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Potential changes to compensation possibilities in the European telecommunications standardization system

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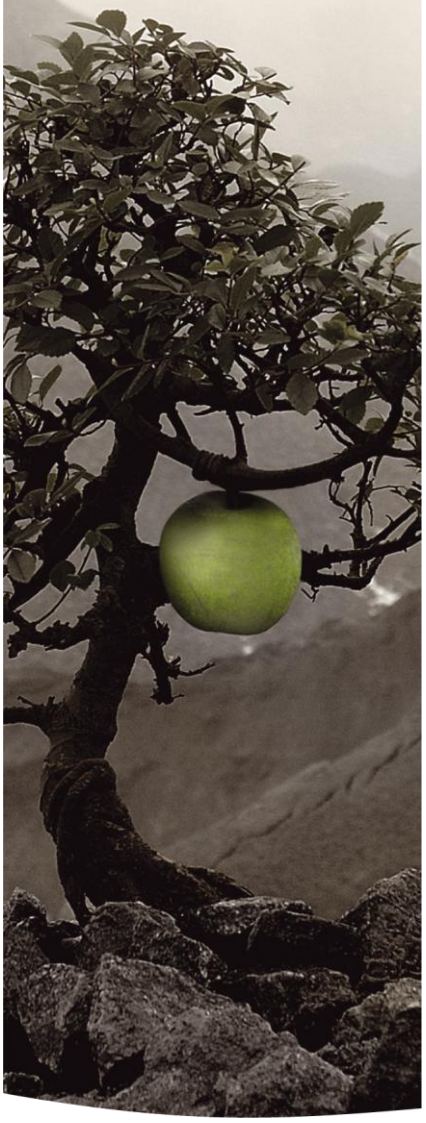

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Executive summary

Within the telecommunications industry most standards are decided in the SSO's where representatives from actors from the different parts of the value chain are represented. The discussions in these forums in the different SSO's are limited to being of a technological content and not business in order to simplify the discussions and decisions made about the new standards. The telecommunications industry is defined by the standards and the IP-holders of the innovations included in the standards are subjected to license according to FRAND rules as long as they are members of the SSO's. Patents that either belong to actors outside the SSO's or patents of members within the SSO's that are not part of the standard are subjected to licenses that are negotiated individually between the different actors.

This current standardization system is characterized by conflict and a lack of clarity, due to a lack of administrative clarity and of consensus regarding the interpretation of policies such as FRAND licensing. Members of the SSO's are believed to take advantage of this fact by demanding high royalties from the licensees. Current complaints include the perception that licensing costs are unduly burdening the costs required to produce mobile terminals based on standardized innovation. The inability to monitor the royalties opposed by the different IP-holders has resulted in the total price for licensing all essential patents within a standard for a licensee to become too high and in no way FRAND.

The conflicts in the system have motivated actors to present changes to the current structures of the system, and these will most likely impact the compensation possibilities for actors involved in standardization. In this thesis the focus is placed on analyzing four such potential changes and their impact on compensation possibilities. These four scenarios concern Patent Pools, Royalty Caps, Ex Ante Declaration and New Standards Bodies. These scenarios and the material used to analyze and determine the effects of scenarios like those being implemented are a product of interviews with mainly a major Swedish IP-holder within the telecommunication industry, law and market studies and last but not least the actual ongoing discussions about changes within the SSO's made by the different actors/members of the SSO's.

As will be seen in this thesis all these new proposals although they will indisputably solve some of the problems with the current standardization system, they will also present difficulties in terms of implementation and the creation of consensus. A key conclusion of the thesis is that such changes can lead to a number of different outcomes based on their implementation, and recommendations are therefore made for the strategically aware actor wishing to initiate such changes in a beneficial manner.

Table of Contents

1. Introduction

This introductory chapter presents an overview of the general issues that underlie the purpose and scope of this thesis. The chapter brings up the approach taken by the authors to the thesis, the background to which the thesis applies, and some of the methodological considerations taken into account when designing the scope of the thesis as such.

Standardization within the telecommunication sector has been the dominant market strategy since the deregulation of the state telecom monopolies. The current system has been rid of the strict regulations of state control, but the technology and market specific requirements of the telecommunications field have given rise to a compromise system, in which free market actors voluntarily submit to regulation and coordination intended to create standardized development and diffusion of technological value. As the structures established to bring about this regulation are primarily initiatives controlled and originated by market actors, the struggle between the interests of these actors is represented by a lack of clarity and established homogeneity in the collection of structures and mechanisms termed the "standardization system" within this thesis. Policies such as FRAND licensing and an unwillingness on the part of the administrative organs of this system, the standards setting organizations (SSO's) has created a system that gives the appearance of order but contains both confusion, conflict, and potential for the strategically aware actor to bring about influences suiting its market and development strategies.

The lack of clarity in the system has lead to great potential for change in compensation possibilities, which is the driving mechanism of maintaining the system in the first place. Combining the various interests of the actors in the standardization system who, as will be demonstrated, span several levels of the traditional value chain, leads to a number of often vaguely worded compromises. Without support structures outside of the market to clarify and enforce these compromises, actors often end up committing to a joint policy but interpret it in radically different ways. In terms of compensation, this leads to disparate understandings of the central tenets of fair, reasonable and non-discriminatory, and opens up possibilities for conflicts regarding the perceived burdens of costs related, primarily, to intellectual property.

The thesis also looks at how actors within the SSO's adapt to the lack of clarity in the aforementioned structures, and create the foundation for joint technological innovation on a basis of veiled competition and market conflict. This climate of competition and collaboration creates complexity, and actors

wanting to maximize their value exploitation have clear incentives to manipulate the system as far as possible, considering the lack of clearly defined and enforced sanctions. In others words there is a strong conflict of interest and power struggle, where the actors/members are challenged by the need to be able to predict and react to changes to obtain a leading position within the industry. The thesis takes as its starting point this semi-chaotic structure, and suggests means by which the strategically aware actor can influence the structures of the system to maximize their own control over and gain from the system.

1.2 Background

Telecommunication refers to communication over long distances and covers all kind of communication forms through radio, telegraphy, television, telephony, data communication and computer networking. Telecommunications on the other hand refer to the underlying technology or as according to ITU (2000), "Any transmission, emission or reception of signs, signals, writing, images and sound or intelligence of any definition applies to at least two different kinds of communicating at a distance, traditional telecommunications and broadcasting.[1]"

The elements of a telecommunication system are a transmitter, a medium and a channel imposed on the medium, and a receiver. The transmitter is the device that will transform or encode the message into a physical phenomenon; the signal. The transmission medium will then modify or degrade the signal that is transmitted from the transmitter to the receiver. The receiver with its decoding mechanism will recover the message and the end-user will thereby have access to the information sent[2]. In other words a basic communications system consists of end user equipment, network access connections, network interconnection devices and a control system that coordinates the network[3] and thus a lot of actors fulfilling all those functions.

In figure 01 the basic telecommunications system is presented. There can be different types of end user equipment used to allow customers to access network and thus one or more communication systems. The access network links the customer to a communication network through copper wire, coax or fiber[4]. Different communication networks can be interconnected to each other and connect end users to other end users or information services.

1 ITU 2000
2 Lindmark, 2002
3 Harte et al, 2002
4 Lindmark, 2002

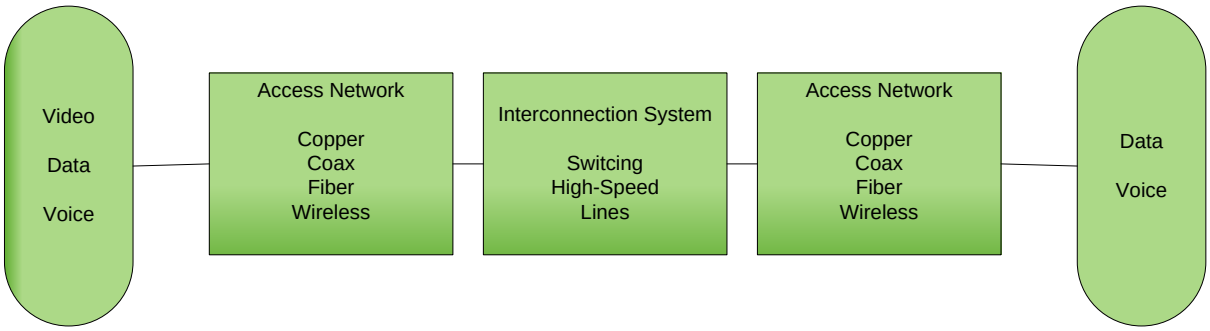

Figure 01: Basic Telecommunication System[5]

The telecommunications industry has a long tradition in standardization since it is the founder of standardization. As one can understand from the short description of a telecommunication system there are many actors involved in different ways contributing to services, hardware and software that will enable communication between two physical entities. In order to make sure that new innovations would be diffused and used in a wide scale to avoid practical problems that could occur by implementing different systems, the standardization and thus the SSO's became forums to regulate and monitor the actors within this industry. The majority of the future technologies like 3G, MPEG, etc are discussed and adopted in these forums. One could say that opposed to courts and regulations the telecommunication industry and the players on it look at the SSO's for guidance.

As expected some players driven by the monetary and power aspect that want to maximize their own wealth by increasing income and decreasing their costs, work towards altering the regulations within these forums to achieve that. One of the primary motivations for the study undertaken in the thesis is a recent proposal by a coalition of mobile telephony operators, spearheaded by Vodafone, which attempts to address a perceived imbalance in compensation between actors in the standardization system. Vodafone, and its partners, assert that the major owners of intellectual property within the system are allowing costs related to those properties to unduly burden the remainder of the system, through, for example, licensing costs, and that this is inflating the costs to the end-user of actually purchasing the mobile handsets incorporating standardized technologies. In a challenge to the major European telecommunications standards setting organization ETSI (the European Telecommunications Standardization Institute) in November 2005, the Vodafone-led group demanded a complete overhaul of the current licensing structures permitted under ETSI policies, and this proposal, and some of its suggested changes, forms the basis for analysis of tools and conflicts within the standardization system as a whole.

5 Lindmark, 2002

1.3 The objective

Given the current situation of the debates within SSO's for eventual changes in the system, this thesis will concentrate on (1) describing the System that all actors are involved within the telecommunication industry, (2) defining the role of the key actors within the System and (3) try to define what the System could look like in the future regarding the proposals made by the actors the past six months when this thesis begun. It is about providing actors in the standardization system with the necessary awareness to predict and react to potential changes in the compensation possibilities inherent in the system. In order to achieve this as mentioned earlier, the thesis provides: an overview of the factors that created the current system, including the development of the market and relevant SSO's; an analysis of the value structures that comprise the system; and a prognosis of the potential changes facing the system grounded in current challenges proposed by actors in the system. These milestones are used as a knowledge base to reach the objective of the study which is to provide an overview of the standardization system that allows actors in the telecommunications industry to predict changes in the compensation possibilities for major IP-holders in the System.

1.4 Delimitations

Concerning the scale of the telecommunication industry and actors involved it became necessary to make some delimitations in order to be able to grasp this problem area. The delimitations made concern geographical, SSO's, actors and timeline issues. The study focuses on what is happening within Europe and the telecommunications industry and its SSO's. Since there are several kinds of standards, this study is limited to focusing on those concerning telecommunications that are de jure and open as well as promoting interoperability/comparability. The extensive number of actors in the telecommunication industry makes it almost impossible to consider all actors involved and their individual roles in any given setting, therefore in this study the focus is on the major IP-holders, their roles and the IP licensees involved. Since the discussion about changes in the SSO's has been going on for a while and is not nearly finished, the study will concentrate on major events before the thesis began in November 2005, and projected possible results of the discussion.

2. Methodology

As stated in the introduction the main objective of this study is to provide an overview of the standardization system that allows actors in the telecommunication industry to predict changes in the compensation possibilities for major IP-holders in the System. In this following chapter the methodology behind how the thesis was outlined and the information for the analysis and conclusion gathered will be outlined.

The corner stone of this thesis is to look at probable future scenarios that could influence the compensation possibilities for the major IP-holders in the telecommunication's value chain. These probable scenarios are a product of discussions taking place with a Swedish major IP-holder within the telecommunications industry and some of the proposals actually used during the discussions in the SSO's by different key actors. The vision is to create solutions that can help in avoiding compensation losses in the future, but the aim is to discuss whether or not these scenarios are probable. To achieve the study's objective information and a thorough understanding of the System at work today must be gathered and analyzed.

All information gathering, the results and the assumptions made in this study are largely influenced by the methods chosen to select and process the information. There are different approaches (investigation and collection of data) and ways to gain knowledge (scientific method), which are going to be analyzed later in this chapter. The approach used to reach conclusions is presented in figure 02 and is divided in three stages: theoretical, empirical and analytical. In this study only qualitative methods such as questionnaires and individual interviews have been used in different stages of the study to gather information. There is a point in using both quantitative and qualitative methods because in this way they compensate each others weaknesses. However, due to the nature of the study and limited response to the questionnaire that was sent out the study because of this lack of extensive empirical findings is of qualitative nature.

Individual interviews have been used to find out what is common and representative for a company active in the standardization organizations.[6] The interviews held were semi structured with employees from a Swedish major IP-holder within the telecommunications industry chosen to gain the basic understanding of the System. The questionnaire as well as some additional interviews have been used

6 Göransson Agneta G. (1995), Kvinnor och män i civilingenjörsutbildning,
Chalmers Tekniska Högskola, Göteborg, Utgiven av Pedagogiska enhet vid Forsknings- och utbildningsbyrån, CTH, ISBN 91-7197-103-3

to discover any deviation in how individuals, representing companies from different positions in the telecommunication's value chain, perceive the System and future possibilities to alterations of it.[7] Why and how this method was chosen to collect the data and some of the disadvantages with choosing those as well as difficulties and failures of the methods chosen to collect empirical data in particularly will be described later on.

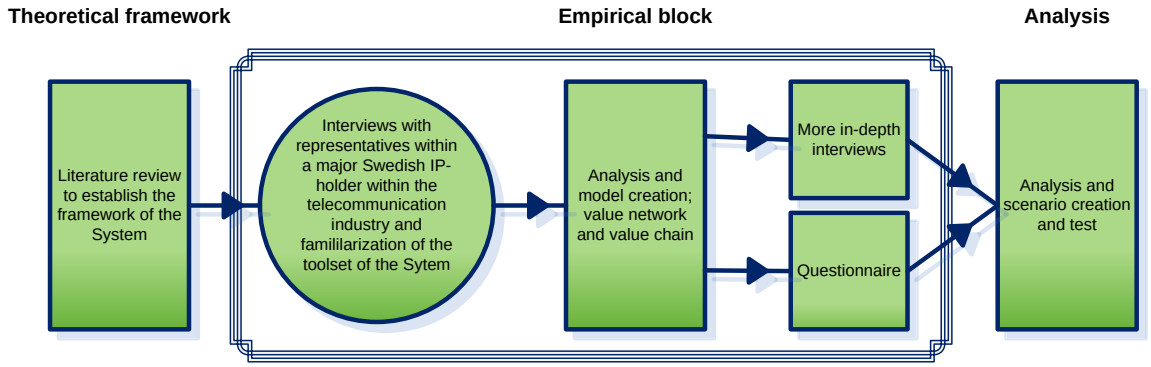

Figure 02. The approach of the study.

2.1 Theoretical framework

The approach of this thesis as outlined in figure 02, consisted of three critical steps. The first step was to find literature to understand the legal system and raise of standardization organizations. It is important to understand fundamental conceptions such as patent and the rights derived from being an IP-holder, the legal aspects of being part of a standardization body or consortia and the historical development of the telecommunication industry in terms of establishing dominant designs and technologies through out the world. To be able to understand the forces driving for change in the standardization settings depending on the role and structural control of the different actors involved in the telecommunication chain, there was a need of models to analyze and understand the System from different perspectives. The aim by using these models was to gain a general description of the current System. However, since the system analyzed and described in this thesis is complex in its nature and has both tangible and intangible value flows attributed to it, the need for analysis models covering both of these attributes is apparent. Many of the models in traditional literature concerning industry analysis are concerned more with the material flows and in many cases disregard or undermine the intellectual flows and structures that are the source for the main value creation among actors in the telecommunication industry. Thus in this study there is a combination of traditional models, tentative

7 ibid

models on the subject of intellectual value creation and even models created after the empirical information gathering for this study's objectives. However, in order to be more pedagogical all models used in analyzing the System will be presented in this section regardless of their origin (traditional or not).

The theoretical framework begins by presenting and discussing the IA-IP-IC way of thinking that is represented throughout this study. The model is used for defining intellectual value by relative gradation and originally created by Professor Ulf Petrusson, however some minor changes have been made to make the model more relevant to the standardization realities.

