the artefact. This is the behavior that contributes most to development speed among the implementors.

The second stance, distinguished by an openly hostile behavior covered in the previous section is also productive, but in a completely different fashion. The development have been influenced through the reactions among the remaining implementors and actors as an increased resolve and determination is instilled in their minds. Obviously, it appears to them that the competition in the near future is between the participants and non-participants of the project as will be demonstrated below. The more hostile behaviors are displayed, the more apparent it becomes that their quotidian actions need a more careful consideration of their strategic implications. In order to avoid a situation where the project participants finds themselves in a role as satellites orbiting a centrally located powerful actor and being forced to adhere to the conditions this actors whims stipulate. The possibilities for maximizing profits are hardly optimal in such a state.
Although being hostile a reaction as any reaction to the procedure of creating a standard fortifies the position of a standard that has not yet reached embeddedness. As long as the creational forces are at work, the proponents greatest adversary is indifference. Diffusion of standards make profound impressions in organizations. Absence of diffusion provokes no tangible or sublime reactions. In the cases where diffusion does provoke reactions, be they hostile or favorable, they tend to stimulate diffusion as demonstrated in theories such as increasing returns or bandwagon effect in economic theory. And, as they promote market efficiency and expansion, the impact is ever increased. As previously described, these are the main tools driving development of de facto standards. Thus, there is an element of irony in that the market actor that relies on the impetus incurred by the same forces effectively contributes to the diffusion and through its actions actually strengthens the standards position in two ways; the direct response from the remaining actors with increased resolve as well as the picture becomes more clear, in that the monopolistic actor also admits to the project standards viability as it is regarded as a threat to the proprietary standard developed and maintained by the firm itself. A standard that does not possess technical completeness and a ready extent of diffusion cannot be regarded as viable (Lee & Oh 2005, Fomin & Keil 1999).

6. Implications

Future research could be concerned with applying existing theories and models to the design/diffusion concept. A further investigation of how other variants of standardization efforts are susceptible to the forms of design and diffusion interaction that have been prevalent in the standardization efforts in our case analysis. It would be rewarding to examine how formal standardization procedures could benefit from insights of design and diffusion interplay. Indications of increased possibilities to do business have not yet been realized, although there are already industry implementations of the standard the evidences pertaining to a widened rim of needs possible to cater to is lacking. This, however are changes just around the corner as the consortium is active, a dubbed and branded group have been established that is responsible for stability and continuous development of the standard. As these changes occur, it would be rewarding to trace changes and innovations utilized in business workflows driven and enabled by the standard and in the manner this standardization effort was construed and conducted. Further, to be able to show the individual actors magnitude in their actions related to the size of their respective organizations as vertical standards are implied to empower smaller actors.

7. Conclusions

This paper recognizes that the literature on standards is in many aspects lacking. The vast majority of previous studies have been done "with one eye closed" hitherto. One area of study have been concerned with the creation of the artefact's. This is analyzed in several different ways such as design theory, sense-making and ANT. The research have actually been occupied with the examination of the creation of an artefact possessing a distillation of the interests of nations, firms or individuals. The standards have been implemented standalone, coupled and/or merged with a set of rules or regulations, manifested by a published document (Pember 2006). The contrariety areas subject of study are being concerned with the usage and selection of standards. Simply put, it is expressed that there is a missing link between the two ways of viewing standards and the making and usage of them. Using vertical standards to ameliorate this deficiency to invigorate standards research and taking an all encompassing grip on the standardization procedure, showing that design and diffusion are phenomenon important to examine and understand in order to design procedures able to draw upon the benefits of using the 'natural forces' of social interaction and more closely intertwine the standardization processes' methods of creational ability with similar procedures in the social interaction such as norms. If standards design processes have a tendency to be created more bottom-up, then the interaction between design and diffusion plays a more vital role. Integrating the two might even prove necessary to reach a state of embeddedness with fully realized potential in terms of service cardinality, efficiency and usability in markets. The contribution of this essay is affirmation of the reciprocal relationship between design and diffusion in the standardization procedure. The constituting parts in this phenomena partnership covers the display of how diffusion steers design decisions in the development of the case standard and actions and how design impacts diffusion and promulgation of the standard and its protocol.

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9. Appendix

9.1. Journals:

“ACM SIGecom Exchanges” (http://www.acm.org/)

“Communications ACM” (http://www.acm.org/pubs/cacm/)

"Journal of Information Systems" (http://accounting.utep.edu/jis/)

"European Journal of Information Systems" (http://www.palgrave-journals.com/ejis/index.html)

"Information Systems Journal" (http://disc.brunel.ac.uk/isj/)

"Informations Systems Research" (http://iol-a.informs.org/site/ISR/)

"Journal of Management Information Systems" (http://jmis.bentley.edu/)

"Knowledge, Technology and Policy" (Piscataway, N.J. : Transaction Publications, Rutgers University, ISSN 0897-1986)

"International Journal of IT Standards and Standardization Research" (http://idea-group.com)

"Journal of Strategic Information Systems" (http://www.elsevier.com)

"MISQ" (http://www.misq.org) as in two special issues on standards and standardization in 2003 and 2006 (http://www.si.umich.edu/misq-stds/ and http://www.misq.org)

"Records Management Journal" (http://www.aslib.co.uk/rmj/)

“Research Policy” (http://www.elsevier.com)

"Standards Policy for Information Infrastructure" (http://mitpress.mit.edu/catalog/item/default.asp?tid=6633&ttype=2)

"Standard View" (http://acm.org/)

"Working Papers on Information Environments Systems and Organizations"(http://sprouts.case.edu/)

9.2. Conferences:

"Annual Telecommunications Policy Research"

"International Conference on Information Systems"

"ACM symposium on Applied Computing"

"Standards and Public Policy Conference" (http://www.chicagofed.org/news_and_conferences/conferences_and_events/2004_standards_emerging_payments_agenda.cfm).