The standardization value network focuses on describing the system of standardization-related processes, and on mapping the flow of value throughout this system. The idea behind this model is that value is added through various contributive processes until one reaches the market, where value flows in the other direction, in the form of compensation for the value-generating activities. This model depicts how legislative normative structures, regulatory normative structures and specifications within standardization interact to form standardization creation and implementation. The model originates in the material gathered during the interviews and applies the value definition model created by Professor Ulf Petrusson.

In order to understand the industry better Porter's five forces has been used to analyze the situation statically. The model is used as a first step in understanding the forces that create and change the rules of doing business within the industry. In this study the model has been used to describe the same industry but from two different actors' perspective to gain the most holistic picture possible.

The telecommunication value chain is influenced from the traditional material chain way of thinking but with a value creation dimension to it. Thus the model looks more like a network and not a chain, where the flows (intellectual, virtual and material) between the different actors are shown. The model is almost entirely based on the empirical material gathered during the interviews with the large IP-holder in the telecommunications industry.

Together all these models will provide the means for understanding and analyzing the telecommunication industry and its actors. In this way one is able to describe and analyze reality to identify potential conflicts within the system and thus the triggers or means of change. The next step is testing possible future scenarios to see if they are possible indeed and what the consequences of a

change would be for actors involved. A short description of the benefits, disadvantages and the modifications of the models chosen for the analysis and description of the industry will now follow.

2.1.1 Petrusson's IA – IP – IC Model

In order to achieve a useful description of the standardization system, and the activities therein, it will be necessary to analyze a few key concepts in greater depth. This need arises partly from the complexity of these terms, but also from the fact that they have often been used indiscriminately and interchangeably, without any concerns as to establishing an internally consistent framework for their usage. One such term is intellectual value. This term is critical to any description of activities in the knowledge economy, as most if not all analysts agree that the preeminent value transactions of the new economy will not be material, or the sometimes uncomfortable hybrid of the intellectual and the material, monetary value, but will rather be entirely intellectual in nature. Naturally, such a crucial and untested concept will be subject to a number of attempts to explain and define it, ranging from the uselessly vague[8] to the inappropriately specific[9]. When establishing the theoretical framework of this thesis, therefore, the problem was not a lack of available definitions but a surfeit. Very few of these definitions, however, were able to meet the theoretical needs of the thesis, or suited to describe the intellectual value development as it applied to standardization. Thus a definition of some key concepts is necessary to make in the beginning in order for everyone reading this report to have the same basic idea when it comes to these concepts.

2.1.2 The Advantages of a Value Network Approach [10]

A value network provides three primary benefits over traditional forms of mapping value transfers within systems – added complexity, added detail, and added flexibility. The network perspective adds complexity to the task of mapping value by providing a two-dimensional interface for the process, as opposed to the traditional vertical or horizontal lines of value transfer. This reflects the understanding that value transfer dynamics are rarely linear, and must, for example, incorporate transfer structures which can affect actors both in the beginning, middle, and end of the system being mapped, concurrently in order to provide a map approximating real-life relationships. At the same time, the value transfer structures must obviously be able to transfer value in more than one or two directions at once, something which is difficult to make comprehensible in a one-dimensional representation. In the

8 "Intellectual capital is knowledge that can be exploited for some money-making or other useful purpose."
9 "[T]he difference between the book value of an organization (based on tangible assets) and the market value." – Incubator's glossary, Promitheas, http://www.promitheas.com/glossary.php 09/02/05
10 "The key business question in the knowledge economy is, "How is value created?" The traditional answer to that question is – "through the value chain." The value chain model, however, is a linear mechanistic model of business that is based on the industrial age production line. Such a mechanistic model is simply inadequate to understand the complexities of value in the knowledge economy." Understanding Value Networks, Verna Allee Associates

value network drawn up for this thesis, this two-dimensional freedom helps demonstrate the effects of standardization organs and technical standards on value dynamics within the system, as these phenomena exist outside the traditional, actor-based value chain, yet have a substantial impact on the structure of value flows within the system.

The added detail that is possible to portray through a value network is derived mainly from the fact that the intellectual value network focuses on processes and activities in the system, rather than using an actor-based classification system. While the mapping of actors has a definite role in viewing value transfer systems and simplifies the attribution of action and value flows to real-life entities, the depiction of each actor as a homogenous, closed entity with a single, undifferentiated effect on the value dynamics within the system. As soon as one wishes to understand exactly what process and which activities create or affect value, a nuanced perspective is necessary. in this way, the value network can increase understanding both of external relations but also of internal processes, which is a clear advantage to most companies. When portraying the specific dynamics of the standardization system, this process-focus helps arrange processes in an orderly format demonstrating their effects on value dynamics, rather than having the process constantly double back and bounce from actor to actor.

Finally, a value network approach provides far greater flexibility than traditional methods of mapping value systems, partly by combining the two advantages already mentioned. The two-dimensional approach, for example, allows for several different kinds of processes and actors to be mapped – as there is no longer a linear progression, either chronological or in terms of closeness to the market, relatively static influences such as normative structures can be mapped next to dynamic market actors. Flexibility is also achieved through the fact that it is no longer quite as necessary to 'pigeonhole' each entity – if, for example, one intends to place Ericsson into the standardization value network, one would have to place them in almost every single category of value-affecting entities, with constant market interactions on every level and value flows in every direction. Mapping Ericsson's separate processes into the same, on the other hand, allows one to precisely and accurately link a number of specific activities to their place in and effect on the value transfer system. For this reason, the value network can be adapted to far more situations than the traditional methods of mapping value transfer flows.

2.1.3 Limitations of the value network

While a value network provides a dimension of understanding that is absent from the traditional value chain model, and illuminates some of the otherwise hidden transfers of value in the system, there are

of course limitations to such a model as well. As mentioned, the intellectual value network is primarily a map of dynamic processes and the interactions of those processes in generating and impacting value. While this has its advantages, it is clear that for many strategic decisions it is preferable to use models that are actor-oriented, and focus on showing the relationships of entire actors within the system. Relative competitive positions are not easily demonstrated with a network approach to value mapping, as each actor is sub-divided into its various functions. On the other hand, the value network helps identify strategic 'choke points' in the value flows of the system, and gives an understanding of the underpinnings of the market dynamic, rather than the current landscape. For the purposes of this thesis, it was felt that a more generic, detailed view of the standardization system dynamics was needed, and that the relative positions of actors in that system could be mapped with a more traditional value chain.

2.1.4 Porter's model for Industry Analysis

To gain structural control a company has to be aware of the market it is active within. The market, and thus the industry have to be thoroughly analyzed in order to identify opportunities and threats - that can become an opportunity. Porter has developed such a model that enables the external analysis of a company's environment. The five forces model by Porter[11] is an outside-in business strategy tool that is used to analyze the attractiveness of an industry structure. The tool can preferable be used to get a better understanding of a new market and to identify where businesses, products or services will have the potential to be profitable as well as to study the rules of success in the established markets. The fundamental idea is that a business success will be determined by Porter's five forces: the bargaining power of (1) suppliers and (2) buyers, the (3) rivalry among incumbent firms, and the threat from (4) substitutes and (5) new entrants, as illustrated in the figure 0.

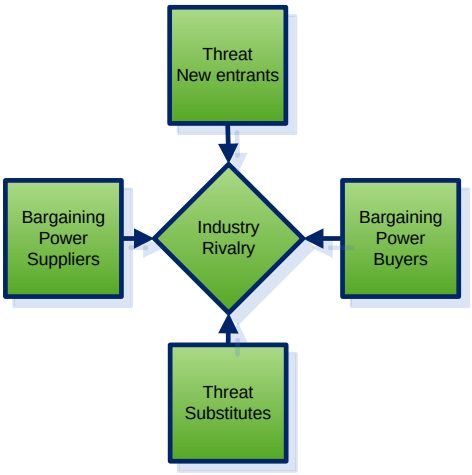

Figure 03. Porter's Five Forces

Using Porter's structures of five has its
h a static picture or a snapshot of the existing market for a product-based company. It does not take changes into consideration, which in other

11 Porter, M, (2004) Competitive Strategy: Techniques for Analyzing Industries and Competitors. Free Press, New York.

12 Hill, C. W. L. and Jones, G. R. (2001) Strategic Management Theory, Fifth edition. Houghton Mifflin Company, Boston.

words means that it is not dynamic and takes under consideration only one of the company's roles on the market. Keeping this in mind will bring us closer to the truth and enable us to see the result with a critical eye. Since the market is defined by changes and is a dynamic environment, we will have to adjust the strategy on each given situation. When analyzing the market with the help of the structures of five it is important to keep two things in mind; how the analyzed company will address the competitive marketplace and how it will implement and support its day-to-day operations. In this study Porter's five forces model is applied with two different actors as the focus in order to obtain a better picture of reality, since on actor can have different roles depending on which actors one focuses on to describe all the others. In this way some of the disadvantages with the model are neutralized.

2.1.5 The Intellectual value chain

A material chain is created through the integration of different actors on the market (figure 04). To produce a product and supply it to the market a material chain is created and the product has to pass through all the stages to reach the end consumer. Through the material chain, the product will be passed from one actor to another until it reaches the desired form and the delivered to the customer. However, thus in the material value chain only the money flows for the physical product compensation are regarded, in the telecommunication filed there are more flows and actors that are interesting from a structural control perspective.

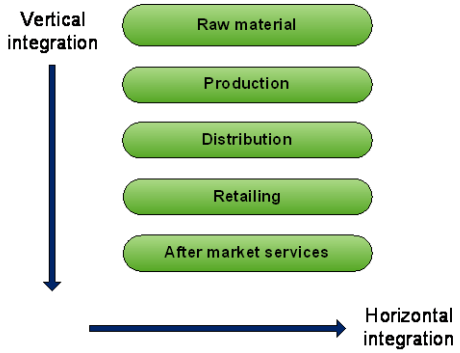

Figure 04. The material value chain

In the real world the truth is more complicated and there are more actors involved in the process as the value flows increase in number. There are three main value flows; material, virtual and intellectual. The last two regard intangible asset movements and are in particular of interest in the telecommunication industry. A typical value chain for the telecommunication industry will be presented later in this study and is largely influenced from the information gathered during the interviews. The chain that looks more like a network is a hybrid value chain including all three types of assets mentioned earlier as well as a fourth flow i.e. monetary flow.

2.2 Empirical Block

The empirical block contains the methodology as to how the empirical information in this study was gathered. The main source of all empirical information is the interviews made at a major IP-holder

within the telecommunication industry in Sweden. The information gathered is not presented as such but is the ground for many models made during this study and the source of some of the scenarios tested in the end.

2.2.1 The interviews

The scientific method for gaining knowledge in a specific subject can be described with the help of the two philosophical traditions; epistemology and ontology. Epistemology is one kind of knowledge theory, while ontology is the way the world is characterized and is synonymous to metaphysics even if they do not have the same charge as the word metaphysics.[13] Ontology can be divided into different theoretical starting points where the two extremes are realism and idealism. The authors describe realism as a conviction that people can get the true picture of the world while idealism means the knowledge never can be separated from consciousness.[14] In other words one can see that the difference between epistemology and ontology are not quite obvious.

In this study since most of the empirical material is taken from interviews, a true picture of the reality was not anticipated to be found. Therefore the authors' own consciousness and interpretation are thought to have played a significant role in how the reality was perceived in the end. In other words the knowledge derived in this study is believed to be more close to idealism than realism.

Within ontology there is a distinction between subject and object also made when idealism and realism are concerned. Some authors believe that the scientific tradition of objectivism is positive because it is implied that knowledge and the theories about it can be explained through cause and effect relationships.[15] In other words this means that the human behavior is decided both socially and biologically before hand. Andersson makes a connection between the subjectivist traditions to the non positivist since it will mean that the social world can not be explained with a theory that assumes that everything is done according to a set of rules.[16] This means that the social nature cannot be studied without studying the human participation. Since the reality will be influenced by the observer and thus could be explained in many different ways rather than one correct way, will the picture of the System presented in this study be objective. In other words will reality as presented in this study be subjective.

13 Sohlberg B. M, Sohlberg P. (2001) Kunskapens former – Vetenskapsteori och forskningsmentod. Liber AB, Stockholm.
14 ibid
15 Andersson C. (2000) Kunskapssyn och lärande – I samhälle och arbetsliv. Studentlitteratur, Lund.
Sohlberg B. M, Sohlberg P. (2001) Kunskapens former – Vetenskapsteori och forskningsmentod. Liber AB, Stockholm.
16 Andersson C. (2000) Kunskapssyn och lärande – I samhälle och arbetsliv. Studentlitteratur, Lund.

According to Trost and Jacobsen there are two kinds of interviews; qualitative and quantitative.[17] A qualitative interview is characterized by the easy questions that are asked and the complex answers that are received. After having an interview like that the interviewer has gathered a lot of complex material which with a lot of work and analysis will result in many interesting patterns, opinions etc. Many believe that qualitative studies are pre-studies for the quantitative interviews.[18] The quantitative method, on the other hand, provides an overall picture which gives increased understanding of the social processes and their context.[19] Quantitative studies are believed to be better because they are less speculative than the qualitative and therefore people can understand the outcome easier. In this study both qualitative and quantitative interviews have been carried out. The interviews were conducted in two different stages of the study, with the first sessions being qualitative with open questions to understand the System, followed by quantitative interviews with more in-depth questions to verify and create a better understanding of what was said in the first interview round.

After these fundamental conceptions were identified and analyzed, interviews with representatives from Ericsson with different positions and levels of the hierarchy were conducted. The interviews had a duration of one hour and the questions asked were of an open character. The aim was to get acquainted with the processes inside Ericsson concerning licensing and standardization work; from idea to licensing the technology. Which questions were asked during the interviews depended a lot on the position of the interviewee and thus the level of knowledge on the specific area. The information gathered had also a higher purpose, namely to understand the custom way of doing business within standardization bodies. The purpose was to get a feel for the system today and start to identify possible conflicts that would help in conceptualizing the different scenarios threatening the compensation of the rightful IP-holders. The information gathered during the interviews together with the authors own analysis of the System gave birth to the standardization value network that was connected to the intellectual and manufacturing value chain of the telecommunication industry (see figure 10).

The interviews in this stage were divided into two steps. In the first stage the interviewees were send a standard questionnaire containing five key question areas. As stated in the questionnaire they represented the viewpoints of several different actors and not necessarily those of the authors. However, the questions were thought cover the main areas of the thesis and therefore the interviewees were asked to comment upon them from their company's perspective. In the second part the

17 Trost, J. (1997). Kvalitativa intervjuer, Studentlitteratur, Lund
Jacobsen D. I. (2002) Vad, hur och varför? Om metodval i företagsekonomi och andra samhällsvetenskapliga ämnen. Studentlitteratur, Lund.
18 Trost, J. (1997). Kvalitativa intervjuer, Studentlitteratur, Lund
19 Holme, I.M. and Solvang, B.K. (1997) Forskningsmetodik – Om kvalitativa och kvantitativa metoder, Studentlitteratur, Lund, Sweden

interviewees were once more contacted to comment their responses more in depth and in that way verify themselves what they have said is truly what they think. In this phase an expert with a lot of experience within the telecommunication field was interviewed through a telephone conference that hade a duration of one hour. The question asked during this interview were based in the findings from the previous interviews and they had therefore a more statement character were the interviewee was provoked to confirm or reject the information and believes previously gathered.

2.2.2 The questionnaire

In step three, a questionnaire and interviews with other representatives from the telecommunication value chain, besides Ericsson were used as tolls to gather more information. For this stage key actors in the value chain were identified. To have as big diversity as possible actors representing different roles on the value chain were contacted by phone and e-mail. Unfortunately not all actors contacted were willing to participate in the study. The authors found the reason for the companies not wanting to partake in the study to be a combination of the subject being too confidential to talk about or that it was hard to get in touch with the right people dealing with this kind of issues. However, in the end some interviews were conducted but had not the diversity that was intended in the beginning. The actors interviewed were representatives from Ericsson.

According to Trost, questionnaires have a lot in common with personal interviews.[20] There is though one big difference between the techniques, which is that all questionnaires are characterized by the fact that it is the interviewee that notes the answers to the questions and therefore there is no interviewer. There are two types of questionnaires, according to Trost.[21] One is sent to the interviewees and the other is given to them in person. The type that Trost focuses on is the one that is sent to people, which is what has been used in this study.[22] The process of doing a questionnaire always starts with identifying the objective of the study. In this master thesis one of the aims is to find out the different drivers for the actors involved in the telecommunication's value chain. By using the questionnaire an identification of the IP and money flows in the telecommunication's value chain is done to later identify the parameters that trigger the different actors towards change. For this purpose a short questionnaire was sent to representatives from companies representing the different actors in the System.

20 Trost J. (1994). Enkätboken, Studentlitteratur, Lund, Sweden
21 ibid
22 ibid

The second choice that has to be made is if the survey should be qualitative or quantitative. A quantitative study is when numbers or numerical words are used. Qualitative thinking means avoiding these kinds of comparisons.[23] Qualitative and quantitative surveys are possible to combine. Since the purpose of the questionnaire in this master thesis is to find out what drives the different actors to wanting to change the rules of the System and thus the value drivers, the questionnaire is qualitative.

The third thing that has to be considered when preparing a questionnaire is, according to Trost, which population should be included.[24] The questionnaire in this master thesis includes key persons working with the standardization and licensing department within their company. If the whole population can not be included in the survey representative selection of interviewees has to be made to get a faire opinion of the preferences of the chosen population according to Trost.[25] How the selection should be made and how big it should be needs to be decided from the beginning. In this study it was decided to send the questionnaires to key companies representing the different actors within the telecommunication's value chain. The companies were chosen based on a number of significant factors, the determination of which was arrived at both through the interviews with a Swedish major IP-holder within the telecommunications industry, as well as studies of the drivers of standardization work. These factors included the actors' market significance, their influence in standardization organizations, and their role in illustrating the key problems discussed in the thesis. While it was impossible to quantify these factors, and thus objectively rank the significance of each actor, as the factors were chosen on a qualitative basis, it was nonetheless possible to informally validate our selection methods through noting reactions and attitudes during the interviews. Based on this, it was concluded that the companies chosen were satisfactorily representative of our thesis problem, and constituted some of the key actors within the telecommunications industry.

According to Trost it is desirable to reach a high level of homogeneity when most questionnaires are considered.[26] This is because homogeneity makes it possible to compare answers and make statements about the opinions of a whole population, which is why the questions in the questionnaire send to the different representatives were standard disregarding the type of actor they represent in the telecommunication's value chain. However, unfortunately although the questionnaire was sent to over 15 representatives from different companies but the answer frequency was very low. The reasons behind this low answering frequency is either the sensitivity nature of the questions asked on the questionnaire or/and the difficulty in finding the right people in the companies willing and able to

23 ibid
24 ibid
25 ibid
26 Trost J. (1994). Enkätboken, Studentlitteratur, Lund, Sweden

answer the questions asked. On the other hand a major Swedish network operator/operator answered to the questions, which made this study even more interesting having opinions from the two influential roles in a standardization process; the IP-holders and the operators. Having answers from this Swedish operator's employees makes it hard to generalize the answers for all the operators. However, after studying the resent events in the SSO's and taking into account the answers from the interviewees with the Swedish major IP-holder, one can say that the answers given from the Swedish major operator have confirmed what has been previously stated during the interviews and is in accordance with what is happening in the SSO arena right now that will be later discussed in this thesis.

2.3 Analysis

Jacobsen, as Andersson, talks about ontology and epistemology and refers to the two extreme cases of positivism and comprehension base attitude.[27] Jacobsen also makes a distinction between inductive and deductive way of gathering information as two extreme cases.[28] The deductive method is used when a researcher searches after empirical information that confirms the theoretical hypothesis and thus use the positivisms way of thinking. The downside with this method is that important information that is not seen as relevant is discarded. On the other hand there is the inductive way which is connected to a more understanding-based attitude according to Jacobsen.[29] In this study a combination of the two (deductive and inductive) was used in order to have a broader scope. Studying a company in the telecommunication's value chain is a good way to describe the environment they are active in and goes in line with the inductive way of searching after theory that support the study's objective.

According to Jacobsen this means that the observer/author/investigator will enter reality without almost any prejudice and than try to construct theories based on the empirical information gathered.[30] However, in reality it is impossible not to have any prejudice, and in this study the interviews were conducted after the theory was selected, but constituted the grounds for the creation of the some of the models used for the analysis of the System. This mean that the choice of theory in a way influenced how the information was interpreted during the interviews and all questions asked were derived from the specific theoretical way of thinking. However, in this study the material from the interviews was perceived with an open mind and the choice of theory and implications thereof were more dominating

27 Jacobsen D. I. (2002) Vad, hur och varför? Om metodval i företagsekonomi och andra samhällsvetenskapliga ämnen. Studentlitteratur, Lund.
Andersson C. (2000) Kunskapssyn och lärande – I samhälle och arbetsliv. Studentlitteratur, Lund.
28 Jacobsen D. I. (2002) Vad, hur och varför? Om metodval i företagsekonomi och andra samhällsvetenskapliga ämnen. Studentlitteratur, Lund.
29 ibid
30 Jacobsen D. I. (2002) Vad, hur och varför? Om metodval i företagsekonomi och andra samhällsvetenskapliga ämnen. Studentlitteratur, Lund.

in the analysis of this study. In other words there was an attempt made to combine induction and deduction throughout the study and thus the thesis. Both the material gathered during the interviews and the theoretical framework used in this thesis, set the grounds for the understanding of the System and are two sources of information that complement each other to find the truth.

As mentioned earlier this thesis is done in cooperation with a major Swedish IP-holder, and thus the objective and scope of the study was developed to include the companies own issues and interests in the matter at hand. However, the thesis is of interest for all active actors in the telecommunication industry since the scope of the study has been developed in that way. It has been in both the major Swedish IP-holder's interest and this thesis objective to see the issues from a broader and more holistic point of view. The issue of standardization and compensation opportunities concerns the whole value chain and thus all actors and their interests are of interest, which makes it highly relevant to start by establishing a broad understanding of the system to narrow down and concentrate in the areas of specific interest.

To gain all information necessary to understand and analyze the system to drive relevant conclusions in the form of probable scenarios affecting compensation opportunities in the standardization organizations, interviews, public documents and surveys were used as information sources. When the information was gathered and the models chosen or created the information went into the models and created a picture of the telecommunication industry, its actors and driving forces for control and role creation. After that four scenarios were chosen according to the information gathered from the interviews and the discussions on the different standardization forums. These scenarios were then analyzed as to what effects they would have if implemented for all parties involved.

2.4 Validity and reliability

The thesis is partly based on analysis of different kinds and as the chain never is stronger than its weakest link a conducted analysis may be more destructive than constructive. Our ability to interpret and use the different models must therefore be evaluated. In the final stage of this study our knowledge and understanding will be at a general level and there may be some blind spots in the theoretical coverage of the models. The level of uncertainty raises when most of the models that describe the System, the actors and their drives are a product of the authors own interpretations of reality. However, the material used for the interpretations were gathered through theoretical studies and interviews conducted with people involved in the different processes taking part in the

telecommunication's value chain, which should increase the level of validity and reliability of the models.

There is a point in having interviews in different stages of the study, not only to gather more information but also to confirm that what was derived from the first set of interviews is true for others active in the value chain, besides the major IP-holder the interviews were held with. The fact that the scenarios are tested through a discussion with representatives from this IP-holder active in the standardization and licensing work makes the scenarios more plausible and thus the description and relevance of those.

4. Defining intellectual value

This section presents the definition of intellectual value as used in this thesis. It outlines the need for creating a definition of intellectual value that is more rigorous and applicable to the standardization system than what is currently available, and introduces a model for this definition, based on the theories of Petrusson. The theoretical and philosophical basis for the model is discussed, and the model is presented and discussed. The limitations of the model are pointed out, and the model is redefined to apply to the standardization system.

In order to achieve a useful description of the standardization system, and the activities therein, it will be necessary to analyze a few key concepts in greater depth. This need arises partly from the complexity of these terms, but also from the fact that they have often been used indiscriminately and interchangeably, without any concerns as to establishing an internally consistent framework for their usage. One such term is intellectual value. This term is critical to any description of activities in the knowledge economy, as most if not all analysts agree that the preeminent value transactions of the new economy will not be material, or the sometimes uncomfortable hybrid of the intellectual and the material, monetary value, but will rather be entirely intellectual in nature. Naturally, such a crucial and untested concept will be subject to a number of attempts to explain and define it, ranging from the uselessly vague31 to the inappropriately specific32. When establishing the theoretical framework of this thesis, therefore, the problem was not a lack of available definitions but a surfeit. Very few of these definitions, however, were able to meet the theoretical needs of the thesis, or suited to describe the intellectual value development as it applied to standardization. What was needed was a definition

31 "Intellectual capital is knowledge that can be exploited for some money-making or other useful purpose." – HPC definition,
32 "[T]he difference between the book value of an organization (based on tangible assets) and the market value." – Incubator's glossary, Promitheas

that was internally consistent while specific enough to be applicable to real world examples. At the same time, the model needed to reflect the dynamic activities of standards creation as a value-creating process.

4.1 Social Constructionism

The theoretical basis for this model was created by Petrusson, and is the result of the application of the precepts of social constructionism to intellectual value creation and management. The social constructionist philosophy in turn, was pioneered by Berger and Luckmann,33 and is based, somewhat simply put, on the tenet that all knowledge, no matter how self-evident or undeniable, is the result of individual perception and, more importantly, the social interactions that form in the intersections of different perceptions. While different schools of social constructionism take different approaches to the ontological or epistemological nature of reality, there is widespread agreement that no matter what the nature of reality is, our perception of reality will always be far more important to understand. The social constructionist philosophy as such will not be the subject of in-depth analysis in this thesis, but it constitutes a theoretical cornerstone of the models created to describe the standardization system, and for this reason it was considered necessary to outline the fundamentals of social constructionism in order to explain some of the basic assumptions on which the models are based. Some of these assumptions can be stated quite simply:

- Reality is our perception of reality, as we cannot approach reality without perceiving it;
- All our perceptions are constructed through social interactions; thus
- Reality is a social construction.

These very simple concepts can be used to build up a critical, function-based approach to examining and deconstructing legal, social and business concepts, which is the basis of the approach pioneered by Petrusson. It is not necessary for the purpose of this thesis to understand or accept, for example, radical technological constructionism, but in order to understand the models used, the reader must be aware that they rest on certain assumptions: that value in a technological innovation is derived primarily from social perception of the innovation; that value can be increased through constructive activities (referred to as constructive activities or value packaging) that shape the social perception of the innovation; and that the constructive activities that shape social perception of an innovation can be defined and mapped to understand how real-world activities create value in an intellectualized context such as the standardization system. These activities, understood through this approach, are what

33 Berger, P. L. and T. Luckmann

constitute intellectual value management. Within this thesis, two models based on the concepts of intellectual value management will be applied to the standardization system, to enable a critical understanding of that system: the model of the three arenas on which intellectual management activities take place, and the model of the transformation from intellectual assets to intellectual property, and from intellectual property to intellectual capital, which results from intellectual value management activities.

4.2 The Three Arenas

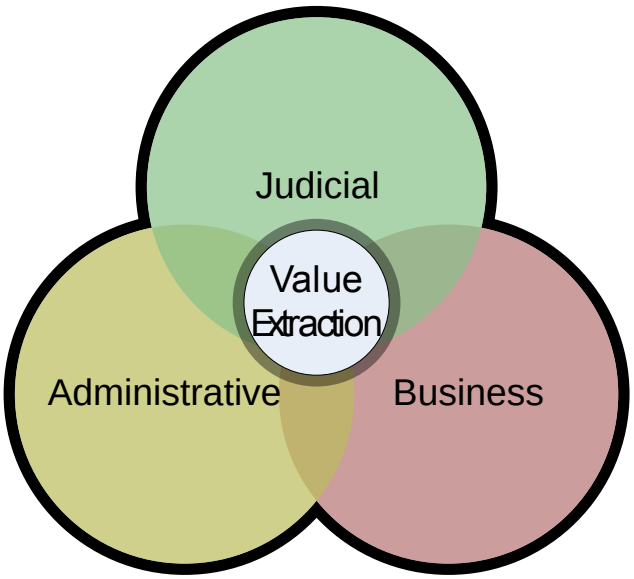

Figure 05. The three arenas

The model of the three arenas is a tool for mapping value-creating activities by actors from a communicative, social constructivist perspective. It was created as a response to the inadequacy of traditional value chain models in describing the emerging intellectualized economy, and to provide a more accurate mapping of how to assess an action or creation in terms of its full potential for value extraction.

The model builds on the concept that all value is primarily created through action, rather than simply discovered or exploited. This means that different levels of value can be created from the same basic foundation, depending on the kind of actions applied to that foundation, and that the value invested by actors in value-structuring activities is often more important, and more economically exploitable, than the initial substrate upon which they acted. This reflects the specialized, service-focused reality of the intellectualized economy – the value of any specific phenomenon in this economy is more heavily

dependent on the refinement it has undergone than its original 'raw material'. This is true in all industries and markets, but is particularly true when the phenomena involved are intangible, as it is almost impossible to categorically divide the intangible raw material from its intangible refinements.

At the same time, the model incorporates, and demonstrates, the concept that all value is a social construction, and is in reality a communicative function. The value a product or good is not immutable and objective, but is in fact a result of communicative actions building a brand, creating supply and demand, and leveraging the value of the product through services and ancillary offers. For an intellectual creation to have any value beyond its most basic, therefore, it must be possible to communicate that value well, and to as large a number of diverse actors as possible. If one can communicate the value of ones constructions fully to the entire world, without doubt or disagreement, the exploitable economic potential of that creation will be fully realized. Taking this into account, the model shows how it is necessary for an actor wanting to create value to strive to create optimal value communication - and ultimately, to extract value in its various forms, whether it be in the form of economic winnings or further structural creation.

Finally, the model takes these concepts and describes how value-creation with the goal of communicating value fully can be mapped onto three separate arenas. These arenas cover the range of behavior available to commercial actors, and encompass the institutions and structures already in place in society that enable and facilitate value creation. Value extraction is a natural consequence enabled by this constructive process, and optimally takes place in the intersection between structures on each arena. As the three arenas are heavily dependent on social norms, institutions, and establishments, they reflect, naturally, the social conditions that apply to the chosen field – in a geographic area where the intellectual property rights system is outdated or easily circumvented, for example, it is unlikely that there will be strong existing structures in the administrative or judicial arena. It is necessary, however, to fully understand each of the arenas before attempting to apply them to a chosen region, field, or industry.

4.2.1 The Judicial Arena

The judicial arena adjudicates disputes and thereby provides the function of acting to validate value constructions. A construction only carries value to the extent that is effectively communicated and accepted by all actors – if its validity is in dispute, the value that can be extracted or leveraged is minimized. A court provides an effective communicative support by linking the disputed matter to a series of well established communicative traditions and structures – the outcome of a trial is supported

by the democratic system and the constitutional system establishing the authority of the court. Once this authority lends its legitimacy an interpretation of a communicative action, it becomes as accepted as any other communicative action supported by the court, and, by extension, supported by the state.

An example of how transactions and relationships exist in the form gain or regain legitimacy through actions on the judicial arena would be a dispute over the validity of a contract. A contract is, simply expressed, a communicative action between two or more parties, containing certain assurances and reciprocal commitments. The only real value vested in the contract as such is the belief in the reliability of those assurances and commitments – the belief between the parties that reciprocity will be honored, and the belief by third parties that they can use the assurances in the contract to predict the behavior of the contracting parties. These beliefs form the basis for any economic transactions made based on or relating to the contract.

In a dispute between the parties, stemming from a difference of interpretation or a refusal to honor the contract, the legitimacy of any assurances with that contract is removed. It is no longer possible to use the terms of the contract to predict the actions of the parties, and it is therefore impossible to use the contract as a basis for economic considerations. Expressed in terms of the legitimacy of communicative value structures, it is clear to see that a contract which is not being honored has a very low communicative value – it no longer serves as a signifier of intent, and can only be used to derive, at best, the unreliability of the party in breach.

Another example would be the assignation of a patent. While an administrative institution such as a patent office may make a determination of the patentability of an innovation, it usually makes no deeper inquiry as to the proper ownership of said patent rights. If the assignation of rights comes into dispute, the otherwise paramount question of patentability becomes a matter of secondary importance, as it will be impossible to extract any value whatsoever from the patent without being able to clearly and definitively communicate ownership of it. In this way, the verification attainable on the judicial arena becomes a prerequisite for extracting value from the structures created on both administrative and business arenas, and a court decision becomes a communicative value creating structure in its own right.

4.2.2 The Administrative Arena

Within the administrative arena, we find those support structures that exist to establish and help establish structures that are used in other arenas. This is done primarily through the application of

some form of recognized, reliable criteria that are applied equally to value structures, and the communication of fulfillment of those criteria. The value, as such, of this communication is dependent on the legitimacy and trust that the administrative institution enjoys – usually such legitimacy is created thorough the creation of bureaucratic machinery that ensures the exact and equal application of the criteria in each case. Once outside actors accept that the institution applies its criteria reliably, equally, and transparently, it will accept the transferal of legitimacy onto other value creations. In order to achieve this level of acceptance, most institutions in the administrative tend to serve not only the purposes of actors in the business arena, but also secondary (or in some cases primary) objectives that are of value to other actors or society at large. Most patent offices, for example, were created to ensure that patents fulfill a secondary goal of allowing innovation to benefit society, and in this process they create a legitimacy that is conferred on the patent institution. Part of this legitimacy derives from a presumed connection with the judicial arena, which is expected to uphold the validity and enforceability of the structures established or accepted by the administrative, however, such a connection is not a necessary prerequisite for the legitimacy of administrative structures.

One example of a structure existing on and acting within the administrative arena would be the ISO certification process established by the International Organization for Standardization. Even though the technical ISO standards are created by actors often established or with vested interests in the business arena, the function filled by the organization is that of an administrative institution (it is also worth noting that many of the members of ISO are affiliated with governments and governmental institutions). ISO has set up a bureaucratic structure that inspects, tests, and assesses the compliance of certain practices with certain criteria, depending on the specific ISO-standard. This machinery conveys legitimacy by consistent application of reliable standards, which acts as a communicative signifier of quality commensurate with that of any actor awarded the same ISO certification. The value that this communicative signifier confers in terms of legitimacy is directly equal to the level of trust in the ISO process that actors have – as long as the process is transparent, and clearly and incontrovertibly sufficiently rigorous to assess minimum conformity with the ISO standard, that same trust is conferred to the actors who have obtained ISO certification.

Another example of administrative institutions is patent offices – the national or international patent offices are bureaucratic machinery for establishing criteria for patentability. They serve the secondary purpose of promoting innovation, and provide protection through the right to exclude for intellectual creations, which can then be leveraged into more advanced value structures. The criteria for patentability are, essentially, codified in legislation, and are thus as transparent and as reliable as the

legal system in question itself. The application of these criteria, in order to determine what can and cannot be patented, is done by governmentally established institutions, and thus carries the legitimacy of the democratic process to some extent – if nothing else, this official standing provides a strong link with the judicial arena, as the assumptions is that an officially granted patent would also be upheld in court in the case of a dispute. Without the support of administrative legitimacy and judicial validity, the means of excluding others from utilizing proprietary technical innovations other than secrecy would be substantially limited. Naturally this doesn't mean that a patent granted by an official patent office is an incontrovertible communication of either ownership or validity, as many patents can be revoked or challenged in court, but it lends structural value to claims of technical value by lending them legitimacy.

4.2.3 The Business Arena

The business arena is of course the arena on which actors act primarily through market-established means to attain market-derived goals. On this arena, any actor is equally capable of creating structures, and structural creation is typically given much less scrutiny and insight. There is a tendency to see the business arena as a far more 'trial-by-fire' field than the other two arenas – a structure created on the business arena will be validated immediately as soon as it is accepted by other actors, which naturally means that the communicative interplay is particularly exposed in this arena. At its most basic level, value creation on the business arena is entirely a matter of convincing other actors, by any means, and there are no external or fixed principles to which actors must adhere to. In practice, however, the actors in the business arena tend to establish normative structures to shape value creation, including industry standards, codes of ethical business practice, and streamlined, customary processes. Nevertheless, as these normative structures tend to be more flexible and mutable than those existing in the other arenas, they tend also to confer less legitimacy on a value structure, which is why actions on the business arena still usually depend on support from structures in the other arenas.

The immediacy of validation on the business arena means that it is quite possible for value creation to occur and flourish entirely within this arena without first requiring support from structures on the other arenas. While an administrative construct with economic significance is rarely seen as worthwhile, and a law created without enforceability is typically ignored, a business construct validated only by other actors can nonetheless thrive and motivate investment of time and resources. A clear-cut example of this would be the institution of television show formats, an industry in which the blueprints for television show concepts such as Survivor or Big Brother are traded, invested in, and even licensed. These blueprints have not been established or approved by any administrative institution, and there

was nothing in existing legislation or case law that supported the use of these concepts as tradable intellectual property. Nevertheless, the strong support given to the idea of trading these blueprints by actors within the television industry, made it possible for these intellectual creations to enjoy a level of support of value leveraging that was equal to structures with firm footing on each of the three arenas. This is how the business arena is able to influence the framework of the other arenas; an interest that is strongly expressed and tested on the business arena presents a strong case for the establishment of structural support mechanisms on the other two, as can be seen now that infringement of the rights to television show formats has been successfully argued in court.

At the same time, structures on the business arena can of course be affected, encouraged, or curtailed by action on the other two arenas. Passing new legislation expanding the practice of compulsory licenses on biotechnological inventions, for example, will change the ways in which innovations in the affected field are patented or kept secret, while a court decision determining that the use of asbestos-lined brake materials are too hazardous to be used or sold will obviously have an effect on the particular industry. Creating structures entirely on the business arena can have severe consequences, as it is essentially a gamble with structural support – while it is possible for an entirely innovative value structure to create support on the other arenas where there previously was none, it is also very possible that the inherent legitimacy that can be drawn upon in structures on the other arenas will be used to counter business structures by competing or conflicting interests. The flexibility and immediacy of the business arena is not always capable of trumping the legitimacy created by the reliability, transparency, and predictability of structures created on the other arenas.

4.3 The three arenas applied to telecom standardization

Within the current standardization system, it is clear that the primary goal of each major actor, particularly the major IP-holders is the creation of value in intellectual property through the development of structural legitimacy. The tools used for the development of standards and standards-based networks currently rely heavily on patents and contracts, which almost immediately necessitates a connection to both the administrative and judicial arena. Intellectual property rights are typically the means by which modern ICT standardization is made possible, and with that prerequisite, the support of some form of administrative machinery, and the fall-back of a judicial test of validity becomes necessary. Due to the nature of the current telecommunications market, particularly in Europe, established support channels for connecting value creation to these arenas are highly lacking. This is most likely due to the unusual nature of this market – the hybrid free market structures that arose in

the wake of the dismantling of the national telecommunications monopolies present an unusual playing field, which has led to a disjunction from the traditional machineries of the three arenas.

4.3.1 The disjunction between arenas

After the removal of the telecommunications monopolies in Europe, the development of the market was turned over to private actors, operating primarily on the business arena. However, as the underlying reasons why the monopolies were initially established were still highly relevant – the need for international interoperability and the network externalities of standardized solutions, the market did not divide into a large number of smaller actors, but was instead characterized by the organized consortia that arose. These groupings of influential actors helped maintain most of the principles of the telecommunications monopolies, and established structures to replace them. However, in doing so, these consortia established new criteria for value creation – the essentiality of patents, for example, became a prime criterion for determining the extent of the value structuring activities possible to perform with a patent, and became more important, in some ways, than the technical merits of the innovation upon which the patents were based.

In this way the consortia created a machinery that supplanted the traditional machineries of intellectual property and validation, with a machinery that was established and supported on the business arena by business actors. While it can be argued that the consortia were created to fill the functions of those traditional machineries, the consortia can in no way be said to take the independent role of, for example, a patent registration office, and have explicitly distanced themselves from both the role of considering and establishing essentiality, as well as that of resolving disputes related to licensing terms. The end result of this is that many of the essential constructions upon which modern ICT standardization rests are almost entirely unrelated to any kind of legitimacy granted by actors on the traditional administrative arena, and are untested on the judicial arena.

4.4 The intellectual value hierarchy

Measuring the development of structural legitimacy of intellectual is not just a question of ensuring that each arena is involved – this is not always a possible or necessary. The goal in creating holistic value structures is to transform value from its most basic level into its most structured form, as this creates the greatest amount of legitimacy. This process is a result of creating structural support on the three arenas, and has been modeled by Petrusson as the transformation of intellectual assets into intellectual property, and the transformation of intellectual property into intellectual capital.

4.4.1 The IA-IP-IC model of intellectual value management

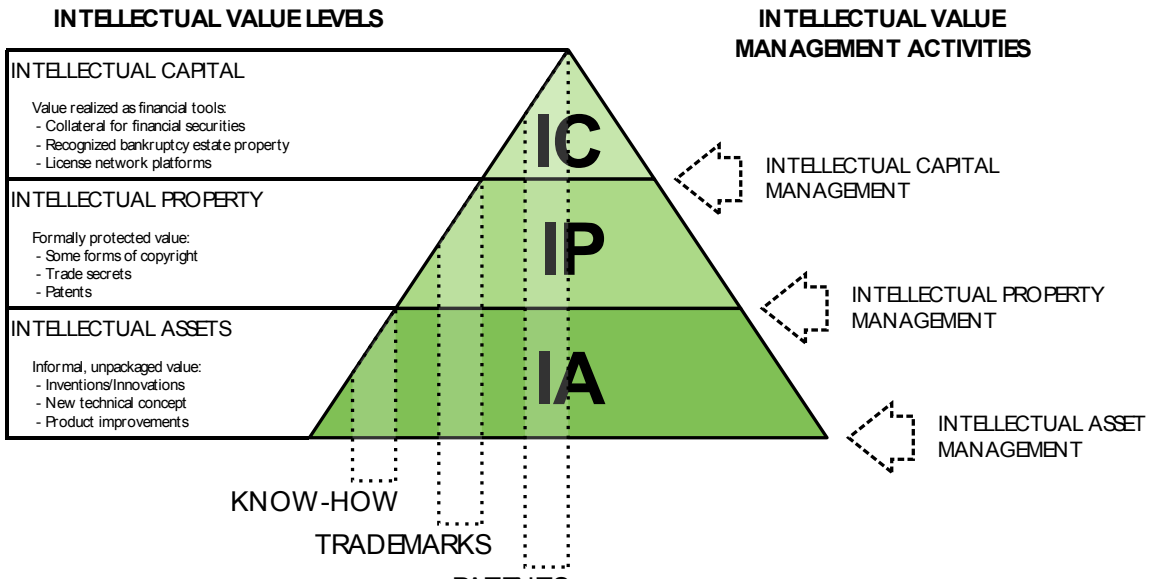

Figure 06. The IA-IP-IC hierarchy

The IA-IP-IC model describes the hierarchical development of intellectual value and helps map the activities that contribute to a progression in intellectual value packaging. The three levels of intellectual value defined in Petrusson's model are, in ascending order: intellectual assets (IA), intellectual property (IP), and intellectual capital (IC). The progression of intellectual value into more refined and legitimate forms follows this development towards the IC level, and intellectual value management is the process of driving this progression – by providing IAM, IPM, and ICM activities, actors can shape social perception of their innovations (while the model can be used to explain value in all its forms, it is traditionally based on the example of technological innovation, which is appropriate for the purposes of this thesis), allowing them to 'transform' and better exploit the inherent value of those innovations.

As an example, we can look at the exploitable value inherent in a unique business model. In Europe, currently, the value of such a model can only be exploited to the extent that it can be implemented in the actual running of a business, and the exploited value is then the gain in efficiency from the adoption of a better model. The business model, within this social context, does not enjoy an independent, formally recognized or quantifiable value attribute, but instead, only holds utility value which is dependent on circumstance and context. In the United States, however, where the institutions on the administrative arena have evolved to allow for patenting business models, the exploitable value

of a business plan is far greater, as it can be treated as property in the form of a saleable patent, in addition to its inherent value as a business model. With this formal, social recognition, the business plan's value to its owner is no longer only useable but also transactionable. It is worth noting that the actual plan, of course, carries the same content in either scenario, but the potential to leverage value inherent in saleable property can only be realized when that content is constructed in such a way as to fit the pathways for formal recognition and communicability established by and relied upon in a social context.

4.4.1.1 Intellectual Assets

"A claim of what is valuable," meaning such intellectual value as has not been defined or recognized in a commercial setting, including artistic expression, technical concepts, and other undefined value which is nevertheless recognized as containing the potential for transformation into formalized value. An example of this is know-how – both technical and personal, it is the difficult to define and package value that is not easily communicated to other actors. While you can claim that the most valuable resource in your company is in the minds of your R&D department staff, you will not, typically, be able to sell, license, or borrow against this resource, as the institutions for shaping our perceptions of these resources do not exist. The key criterion for determining whether value should be classified as an asset or property is thus the possibility to conduct transactions with it. While the definition of a transaction as such can be stretched, it nevertheless conveys the sense that intellectual assets is value that is so unsupported, structurally, that it cannot be transferred to another actor and still retain its value. It is possible, however, with skilled IAM and IPM efforts, to transform IA into IP without such institutions – an example would be know-how licensing, where undefined knowledge is nevertheless packaged into a financial value proposition.

4.4.1.2 Intellectual Property

"A claim of a value proposition," which refers to value that has been packaged and defined to the point of achieving such formal recognition as is afforded to property, with all the rights of ownership and control this implies. This includes all intellectual value that has attained the status of being transactionable, though the traditional way of thinking primarily views intellectual property as primarily referring to intellectual property rights. Since the definition of such rights differs from legal system to legal system, the definition of IP must be seen as more generic and less limited than the traditional understanding, and should not be seen as identical with the traditional, legal understanding of intellectual property. Patents constitute an obvious example in most legal systems – through the support system of a well-defined social administrative institution such as, in Sweden, the Patent Office

(Patent och Registreringsverket), a patent application process is a way of verifying that a technical innovation meets the level of intellectual value management necessary for reliable transactions, and thus deserves the protection of the courts. The patent still builds on the same underlying innovation that can be identified in the form of IA, but now lives up to higher standards of communicability and packaging. Note that the patent does not necessarily contain the entirety of the innovation, but represents those aspects of the innovation that have reached the level of intellectual property. If the innovation has not been sufficiently or properly constructed through appropriate intellectual value management activities, a patent application will not be granted –a formal and administrative signal indicating this insufficiency (naturally the level of construction that is considered sufficient will be highly dependent on the legal system and tradition of the national context).

4.4.1.3 Intellectual Capital

"A claim of financial capital," finally, is the last stage of intellectual value construction, in which the value is so thoroughly established and communicated that it achieves the characteristics of capital, and is possible to use as collateral security in a loan or as the basis for financing. In some legal systems this is automatically the case with many patents, as of the granting of the application, since the requirements for patentability are set so high, that they indicate a reliability that is also sufficient for actors to trust the innovation as intellectual capital. While it is not impossible for value to exist in the form of capital without building on the previous level of construction, this is typically not the case. There are a few notable exceptions – for example, in his book the Mystery of Capital, Hernando DeSoto notes the ability of less formalized economic networks to collateralize reputation and trust in individuals, which are aspects that cannot typically be economically transactionable in the sense that property can. A parallel to this can be seen in the more westernized possibility of using established artistic talent and reputation as a financial security, essentially a form of personal brand management that has reached the level of collaterability. However, the typical situation is, as mentioned, one of property being a prerequisite for capital – most economic and social institutions feature a cumulative sophistication of the interfaces for extracting value, and the ability to trade with something typically precedes the ability to collateralize it. Ultimately, however, the potential represented by the capitalization of intellectual value is not tied to the existence of any specific social or financial institution, but represents the ultimate leveraging of intellectual value possible to attain.

4.4.2 Chronology of the Model

It is important to recognize that the progressive construction model of intellectual value management does not necessarily correspond to a matching chronological development. The levels of intellectual

value are distinct in that they represent hierarchical differences in the level of construction and packaging, yet they, and the constructive activities that contribute to the progression in the value hierarchy, can coexist simultaneously, and activities that contribute to value construction on one level can at the same time contribute equally to structures on a higher level. This is the result of the close connection between the value management hierarchy and the relevant market and social context – depending on the structures already in place, the levels might be broader or narrower, and synergy effects of certain constructive activities can have consequences on every level. For example, if the patent application and registration institution in a country has achieved a sufficient level of reliability, trust, and efficiency it constitutes a guarantee of value construction on the highest level, the very act of obtaining a formal patent from such an institution will not only turn an innovation into intellectual property, but immediately into intellectual capital as well, as the understanding of intellectual property in that context converges with intellectual capital.

4.5 Applying the intellectual value management model to the standardization system

In order to fully apply Petrusson's model to the purpose of the thesis as such, it is first necessary to adapt it on a practical level to the activities and processes that go into the creation of standards and the extraction of value from standards constructions. The model as such has not been published in a finalized state, and is therefore currently only presented within the context of the specific areas and activities comprising intellectual value management in entrepreneurial business creation and in smaller companies. While it builds on an intellectual framework that can be generalized to apply to any discussion of intellectual value, the current state of the still relies builds heavily on certain instances of real-world phenomena that are context-specific and fit the small-business entrepreneurial perspective. In order for the model to be applicable to the analysis of the standards system, it was necessary to examine the more general communicative claims embedded in the model, and then re-contextualize the model to conform to the specific activities undertaken by the standards creator.

The first two levels of the intellectual value ladder can easily be adapted to the standards system, as an understanding of the value of IA has always been key in industries built on technological innovation, and the importance of IP is by now more than clear to the actors taking part in standards collaboration. Even if the model, in its current form, explains these concepts through examples that apply to the reality of the technology-focused entrepreneur, this focus does not differ greatly from that of the standards creator. In both paradigms, intellectual assets are heavily technology-focused (as opposed,

for example, to creative cultural output), and intellectual property is understood to be the formal means of protection appropriate to such technology-based innovation, i.e. primarily patents and in some cases copyrights. Adapting these concepts and finding practical examples to illustrate the ideas of IA and IP was therefore not difficult. The divergence between perspectives, however, becomes noticeable when applying the concept of IC to the reality of standards creation, and for this reason it was necessary to deconstruct the concept of IC more explicitly.

4.5.1 Defining Intellectual Capital

When used to explain the reality of the small business entrepreneur, the definition of IC used by Petrusson builds heavily on the concept of financial capital – of loans and securities, and investment underpinnings. These are all financial activities that are familiar and applicable to the reality of the entrepreneur, who must be able to manage intellectual value in order to secure funding for projects that exist on a very limited financial foundation. From this perspective, the examples used to define IC in the preliminary version of the model are very illustrative of the qualities that should be associated with IC, even if they do not explicitly detail those qualities. However, the disadvantage to using such context-specific shorthand to explain the levels of the model is of course that without a general understanding of the theoretical framework underlying and supporting the model, it can be difficult to see how the model applies to a context where the examples used are not as relevant, and the model thus loses descriptive value and flexibility. Using bank loans and similar financial institutions as examples illustrating IC, for example, will only be usefully descriptive if there is a homogenous understanding of what such activities imply. The level of management activity that is necessary to invest in an intellectual value construction for it to be accepted as collateral, and the leverage opportunities presented by such capitalization, will be highly dependent on the society in which the actors accept it as collateral, and the institutions in that society for handling collateral value. This might seem a needless truism, in that it is obvious that the security and communicated trust inherent in collateral will only extend as far as the security and trust inherent in society's collateral institutions, but there are still advantages in terms of applicability and flexibility to be gained from defining intellectual capital on more generalized grounds.

The difficulty of using the given examples to illustrate the model outside of their original context became clear when the model was applied to the standardization system. A patent owned by a standards creator can often be used as collateral for a loan, but it is not in this role that patents becomes most significant within the standards system, nor are many of the actors involved in shaping the standards system in need of securing investment funding. There is no doubt that the model, and its

underlying theoretical assumptions about the reality of intellectual value management, can apply to the activities and goals of the standards creator, but not using the examples initially employed to illustrate the model. If a patent owned by a standards creator is sold or collateralized, it has generally not achieved the level of value construction and leveraging potential that is the ultimate goal of value construction in the standards system. To describe this goal within the descriptive model, it was necessary to deconstruct the

The criteria, then, for defining IC without relying entirely on specific phenomena such as bank loans, must be inferred from the qualities associated with such phenomena on a general level. These qualities include:

1) validation in the eyes of actors within the relevant social and market context,
2) the possibility of fully communicating value without challenge or misinterpretation, and
3) even greater opportunities for value leveraging.

It is easy to see to see how these qualities derive from and apply to the examples used by Petrusson to define IC – unquestioned validity, for example, is a key criterion in whether or not a value construction can be included in a bankruptcy estate, and for a value construction to be accepted as collateral for a loan, it must be possible to communicate its value in a way that can be uniformly understood by all parties. However, bringing these qualities to a generalized level also allows for the application of the IC-concept to activities more relevant to the standardization system.

4.5.2 The Intellectual Value Management Model applied to the standardization system

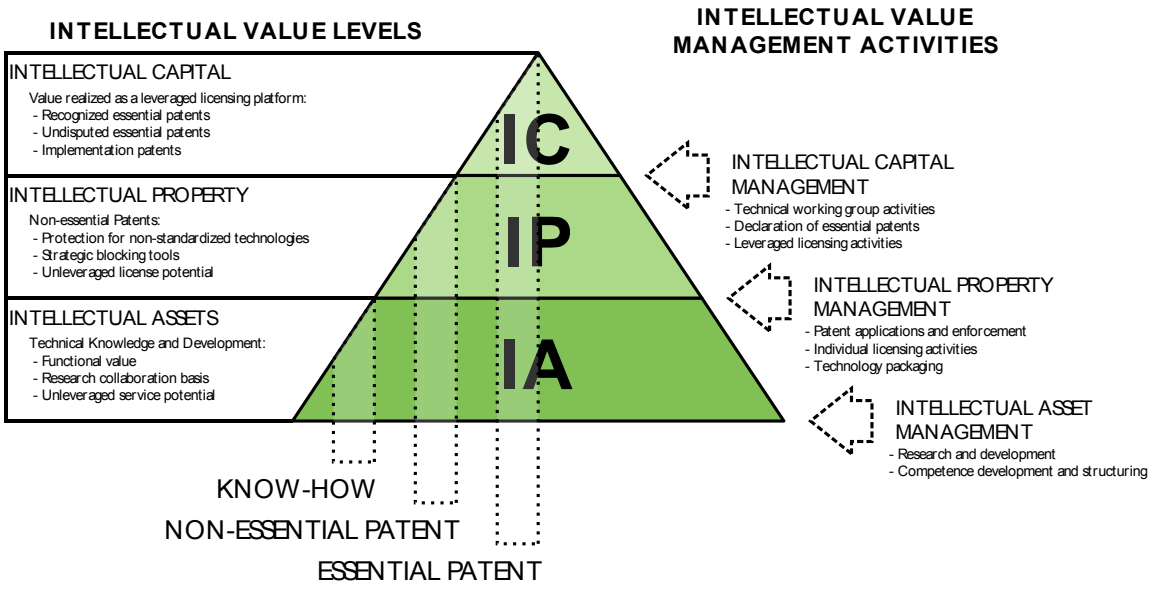

Figure 07. The IA-IP-IC hierarchy applied to telecommunications

4.5.2.1 Intellectual Assets

Intellectual assets are established at the earliest phase of the standardization process, in the form of less formal technology-based intellectual value. This value can be expressed in a number of forms, including fully fledged inventions, technical innovations that may lead to one or more new inventions, and product improvements which may or may not be dependent on existing technologies. The inherent value in all of these is firmly recognized by the technology-based industries that dominate standards-collaborative efforts, but it is at the same time understood that at this stage, the intellectual value of these creations is difficult to communicate and extract value from. The intellectual asset management activity that creates, supports, and refines the value of these creations is primarily research and development – R&D helps the initial process of formalizing the value inherent that exists loosely as skill-sets and creativity in researchers, and helps structure early value creation according to principles of scientific rigor and, in an organization with awareness of the importance foresight, to principles of market success and potential IPR protection.

4.5.2.2 Intellectual Property

Once value in the form of intellectual assets has been defined and communicated within the company, the next step is to structure and protect this value in the form of intellectual property. Obtaining a patent usually completes the transformation of value into IP, and brings with it an immediate recognition of the right to that value by other actors, the ability to communicate that value, as well as the ability to leverage that value far more efficiently. While it is possible, for example, to sell loosely

formed technology-based value in the form of blueprints and technical descriptions, it is far more efficient to do so once that value has been packaged as a patent which can be easily and completely transferred. Another significant leveraging possibility that becomes available with the creation of a patent is of course licensing – by having created a structure that allows for multiple, controlled users of the same value, the intellectual value becomes a non-exclusive, non-conflicting resource, and instead of extracting value merely from use or one-time transactions, the value-extraction of the patented knowledge can now be extended (in theory) indefinitely).

As the basis for such licensing in a standards context is inclusion in the technical specification of the relevant standard, the standards-specific management activities that provide the structure to enable this leveraging are two-fold: the submission of patent applications to the necessary authorities, and the submission of technical proposals to the working groups that determine the final specification of the standard. A value manager's influence over the range of technologies that are included in the standard will help determine the structural suitability of the standard as leveraging platform for the manager's specific IP. Failure to control the specification will not affect the IP itself negatively, but will drastically curtail its leveraging potential.

4.5.2.3 Intellectual Capital

Finally, the transformation of intellectual value within the standards system reaches its apex once value is transformed into intellectual capital. The prerequisite for reaching this level is the inclusion of the technical value in a finalized specification, and of course the preparatory undertaking of the appropriate IAM and IPM activities beforehand, to create the value structures that support the transformation into IC – in this case primarily the focused research and development activities, followed by the appropriate IPR applications and registrations. The difference between value at the IC level and the level of IP is not always immediately apparent, as there is very little perceptible difference between a patent that is used as IP and one that has become IC, and the process of transformation moves, to some extent, out of the value manager's hands at this point. It is no longer primarily a question of packaging and re-designing the value as such, but more one of establishing the proper interfaces for value leveraging.

In accordance with the understanding of value as a function of legitimacy, this appears to be a typical characteristic of IC – the difference between a house that constitutes sellable real estate and one that constitutes collateralizable real estate is not vested in any ontological reality of the house itself, but in its interface to social and financial institutions. As mentioned earlier, the value manager in the standards system can exert a somewhat greater level of influence over the creation of such interfaces

than actors in most other contexts, but this control is not complete. While a participant in the relevant standards organizations and the various working groups can contribute proposals and act to secure his own rights in the proposed technology-base of the standard, the ultimate selection is still an external process, and performed through a combination of 'beauty contest' principles and compromise between the actors. It is this technology-base that constitutes the terms on which IP can be leveraged – inclusion of the technical claims encompassed by a patent in the specification will mean, once essential patents have been declared and accepted by the actors implementing the standard, that the licensing potential of the patent itself will grow exponentially, as a result of technological lock-in. Such leveraging effects are what separate the solitary, 'uninterfaced' patent at an IP level from the accepted essential patent at the IC level, where it has become accepted as part of a compliant implementation of a standard.

When applied to the activities and processes that constitute the primary focus of the standardization system, it is easy to see how the model adds a descriptive dimension that maps onto the activities and interests of actors creating standards. With the revised conceptual background, the intellectual value structure of standards activities as a progressive constructive process becomes clear, and intellectual value creation becomes a process of engaging in intellectual value management activities in order to ascend from the loosely defined, poorly communicated level of intellectual assets, towards the formally recognized and enforced structural level of intellectual property, to the recognized, trusted, and leveraged level of intellectual capital. Each level of intellectual value construction increases the level of construction inherent in the intellectual value, and at the same time increases the level of exploitable value (the value return on construction investment) and adds new forms of available leveraging opportunities, including sales, licensing, and collateralization.

5. The standardization value network

Mapping the intellectual value management activities described in the applied models to the practical reality of the standardization system can be done in a number of ways, in order to create an understanding of the system that expands on the traditional perspective of the value chain and that incorporates the unique structures of the standards

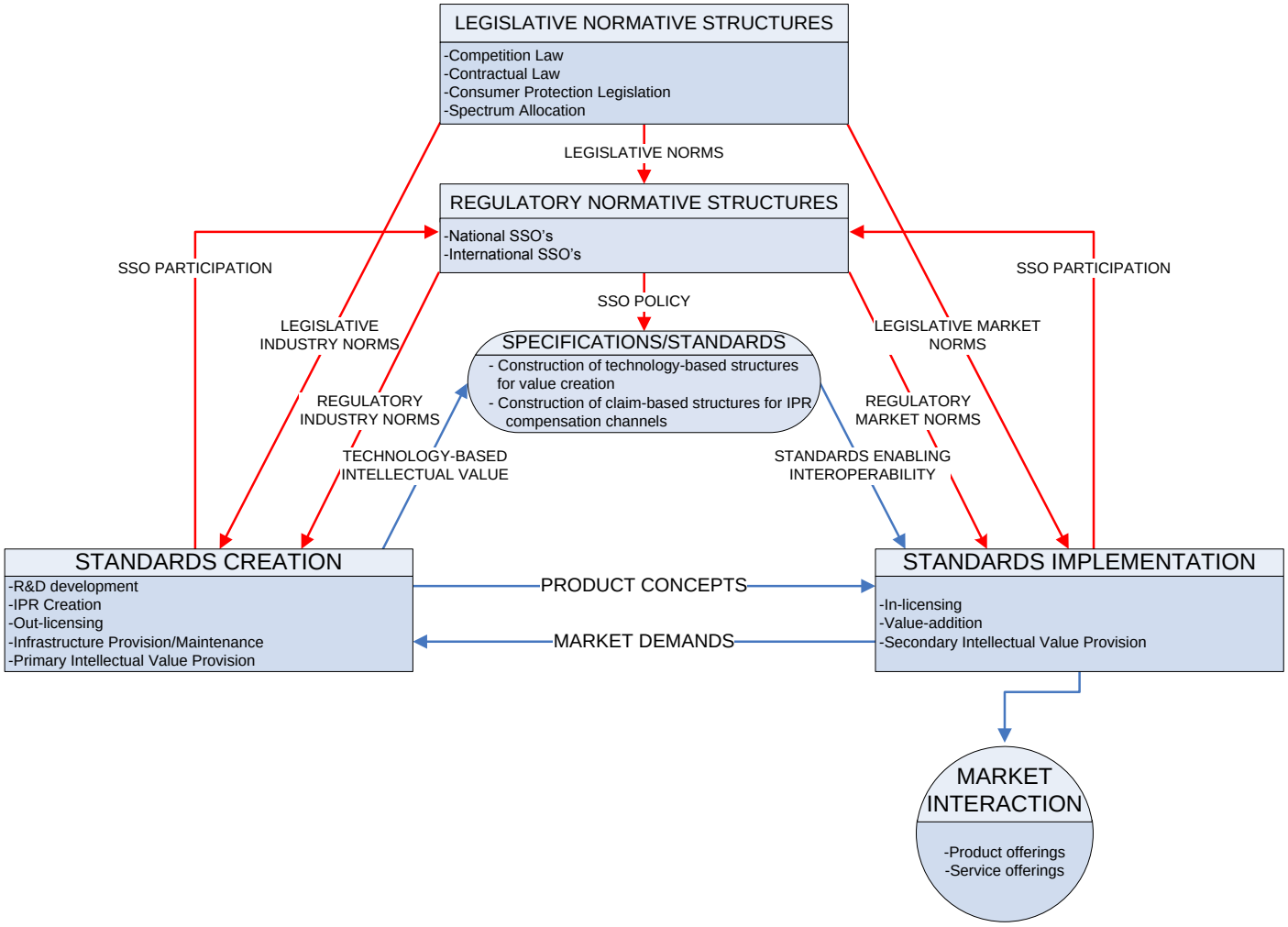

Figure 08. The standardization value network

5.1 Understanding the Figure

The standardization value network focuses on describing the system of standardization-related processes, and on mapping the flow of value throughout this system. Simply put, the overall value flow throughout the system is intended to be circular – as one progresses through the system, value is added through various contributive processes until one reaches the market, where value flows in the other direction, in the form of compensation for the value-generating activities. This is of course not done chronologically, as it would be impossible to have the original value contributors wait until the finished products reached the end-customer before they receive compensation for their value-generating activity. Ultimately, however, the dynamic of the standards system as displayed in this figure is one of value-generation and compensation balancing each other out (and in reality, preferably spiraling upwards, with greater compensation allowing for greater advances in value-generation).

In the figure, processes are separated and grouped by their effects in creating value flows within the system, as well as their relation to the overall process of creating standards. For this reason, processes are grouped according to their primary role in this interplay – processes relating to standards creation, standards implementation, standards setting, and the normative processes that provide structures for the interaction of the processes. Each grouping and its related activities will be discussed in greater depth later on, but the overall dynamic is hopefully clear from the diagram. Standards creators contribute the initial value-generating activity which drives the standardization process; this value is collected and combined in the standards setting process, and the packaged result is implemented and used as a basis for value-adding activities in standards implementation processes, which then lead into market interaction. It is worth noting that while the terms are similar, the processes of standards creation and standards setting are quite different – in standards creation, the substantial value content of a standards is actually created, whereas in standards setting processes, the specific scope and range of included technologies in the standard are formally decided upon. In the figure, value flows are represented by blue arrows, whereas, in order to differentiate between the different effects of the activities, the creation and maintenance of the framework of normative structures established by standards organizations and legislative boundaries is represented by red arrows.

STANDARDS CREATION
-Research and Development - Creates intellectual assets - Creates the technology-based innovation driving the market -IPR creation - Transforms intellectual assets into intellectual property - Creates the building blocks for the IP structures in SSO's -Out-licensing - Leverages intellectual property - Diffuses technological advance - Creates channels for compensation flows -Specification Proposals - Contributes technology-based intellectual value to specifications - Lays foundations for IPR-supported compensation flow claims

5.2 Standards Creation

5.2.1 Research and Development

The initial processes in the intellectual value network originate with the standards creators. At this point the intellectual value creation that provides the material for a standard is funded and carried out. Naturally, research and development plays a large role at this stage, as this process creates the technology-based innovation that drives the entire telecommunications field. This research can be everything from faster data transfer protocols to improved radio mast transmitter or technologies for compressing and displaying video data in mobile terminals. Not all the research that contributes to advances in the end-user experience of telecommunications can be included in this process – those technological innovations that are implemented in mobile terminals but are not officially standardized, should not be viewed as part of the standards creation process. These could include lithium polymers for use in more efficient, longer lasting batteries, or the digital rights management used to encrypt proprietary data files on the terminal, neither of which is included in formal telecommunications standardization processes. The reason for this potential confusion is of course the convergence of technologies that go into the creation of a cellular phone, but this value network, and thesis, focuses on telecommunication innovations – not mobile entertainment innovations.

5.2.2 IPR Creation

In the standards creation process, both intellectual assets and intellectual capital are created. In the research and development process, intellectual assets are created, in the form of fundamental technology-based innovations. In keeping with the definition of intellectual assets, these do not, initially, enjoy intellectual protection, and are often difficult to define and delimit – an innovation may at this point take the form of a categorized research project, but it may also be a part of a project, an external invention disclosure, or an early suggestion in R&D brainstorming. In a functional standards-oriented organization, however, these intellectual assets are identified at an early stage and funneled into the process of creating IPR protection – primarily through the application for a patent on the

invention. This process can be performed in different fashions depending on the organizational structure of the corporate actor, but takes the general form outlined in the earlier discussion of intellectual capital management – identifying and analyzing the assets, and complementing or redefining these until they meet the criteria of a 'good' patent – a patent that encompasses the invention, that can be relied upon in a litigation process, and that has sufficient economic potential to motivate the costs of the intellectual capital management process, in the form of generating licenses or creating market opportunities. During the last decade of SSO regulation, standards creators have learned the importance of both of these processes – claiming intellectual value has become as important as creating intellectual value, and the consequences of allowing others the freedom to claim title have been clearly demonstrated.[34]

5.2.3 Specification Proposals

In the process of creating and claiming the value that serves as the basis for compensation flows within the network, the standards creator must communicate both the value of their assets as well as the claims that encompass those assets to other parties within the value network in order to validate their claims. This is primarily done through technical proposals to the relevant SSO, in which the technology-based intellectual value created in research and development activities is communicated and suggested as a potential basis for a new generation of technology in the various working groups and boards. The selection process these proposals are subject to is officially an examination of technical merit, but is of course also a result of compromise and political maneuvering. Once a technical proposal has been accepted into an official specification, it will be part of the groundwork for that technological generation of telecommunications – the technological value of the proposal is added to the collective value of the standard. In the current system, this contribution of value is recognized as grounds for compensation, and thus serves as the initial foundation in creating a compensation channel, yet without the support of IPR claims which help direct that channel, there is no guarantee that value-generating activities are properly compensated.

5.2.4 Out-Licensing

Once the technical solutions proposed by an actor have been made essential to a standard, and these have been supported by IPR claims that capture and claim title to these intellectual assets, standards creators can initiate the activities that provide actual monetary compensation for these activities. Out-licensing is the final step in the establishment of compensation flow from the point of view of the standards creators. The activities involved in this process include ascertaining the essentiality of

34 Cf. the GSM licensing agreements between Motorola and Ericsson, to be discussed in a later chapter.

proprietary IPR, through the 'mapping' process whereby the claims protected by law are matched to the claims propounded by the established standard, and establishing a continually updated list of actors who aim to accomplish a compliant implementation of the relevant standard. These activities are to some extent similar to the traditional, non-standardized tactics of licensing, but reflect the leverage-effect of standardization. Where normal licensing activities would require the licensor to map its IPR against the final, physical product of every potential licensee, a standards creator can map its theoretical claims set (its proprietary IPR) against an established theoretical claims set (the technical specification), and then immediately apply these results uniformly to a large number of self-declared implementers. These implementers are contacted and a licensing agreement is negotiated, governed to a large extent by the normative structures laid down by SSO policies and applicable legislation. As this activity is the primary source of compensation within the standardization system for those activities which establish the fundamental intellectual value in the system, each of these agreements is of great economic significance for the standards creator, and is highly dependent on a systematic and strategic approach to the intellectual creation and leveraging process within the standardization system.

5.3 Standards Setting

STANDARDS SETTING
- Construction of technology-based structures for value creation - Provide the primary value within the standard (the technical innovation) - Create value-based channels for compensation - Construction of claim-based structures for IPR compensation channels - Create legal claims that contain the technical claims - Create title-based channels for compensation

As explained earlier, the specification/standards setting activities within the system are based on the value claims contributed by standards creating actors. These contributions help turn the standards setting activities into a value nexus, where technology-based value is collected and combined to form a unified set of claims that will comprise the standard. This process is governed by the relevant SSO for the standard, and thus follows slightly different paths based on the policies of the organization, but the purpose is always to enable the construction of a technology-based structure allowing for additional value creation. This additional value creation derives, of course, from the benefits of a holistic telecommunications technology 'generation,' as well as from the interoperability and intercompatibility assured through the interaction and collaboration between standards creators. Supporting and enabling these activities is the technical selection process, which in each SSO aims to apply criteria of technical merit to the claims proposed in the working groups and boards. The final quality of the resulting claims-set is an essential linchpin in the entire system, as it indirectly sets the basis on which all compensation within the standards system is predicated – the technical solutions arrived at largely determine the quality of the end product which the customer will ultimately pay for, initiating the compensation chain.

At the same time, the technical claims made to the SSO in question are interlinked with IPR-based title claims, whereby the standards creators not only assert that their proposed technological solution is superior, but also that it is proprietary. The existence of such title claims is explicitly disregarded in the technical selection process in an SSO[35], but there is no doubt that they play a significant role in the political maneuverings that motivate corporate participation in standardization cooperation. Title claims officially come into the open during the declaration of essential IPR, once the specification for the standard has been agreed on, and the members are asked to reveal to the public which IPR-claims they feel that they can make that encompass one or more of the claims that are essential to the implementation of the specification[36]. As mentioned, this is the second part of the two-step process of constructing a correct compensation channel – IPR protection must be created, and linked to the technology-based intellectual value, in order to combine intellectual assets and property into intellectual capital that can be optimally leveraged.

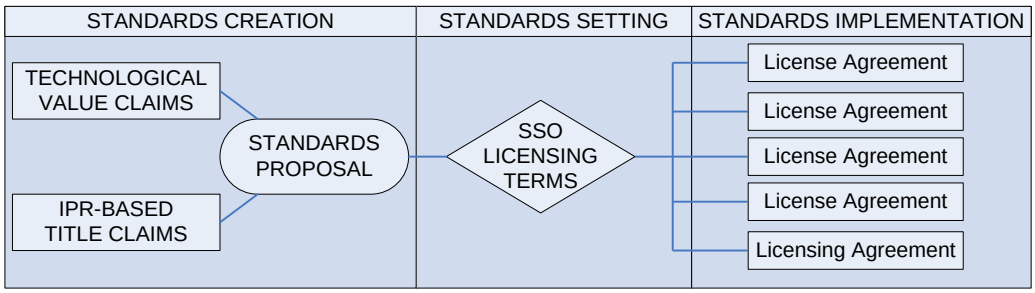

Figure 09. The IP structures established by standards setting activities.

The IP structures generated by standards setting follow a simple model, which coincidentally models the development of intellectual asset, property, and capital management activities. In chronological order, the standards creators in the system create intellectual assets by creating technological value claims, and propose it for inclusion in a standard. Once accepted, the proposal is supported by intellectual property constructions in the declaration of essential IPR that follows the proposal. This combination is then used as a basis for a licensing offer which is modeled on the terms established in SSO policies (such as FRAND terms, for example), at which point the offer can be directed to the implementers of the standard. This is the final step in the development process, and turns the intellectual property claims into intellectual capital, by leveraging the intellectual property into a value

35 "Specific licensing terms and negotiations are commercial issues between the companies and shall not be addressed within ETSI. Technical Bodies are not the appropriate place to discuss IPR Issues. Technical Bodies do not have the competence to deal with commercial issues. Members attending ETSI Technical Bodies are often technical experts who do not have legal or business responsibilities with regard to licensing issues. Discussion on licensing issues among competitors in a standards making process can significantly complicate, delay or derail this process." – ETSI Directives, December 2005

36 The definition of essentiality will be discussed at a later point in this thesis.

construction that is fully validated by the market, undeniable in its financial implications, and fully realized as a compensation flow channel.

5.4 Normative Structures

LEGISLATIVE AND REGULATIVE NORMATIVE STRUCTURES
-Competition Law - Regulates market consolidation and technology transfer opportunities -Contractual Law - Provides structures for actor interaction and the basis for standards obligations -Consumer Protection Legislation & Spectrum Allocation - Limits the available scope of technology-based value innovation -National & International SSO's - Create IP compensation structures - Funnel compensation flows (leverage poss. Of both IPR and tech) - Create technological cooperation enabling interop.

The primary role of the normative structures, both regulatory and legislative, is to provide boundaries on the behavior of actors in the system. These are the 'rules of game' which not only limit the alternatives open to actors in the system, but also provide the very means by which the system is kept running – unified, reliable normative boundaries are after all the prerequisite for all formalized human interaction. Within standardization collaboration these boundaries take two forms – regulatory normative structures, which derive from the policies and terms by which members of SSO's are bound, and legislative normative structures, which derive from national, regional, and international laws and treaties. The former are created by the actors themselves, but are formalized through the application of voting procedure and administrative procedures within the organizations. The latter are bound to national and regional interests of economic control, represent the democratically expressed will of the people in the affected nations or regions, and are of course not always entirely specific to SSO members. Together, they provide a normative framework within which the processes of the standardization system exist.

5.4.1 Competition Law

The legislative structures of competition law provide restrictions on the possibilities for market consolidation, and on technology transfer possibilities – both by strictly constraining the available actions of dominant market actors, and by prohibiting such arrangements that would distort natural competition. In the standardization system, these laws are often particularly significant, as the basis of voluntary cooperation between actors on the market upon which standards rest is a fundamental divergence from typical market interaction. In order not to risk violating these prohibitions, the SSO's must take care not to take too active of a role when dictating member behavior through policy guidelines. Even then, there are potential conflicts between the principles of competition law and the structure of SSO cooperation – phenomena such as 'lock-in' and 'hold-up' licensing, which will be

discussed later on in this thesis, have lead certain actors on the market to claim that current SSO structures facilitate competition law violations by members.

At the same time, members themselves are directly subject to competition law in their more independent behavior. There is a clear risk of competition law violations both in the extensive negotiations which precede the setting of a standard, as an unfettered exchange of plans and technological progress can easily be seen as a cartel arrangement under certain circumstances, and in the license agreements negotiated by the members themselves, after the standard has been set. These agreements are the unstated economic goal of most SSO participants, but are only partly influenced by the SSO's themselves – while many SSO policies establish certain generalized terms for licensing, the SSO's themselves take no active role in establishing the agreements, nor do they take it upon themselves to examine the licenses for compliance with SSO policy.. For this reason, it is incumbent on the members themselves to ensure that competition law is not violated in these agreements, which can often be a danger when extensive cross-licensing deals are negotiated – if the relevant technological market is found to be unnaturally distorted by the cross-licensing arrangements, this can be as significant of an infraction as conventional price-fixing agreements.'

5.4.2 Other Legislation

Many other forms of legislation regulate the behavior of the actors in the standards system – consumer protection legislation, for example, sets certain limitations on the end-products of standardization that ultimately reach the customer – both regulation regarding sales tactics, when standards implementers interact with the market, but also on the available technical innovative space, including limits, for example, on permissible RF radiation levels[37]. These forms of normative structures exist in every value system however, and are not particularly unique in their application to standards cooperation. It is worth noting, however, that the normative structures which support, rather than constrain, the central sphere of standardization cooperation – the actual standards setting – consist of little more than conventional contractual law. On the legislative arena, contractual liability is among the weaker forms of normative structure, and when this is combined with the often vague statements of mutual intent that underlie standards participation, a distinct lack of both predictability and enforceability arises.

5.5 Standards Implementation

STANDARDS IMPLEMENTATION
-In-licensing - Completes channels for compensation flow - Validates intellectual property - Adds value to standards by exponentiating interoperability -Value-addition - Leverages value - Brings technology-based value to the market; creates compensation sources

5.5.1 In-licensing

In-licensing activities are the conduit between the value-generating activities of standards creators and the compensation activities undertaken in market interaction. Through in-licensing the technological value created in standards creation processes such as R&D and packaged in standards setting processes are transferred to standards implementers, and, as long as technological value has been appropriately encompassed by IPR claims, the standards implementer completes the compensation flow channel, leading from market interaction all the way back to technological value generation activities. This can be viewed either as an obligation on the part of the implementers, as they are obliged to engage in sometimes costly in-licensing in order to achieve a compliant implementation of the standard, or as a straightforward purchasing decision, but the effect is still one of gaining access to technological value in order to be able to add secondary value and present market offerings for compensation. It is worth noting that licensing activities are rarely, if ever, as simplified as described here – while the formal, open standardization system builds on the tenet that homogenized licensing terms are offered without discrimination to all implementers, these terms in no way deal comprehensively with the factors that must be regulated in a licensing arrangement.

6. The value chain

In this section the value chain for the telecommunication sector and the actors included in it will be presented. The objective is to present the different values created through the chain including societal values, principal values, and technology progress values with the interests of SSO's in mind. The choice of values considered as relevant in this case will limit the choice of relevant actors included in the value chain.

Furthermore, eventual non-commercial actors that can be relevant in the value creation phase will be presented. To demonstrate the different interests involved in the different parts of the value chain there will be a set of different value flows presented. The main goal for all actors in the production/value chain is to optimize their own winnings disregarding how this would affect the other actors in the chain.

A company's value chain is a mean to analyze a company by looking at its environment; identifying all actors involved and determining the connection between them. A value chain can be used as a tool to show all money flows and understanding the position and thus control of a specific actor. In order to do a complete value chain one has to use a tool for analyzing the environment the company is active within. In this thesis Porter's Five Forces are used for that purpose.

6.1 Applied Porter's Five forces

In this text that follows the telecommunication industry from (1) a major IP-holder and (2) an operator's perspective will be analyzed with Porter's five forces in mind. The Chapter is divided into the three actors mentioned earlier and the five parts that the model consists of; degree of rivalry, supplier power, threats of substitutes, buyer power and barriers to entry.

6.1.1 The IP-holder

Major IP-holders in the telecommunication industry are both system, hardware and software producers such as Ericsson, Motorola, Nokia and Qualcomm. Their role of the system providers is to provide with the Backbone network. A transport provider provides with the connection to the part that is not closest to the customer and connects to the backbone network. The connection and cable that is closest to the customer is provided by the access network provider. Within the telecommunication industry there are large IP-holders with rights for technologies essential for the function of the terminals. How

are they connected to the other actors of the telecommunication value chain and how do they come in contact with the end-users?

6.1.1.1 Degree of Rivalry

The degree of competition on a market will depend on different parameters, such as number of companies, market growth, product differentiation and switching costs, to name some. In the telecommunication industry there are not that many system providers. The ones controlling the backbone system are few and often own the essential patents and rights for technologies behind this telecommunication system. The market growth is stable and the market shares are gained by buying or licensing parts of the existing network. When there is no existing network the different companies will have to buy the option to develop a network from the government, where price is one of the decisive factors. Switching costs for operators to change network provider are big and in some cases it is impossible to change since there is only one actor.

6.1.1.2 Supplier Power

If suppliers are powerful they can have severe influence on the industry and capture a large share of the profit generated. In the case of the system or hardware providers the suppliers are usually the actors themselves as the production is one part of the actor's activities.

6.1.1.3 Threats of Substitutes

Porter refers to substitutes as new products or technologies sometimes in other industries that can become a base for competing value propositions in the market. They can be considered a threat when a product's demand is affected by the price change of a substituting product. As the telecommunication industry is connected to the standardization work, where the dominant technologies are decided for the biggest markets in the world, the treat for substitutes is the standard selected by the majority of the actors within the telecommunication chain if different from ones own technology. If an actor has a technology that is an alternative to the standard, it will have a hard time to enter the market depending on how many supporters it has and their role and influence on the market. There are many widely accepted technologies outside the standards but they are usually complements and depend on the standards.

6.1.1.4 Buyer Power

The buyers in this case are the different operators such as Vodafone, 3 and Telia that purchase or pay for the right to use some parts of the network as well as the devices for enabling communication and are the physical product they in their turn sell to their customers and end-users. As there are not that

many network providers even if the product is standardized they are forced to buy from the actors available. When it comes to the terminals, there are many producers but the operators often choose to buy from almost all manufacturers to sell as many physical products as possible to gain money from the services they will provide with the physical product.

6.1.1.5 Barriers to Entry

It is not only internal competition in the market that poses a threat to businesses, there is always a risk that new companies enter the market and affect competition, however small. The telecommunication industry possesses characteristics that protect high profit levels of companies already in the market and prevent additional competitors from entering. These characteristics are called barriers to entry and uniquely define the market. Barriers reduce the rate of entry of new companies and thus maintain a level of profits for those already in the market. From a strategic perspective barriers can be created or exploited to enhance a company's competitive advantage. Barriers to entry may arise from several sources; government, IPR, asset specificity, economies of scale.

Government creates the framework for how companies can compete in a market. Even though the principal role of the government is to preserve competition, they also restrict competition by granting monopolies and through regulation. This makes barriers to rise and must be considered when entering a market. Companies already in the market may actively use various IPR´s to protect knowledge and build competitive advantage. This prevents others from using the knowledge and thus creates a barrier to entry if the knowledge is needed for competing in the market, which is how the telecommunication industry works.

6.1.2 The operators

The operators are actors that package, distribute and pay for the telecommunication service. In some cases the operator will not own their own network, which means that they would have to pay a network operator for that service. Operators are in a traditional value chain vertically integrated with network operators and the content providers. Examples on operators are Vodafone, Telia, 3, Orange etc.

6.1.2.1 Supplier Power

The suppliers in this case are the network operators as well as hardware and software producers. When it comes to technology the solutions are often standardized and the only thing that diversifies them is the design and features of the physical products they sell to their customers. Since operators will buy almost from all major producers to satisfy a larger group of people, one can say that the suppliers are

many and diversified, however when it comes to the network suppliers the supply is not that big and in some cases there can be only one actor for a specific area. Thus the network suppliers have therefore more power over the operators than the hardware and software producers have.

6.1.2.2 Degree of Rivalry

There are a lot of operators on the market and the competition for the market shares is fierce. The operators have to diversify their offers by using price and special combinations to attract customers. The market growth is increasing while new means for communicating are created. There are some dominant actors on the local market in the different countries but there is no dominant global operator, which makes the diversification of the operators even more apparent. The switching cost for changing an operator are not big at all, which explains the fact that the customers are not loyal and always looking for the best offer.

6.1.2.3 Threats of Substitutes

The telecommunication industry is an industry under constant change. New technologies and ways to communicate appear all the time leaving actors not prepared for the changes behind. It is very easy to develop a company within its traditional frames, however times like these call for more flexibility from the actors and their business definitions. Voice over IP has existed for some time and can be considered as a substitute to the traditional communication by phone. Even though there is no substitute that is able to outmaneuver the traditional wireless communication by cellular phone, the substitute market is emerging and a lot of money and investments are done for developing the next best thing that is going to enable communication cheaper and with no restrictions for the end-user.

6.1.2.4 Buyers Power

By defining the market need or the market pull one can detect if there is a situation where the company is given the opportunity/possibility to extent its economic marginal. In this situation the switching cost is what determines which technology will be widely adopted. The number of buyers in a market and the power they possess dictates under which conditions the companies can offer their value propositions. Since the products offered to the customers are in a sense standardized the buyers are considered as powerful. The buyers are fragmented and buy the services and products from the operator with the best offers. Switching costs are low and the buyers on the market are able to influence changes to their benefit.

6.1.2.5 Barriers to Entry

It does not seem to be difficult for new operators to enter the market. Since they do not have to have the technical expertise and are merely a link between the end-users and the mobile manufactures by providing services, besides when they actually maintain and own a part of the network and thus provide access to the net. The only obstacle operators have to face is the numerous agreements they have to sign with licensors for the technology and the owners of the network that could be the government. Since Sweden dropped their telecommunication monopoly with Telia it has become easy for other operators to enter the market and create a competitive environment, where everyone has the same opportunities to succeed and the same threats to fail. Since everything nowadays is global competition gets more fierce and operators have to win their customers loyalty to continue existing.

6.2 The Telecommunications Value Chain

In this chapter an intellectual value chain as applied to the telecommunications standardization system is presented. One could say that the chain more resembles a network structure, but since the standardization industry does not follow a chain structure per definition this network way of depicting the different flows was found necessary. However it is still a value chain in the end. The figure presented in this chapter is a schematic way of presenting the different actors and how they are connected to each other. Unfortunately in reality the value chain is more complicated since many actors can have different roles at different times as well as have more than one role at the same way. Thus the intellectual value chain in this chapter is of a simplified manner.

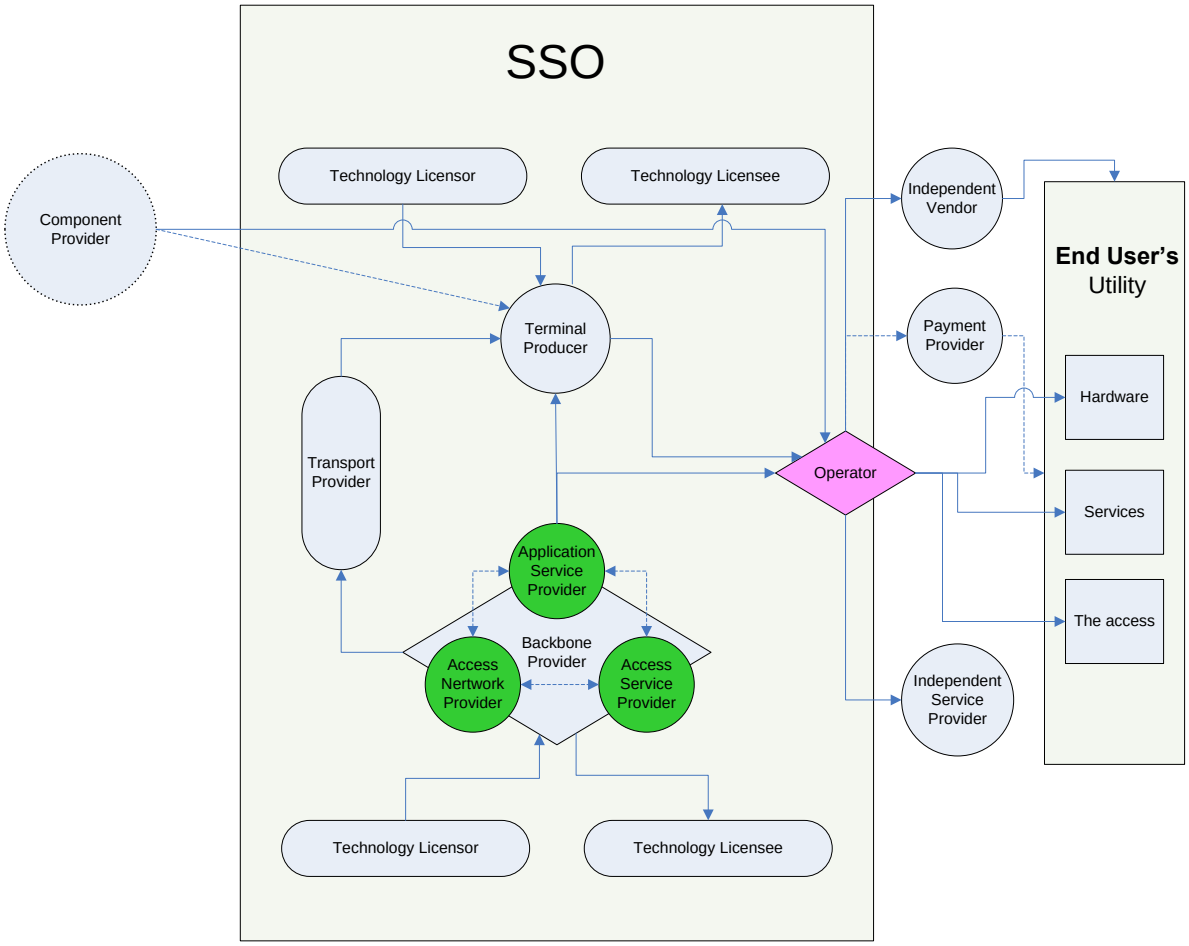

Figure 10. The Telecommunications industry's value chain

As seen in Figure YY there are many actors that are involved in the telecommunication process to enable communication between entities. As mentioned earlier, in reality the value chain would appear more complex with more actors involved that have more than one role in different chains. Thus the chain presented in figure YY gives a simplified picture of reality where the most important roles are reflected as well as the most usual flows displayed. Now follows a short description of the key actors as seen in the value chain.

Backbone Provider – A backbone provider is a system provider. They provide their customers with the base stations, infrastructure, transmitters, etc and handle the installations involved when setting up the backbone structure to enable communication between physical entities. It is really important that structures like these are standardized in order to serve as many customers all over the world. If this was not plausible then each type of terminal would have its own infrastructure system, which would make the overall communication more difficult, expensive and dysfunctional.

They usually posses the technology behind the systems and are in some cases responsible for the construction and maintenance of them. The owner structure of such structures differs, in some cases the backbone providers are only important IP-holders and in other cases they will own and run the systems by themselves. In other words a Backbone provider can be an Assess Network Provider, an Access Service Provide and an Access Application Provider in the same time.

Access Network Provider – The Access Network Provider is the actor responsible for providing the access network. This actor will manage the network equipment parts to enable communication for authorized customers by allowing them to transfer and process information via the network. The Access Network Provider may provide services to end customers or just manage the network equipment so that another company can provide the actual services to customers. These services do not always have to be hardware related but can be provided through a virtual way. In other words while the Backbone Provider will provide with the infrastructure needed, the Access Network Provider will be the link between the Backbone Providers and the actual customer. Because of the two roles being so close to each other some actors will have both roles to gain better control over the network.

Access Service Provider – An Access Service Provider will as the name implies provide the end-user with access to the access provided network. The Access Service Provider will pay the Access Network Provider for the access that they will then offer to the end-user with additional services. In other words a carrier or service provider is company that is engaged in transferring electrical signals or messages for hire through one or more telecommunications systems. These actors are the ones that are closest to the end-user and are thus more influential than others. Being close to the customers and having this close relationship enables these actors to gain a structural control that the other actors in the value chain are not able to gain because of their non direct relation to the end-users. In few words the customers will almost only acknowledge the work of the actors closest to them.

Operator – An operator provides with mobile telecommunication services including data and voice communication. They buy terminals form a terminal producer and while the carrier will appear as being for free for the end-user, the operators charge their customers for the services connected to the terminal. They are the actors with the most contact with the end-users competing with the range of services and prices wit the other competitors on the market. Therefore are they considered of the most influential actors in the value chain; the end-users are aware of the operators and thus brand recognition occurs. The Access Network Providers, Access Service Providers and Application Service Providers can be examples of Operators. The Operators are to be seen as a more general concept that

involves more roles and can be in some cases separated from i.e. Access Service Providers. Examples of such companies are Vodafone, Telia, Comviq etc.

Component Provider – A Component Provider is an independent producer and provider of parts or technology that operators and terminal producers supply from. They are actors "outside" the system and have a material connection to their customers in the telecommunication's value chain. They are often not a part of the standards and act as an outside-in actor. They may have strong IP structures when it comes to protecting their technology. Since they are not a part of the standards they are not obliged to follow the FRAND rules when it comes to licensing agreements with their customers. In some cases they will act only as providers where they get paid fro the components they sell. In either way are these actors outside the standards system which can either mean that they are able to exploit their technology and gain more money than they would do if being part of the standards, or their technology is not part of the standards and thus not that widely used. There is a gray zone in-between those two scenarios where the actors will actually produce components according to standardization procedures in which way they will have to pay fees to the IP-holders to produce these components.

Independent Vendor – An Independent Vendor is an internet based or physical store that sell terminal with or without a subscription connected to an operator. They buy the terminals and "packages" from the operators and terminal producers. Examples of such vendors are PhoneHouse, SIBA, etc. They have no influence over the products or services they sell and are a part of the traditional material chain where they function as retailers. They have no IP-control and are not a part of the standards system.

Payment Provider – The Payment Providers seldom have an independent role in the telecommunication value chain, as opposed to being a key actor when it comes to e-commerce. However, having someone that is responsible for the payment scheme is important concerning that a lot of the services can be provided in a virtual way. This role is often taken care of the operators.

Independent Service Provider – Actors that provide with information, educational or entertainment content for software based products, such as mobile phones. A content provider may in some cases provide the customer with software to access the services. They are not standards creators since they are outside the standards sphere, but they are standards implementers and they create services according to the standards to satisfy the end-users needs. In some cases these Service Providers can be part of an operator's structure, but then they would not be independent.

Terminal Producer – In some cases the provider for the hardware will also provide with the software solutions included, or vise versa. In the telecommunication industry it is common that the software developers include their solutions in hardware carriers to obtain better protection for their innovations. They are the ones providing with the carriers that operators buy to package with their services that they get paid for providing after selling an entity. However, there are many actors that are Terminal Producers but have different job descriptions. For example Sony Ericsson does not create IP on their own but are one of the main terminal providers as a result of a venture between Sony and Ericsson. Another example is Nokia that works a lot with R&D and creates IP while selling terminals, etc.

The end-user - As seen in the figure the end-user will have the most established relationship with the Content Provider and the Operators. Through their relationship with the Content Provider and Operators, the end-user will be able to receive more customer-made services and applications. They are in a sense the driving force for change and even if they do not influence the standards in a direct way, it is the end-users the actors develop standards to please. The end-user or subscriber is the one demanding different services and is offered a clump sum with often no regard to the different money flows and structures within the telecommunication value scheme. In a way the end-users are unaware of the structures and business relationships that are enable telecommunication; in a way they do not always know what they pay for. Their concern is to close the best deal that fulfills their individual demands and the rest is supposed to work of itself. That is way Operators and Content Providers that have the closest relationship to the end-users are the ones that set the grounds for what the users are willing to pay.

6.3 Structural control

The government, standard organizations, the open source movement and in some extent the individual actor monitor and regulate the actors of the value chain through rules and legislations. Structural control is gained by having an understanding of intellectual resources that enables structural exploitation and leveraging. There are five main areas the actors on the market should specifically attend to; technology control, intellectual property rights, market power, secrecy and licensing contracts.

Technology control – The telecommunication industry is defined by the level of standardization participation. Actors involved in the standardization processes can influence the technology adoption on the market by being able to help in deciding which technologies will be incorporated in standards. In this way the different actors have the power to push for their own developed technology to increase

their profits through sales and licensing agreements. The standard procedure is that companies will become alias and by gaining the majority of the votes establish the technologies that they want.

Intellectual Property Rights – Protecting ones property by knowing the intellectual rights of the technology one owns is very powerful. By gaining fully intellectual property rights the technology is easier protected and it becomes easier for the actor to extract value and protect their innovations from infringements. Intellectual Property Rights comes in many shapes, where the most usual are; patents, copyrights, trade marks, trade secrets and design rights. Not all of the intellectual Property Rights have to be applied for in order to have, some are automatically generated while coming up with new innovations. In the standards arena it is very important to have the rights of the technology incorporated in standards since this is what will guarantee one a large future income through licenses and sales. In other words for someone to extract value that does not manufacture and gain revenues trough material sales, the intellectual property rights are of an essence to guarantee survival and wealth for the company. In the intellectualized economy having rights and strategies and structures to support them is the key essence for obtaining competitive advantages and control.

Market Power – Market power is among others recognition, which is a way of evaluating ones brand on the market. A company gains market power when there are known and diffused within their business field and the customers trust and acknowledge the brand and all that it stands for. In other words one can say that how popular you are is quantitatively seen through the market shares a company has, thus it has to do with the level of company rivalry. Ericsson is one of the largest players on the market when it comes to backbone systems enabling wireless communication. They are also one of the largest players when it comes to mobile technology and solutions for the internet. Since they are active in many countries all over the world an exact percentage of their market share is hard to determine.

Secrecy – This can be a big part of obtaining structural control for some actors. It involves trade secrets and how well they are kept and how much value it creates for them. Companies have to have structures and strategies for making sure that information that can be sensitive for the company and should not be known outside the company should stay inside it and thus create value. In a way one can say that it has to do with preventing industrial espionage. Technology intensive companies have their future existence riding on keeping developing technology a secret in order to later on obtain full rights on. On the other hand there are examples of companies such as Coca Cola that have large parts of their business lying within keeping their secrete receipt secrete.

Licensing Contracts – Licensing contracts are a big part of the legal structure of a firm when it comes to extracting value from the innovations. How well a contract is formulated can have a big impact in how much or little a company will be able to extract from its licensees. Depending on parameters such as time span, scope and geographical limitations can make or break a business. It is important that the licensor thinks about maximizing the potential of the contract by enabling to license to many actors while eliminating competition in the same firm. Within the standardization organization a company is obligated to license with FRAND (Fare, Reasonable And Non-Discriminatory) terms for all actors involved in the organization. However, since the FRAND terms are not as explicit as one could think and thus the actors can formulate the contract as they wish but within reasonable terms that no one knows what that in practice means.

For a company to gain structural control it has to be a leader in all three main arenas; Business, Juridical and Administrational. If a company regards the five structural control areas as mentioned above, they will be in a good way of dominating the market. Another thing that is of importance when it comes to structural control is how close one is to the end user. The level of influence and contact with the end user can mean tremendous implications for the company. A company that is near the end-user is near the source its demands are tried to be met and sometimes more than that. The key is to identify what the customers want, why and try to meet those demands and even the demands not already recognized by the users themselves.

Every company has a number of stakeholders that are interested in how the company is performing. These stakeholders can be divided into two groups depending on their influence on the decision-making process in the business. Management, employees and a greater part of the shareholders have a large influence on the company and are therefore named internal stakeholders[38]. The external stakeholders are left out of the decision-making process but have some influence on the company through their interest in the organizations performance and behavior.

Most of the external stakeholders are connected to the company through a contract[39]. Suppliers, creditors, customers and the society are some examples of stakeholders that have such a contractual relationship to the company. They are promised a predetermined return and they are facing the risk that the company can not fulfill the terms of their contract. The residual stakeholders are concerned if companies' revenues are lower than expected but some stakeholders care if they are both lower and

38 Hamberg 2003
39 ibid

higher than expected. Shareholders invest money in the company and expect a positive return from venturing their money. Some shareholders have a greater influence on the businesses' decision-making processes and are a part of the internal stakeholders. They have like managers an interest in how well the company performs. On the other hand the end-users are in a way a company's most important stakeholder. They do not however have a contractual nor residual relationship in that sense that they do not invest money in the company to gain revenues. End-users do invest money in the products and services but their value extraction is made in terms of utility satisfaction. The telecommunication chain is more of a network there are several customers and as known the broader the network becomes the more value can be extracted from the end-users. It is therefore important to identify the end-users utility[40]; Hardware, Services and the Access.

40 Sven Lindmark (presentation) TEA

7. Essential IPR

A crucial step in the process of establishing the scope of a standard is the determination of essential patents. During the declaration of essential patents, the technical claims agreed on in a specification are mapped by SSO members onto their existing proprietary IPR portfolios, and those patents that cover these claims are declared to be 'essential' to the standard. This process is necessary to proceed from the theoretical technical framework of the specification setting process to a legal and commercially sound structure within which the terms and means of usage of intellectual assets are determined. Naturally it should be assumed that the actors wishing to create exploitable value when participating in the standards setting process will not only map passively against declared specifications, but will actively work to include their IPR-protected technologies in the standard as such.

The consequences of possessing IPR that can be designated as 'essential' to a standard are clear and provide perhaps the greatest incentive for strategic participation in standards work in the first place. While the solutions submitted to standards groups are to be judged on their technical merit alone, the effects on an IPR that becomes essential are primarily commercial. Notwithstanding the lack of absolute certainty in defining essentiality, the theoretical result of possessing essential IPR will naturally be the opportunity to craft license arrangements with every actor who is planning a compliant implementation of the standard (in practice, of course, the inter-relationships between such actors makes it impossible to create license arrangements with every actor). Naturally each license will be still be negotiated individually, at a certain cost to the licensor, but holding IPR´s that can be relied upon to be considered essential gives the licensor a prepared list of potential licensees (lowering the cost of external intelligence gathering) in the form of standards implementers, as well as a very strong bargaining chip in license negotiations.

7.1 The definition of essential patents

Even though this process is naturally a fundamental prerequisite for the creation of a standard, very few SSO's have established a formal definition of the concept of essentiality, and the boundaries of the term are largely left to the decisions of the members. Worth noting is that any lack of clarity in the definition of essentiality is not a result of accidental sloppiness on the part of the SSO's, but rather usually an intentional part of the policy of most SSO's to refuse to act as arbiters of licensing matters between members or other parties.

The two most typical, informal ways of determining whether or not a patent is essential to a standard, tend to take the form of a positive and a negative model definition. The positive definition of an essential IPR usually delves no further than stating that it comprises "any IPR´s which [Members] believe to be essential, or potentially essential, to any work ongoing within [the SSO],"[41] which creates a somewhat circular definition of the term. This form of definition is anchored in the technical paradigm of the specification, and assumes that the real-world implementation of the specified technologies will make it immediately obvious which patents cover technical solutions for which there are no substitutes – a perspective that is as optimistic as it is unrealistic. Looking at the usage and context of such positive definitions shows why this lack of clarity and realism arises – essential IPR´s are confused and conflated with the intellectual assets they serve to protect, as in this excerpt from a paper on the problems faced in the standardization of GSM technologies: "Essential IPR´s are defined as protected knowledge that is indispensable for a product that has to comply with that standard."[42]. Naturally the IPR´s as such will never be indispensable for the product; more accurately expressed, essential IPR´s would be those that present insurmountable or non-circumventable obstacles.

The negative definition of essentiality takes a slightly more nuanced approach, and typically defines essential IPR´s as meaning "that it is not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardization, to make, sell, lease, otherwise dispose of, repair, use or operate EQUIPMENT or METHODS which comply with a STANDARD without infringing that IPR"[43]. The difference is subtle, but instead of including all IPR claims that can be seen as fundamental to the specification, this definition explicitly only includes the minimum of IPR claims that would unavoidably be infringed by implementation. It may seem counterproductive to view IPR´s as obstacles to, rather than building blocks of, the standard, yet this definition at the very least implicitly acknowledges the need to minimize the quantity of licenses necessary for a compliant implementation of the standard. As will be demonstrated in this thesis, this goal is one that is increasingly necessary to strive for in modern telecommunications standards.

However, neither of these definitions achieve the level of clarity and unambiguity necessary to provide a reliable basis for predicting and strategically responding to standards setting. The first form of definition leaves the actual task of defining essentiality to the usually conflicting interests of standards

41 3GPP Working Procedures, 21 April 2006
42 Bekkers et al
43 ETSI IPR Policy, Extracted from the ETSI Rules of Procedure, 23 November 2005

setters and standards implementers, with the first attempting to paint the definition of essentiality as broadly as possible and the latter trying to limit it in equal measure. While it might seem clear to a technical expert in the field what constitutes an essential solution and what doesn't, it is nevertheless the case that no objective criteria are established by this form of definition. The negative definition, on the other hand, establishes at least one criterion for essentiality (infringement), but this too is unreliable in practice. Non-infringement is a legal criterion, based on the decisions of courts and national patent systems, and can therefore only be determined with certainty *post factum*. While it is the ambition of most national legal systems to maintain a patent system that is transparent and foreseeable by individuals, it is already obvious that there are wide disparities, not only between different patent systems, but between the applications of such rules within a single system (cf. the patenting of software innovations within the European Union). For this reason, this criterion of the essentiality definition can often only be determined to be fulfilled after a lengthy process of determination, which far exceeds what most actors what consider an acceptable delay in their time to market. The result of this lack of clarity regarding the parameters of essentiality is a state of legal uncertainty, which no doubt contributes to the current problems perceived in the standards system.

One example of the conflicting perceptions of essentiality can be found in a study performed by PA Consulting, which used its own technical definition of essentiality to assess the number of declared essential patents in the UTRA-FDD [44] standard and determine whether these met the criteria established by PA Consulting for essentiality. The results of the study showed that only approximately ten percent of the patents declared as essential were in reality essential to implementing the standard. Since the criteria the study used did not extend to a full legal-infringement analysis, the study cannot be said to have objectively determined the 'true' essentiality of the patents, but the significance of the study lies in the extent to which actor-perception of essentiality can diverge from that of the overt declarations. In a system where, as will be discussed, a large amount of stability rests on the perception of 'fairness' the consequences of a definition that leaves room for such divergence can pose a definite risk.

44 UMTS (Universal Mobile Telecommunications System) Terrestrial Radio Access - Frequency Division Duplexing

7.2 The Consequences of an Inadequate Definition of Essentiality

The inadequacy of current definitions of essentiality has been a feature of the standardization system throughout its history,[45] without preventing the existence and relatively uncontested recognition of the rights of essential IPR-holders. However, the inherent inadequacy, springing largely from a lack of willingness or ability to more closely define the concept, is by now clearly engendering consequences that are detrimental to the entire standardization system. It is widely recognized that a large factor in the problems that characterize the current telecommunications standardization landscape is the proliferation of 'essential' IPR claims – for each telecommunications generation that emerges, the number of IPR´s that must be licensed in order to achieve a compliant implementation grows steadily. For example, by comparing the number of patents owned that have been declared as essential to the WCDMA or CDMA2000 standards with those that were declared as essential to the GSM standard, a definite increase in the number of declarations can be perceived[46].

This is not only due to a more active and strategically aware patenting policy on the part of the major IPR-holders, but also, in part, to a definition of essentiality that can be exploited and expanded to at least give a modicum of support to license demands for an ever growing number of patents. In the long term, it is obvious that this will lead to a dilution of the essentiality concept, since as more patents that are declared essential, actors lose their assurance that a court of law would uphold the declaration, i.e. would maintain that implementation of the standard is necessarily an infringement of the patent in question. Essentiality declaration in such a climate does little to achieve the intended effect of reducing transaction costs, and actors will have to evaluate each license negotiation without being able to count on the patent actually being a necessity. At the same time, the risk of submarine patenting and hold-up licensing becomes an ever present danger in such an unpredictable climate.

A more stringent definition of essentiality would never be able to completely and preemptively determine which patents will be essential to a standard, but would at least help curb the unchecked expansion of claims of essentiality. Such a definition would also be a useful tool to create a framework for objectively challenging such claims in court, allowing the regional court systems to shoulder the burden otherwise presented to the typically unwilling SSO administrations. It would also allow actors to design their contributions to a standard in a more strategically aware fashion, as the use of

45 In the 1980's there were already calls in numerous SSO's to include commercial essentiality in the definition of essential patents – see Wilkinson, S. L. (1991).
46 3g cellular standards and patents, IEEE WirelessCom 2005, June 13, 2005. Goodman and Myers

'implementation patents' skirting the edges of essentiality would then become more precisely defined and relevant in the creation of patent portfolio structures.

7.3 De Facto essentiality

Despite the importance of the essentiality criterion in establishing an IPR-based standard, and the scope of the mechanisms which have evolved to enable such designations and declarations, proprietary IPR that is still essential to the compliant implementation can arise outside of these mechanism - a *de facto* essentiality as opposed to a *de jure* essentiality. Sometimes this disparity is the result of undeclared IPR-ownership, or undeclared IPR applications, and this eventuality will be dealt with in the section on submarine patents, yet there are also other situations that can create de facto essentiality.

7.4 Commercial Essentiality

Commercial essentiality can be used to describe the situation where certain technical solutions, while not, theoretically, essential to the technical implementation of a specification, constitute the only viable commercial alternative("Practicality" is generally judged by whether it would be cost-effective or sensible in the real world to design around the intellectual property at issue. If not, the intellectual property is commercially essential.").[47] As the selection process for inclusion in a specification is usually explicitly and self-consciously limited to technical argumentation, no consideration is made of the cost of implementation, or the future market structures.[48] The consequences may well be that while a number of alternative solutions are seen as equally necessary to achieve a compliant implementation of the standard, most of them may be too expensive, or subject to limited supply. Such situations also arise when a marketable product relies on more than one technical solution, some of which may lie outside the field of standardization. The result, in such a situation, is that a product cannot be useful to the customer (and thus commercially viable) without a license to use the complementary technology, and the complementary technology then becomes commercially essential.

Typically a number of factors mitigate this risk: it is unlikely that a suggestion that cannot be offered to the market at a competitive price will be promoted in the process of setting the specification (as commercial interests ultimately drive the presentation of technical proposals), and the actors that play significant roles in the specification setting process tend to have the necessary resources and

47 "Practicality" is generally judged by whether it would be cost-effective or sensible in the real world to design around the intellectual property at issue. If not, the intellectual property is commercially essential." Beeney et al 2002

48 Some definitions of essentiality allow for greater leeway, cf. the 6C DVD Pool: "A Licensor's patent is "essential," and thus subject to the commitments in the MOU, if it is "necessarily infringed," or "there is no realistic alternative" to it, "in implementing the DVD Standard Specifications." - 3C Letter, *supra*, n. 1 Letter from the Hon. Joel I. Klein to Carey R. Ramos (June 10, 1999)

infrastructure to successfully follow up their suggestions in the marketplace. In addition, it is rare that a product solution that encompasses several technological solutions is not entirely encompassed by the scope of standardization efforts within the industry. However, as the specification setting process usually precedes the market entry of a solution by several years, these factors cannot always be predicted, and new developments can lead to a de facto commercial essentiality, where it is certainly technically possible to achieve a compliant implementation of the standard without access to certain IPR, but commercially unfeasible.

Even though very few standards organizations have made provisions for cases of commercial essentiality, the reality of these cases has been recognized by the actors on the market explicitly. For example, the Philips CPT License Agreement, which established a cross-licensing scheme for technologies relating to Super Audio CD and Digital Rights management, defined the difference as follows:

"*"Technically Essential CPT Patents": patents, the use of which is absolutely necessary for compliance with the specifications defining the Super Audio CD Copy Protection Technology.*

"Commercially Essential patents": patents relevant to the Super Audio CD Copy Protection technology, other than Technically Essential CPT Patents, for which no commercially viable alternative is available."[49]

No studies have been performed to determine the frequency in practice of commercially essential patents which are capable of blocking standards implementers, but it is clear that the potential risk of such essential patents undermines the acceptance of traditional essentiality definitions – if the actors cannot be sure that they will be able to implement the standard once access to all formally essential patents has been obtained, the predictability of the system will be minimal. At the same time, regulations on commercially essential patents will be far more difficult to establish, as the risk of infringing competition law requirements will increase greatly.

7.5 Regulatory Essentiality

Yet another situational factor that can bring about de facto essentiality without de jure designation, is the relevant regulatory structure. While the focus in determining the basis of essentiality typically lies

49 Philips CPT License Agreement Reference Copy, available at http://www.licensing.philips.com/includes/download.php?id=4520&filename=3232.pdf

on emphasizing technical aspects and excluding commercial aspects, other factors, such as legislation and regulation are also ignored. Regulatory essentiality can arise in a situation where a number of technically equivalent solutions are available to perform a compliant implementation of the standard, but due to specific regulation affecting the industry, only one of these solutions is possible. Such regulation can for example take the form of environmental protection legislation or safety regulations – if, for example, limits are placed on the permissible level of exposure to radio frequency (RF) radiation, such limits might rule out the use of certain solutions, leaving actors no alternative but to use an approved method. The risk is usually small, and in the given example it is very unrealistic, for example, that a solution would be developed and even brought to market within conforming to the relevant regulatory structures, yet the risk remains. Such regulatory restrictions cannot, in the current SSO system, be predicted and circumvented – partly due to the fact that the standards setting process explicitly avoids taking such factors into account, but also due to the fact that the critical standards setting period usually precedes market entry by several years, whereas the reactive legislative process is not initiated until much later. If relevant regulatory limits are changed or introduced subsequent to standards setting, it might very well be the case that the alternatives available to standards implementers are reduced to a single, de facto essential alternative.

7.6 Conclusions

In conclusion, the uncertainty and lack of transparency surrounding the essentiality concept is a characterizing aspect of the current standardization system. It is an accepted fact that a declaration or determination of essentiality is necessary for the possibility of an effective implementation of a specification, but it is at the same time true that such determination has become too encompassing to be within the administrative range of current SSO's. At the same time, obviously, this creates possibilities for exploitation, and facilitates a pseudo-fraudulent declaration that is made only in order to gain licensing leverage without contributing significantly to technological advance. Such strategies are easy to develop, and will typically not carry a penalty as long as the uncertainty remains. Over all, however, it would seem that if the goal an efficient and reliable standardization system with minimal transaction costs, it is necessary to work to either reduce the uncertainty regarding essentiality declaration, or to limit the effects of such declaration by changing licensing behavior subsequent to the declaration of essentiality.

8. Licensing Term Declaration

The conventional manner of determining the terms of a license agreement is in conjunction with the establishment of the agreement as such; entering into the license agreement per se hinges on the terms negotiated. Aspects such as cost, term and scope do not diverge as such from the purpose and existence of the agreement, and the only outside factors influencing these terms are the restraints and proscriptions inherent in civil legislation and competition law. As the determination of licensing terms presupposes the desire to reach an agreement, and the conclusion of the agreement presupposes the joint determination of the terms, these are usually seen as a single result of a single process. In the standardization context, however, determining license terms prior to negotiation of the agreement is not only possible, but to some extent considered to be a prerequisite of successful IPR handling in the standard. Committing to FRAND obligations, for example, which is traditional in most standards organizations, is a clear indicator of the desire to commit to preemptive term setting. However, as the commitment to FRAND is still, as mentioned, fairly vague, it is quite possibly to use the somewhat unusual nature of licensing within standardization to improve on the benefits of early term setting.

8.1 Ex Post and Ex Ante Declaration

Within standardization activities, a distinction is made between the *ex post* establishment of licensing terms, which is the way licensing is typically carried out, with the Latin word post signifying that terms are set *after* the standard is set, and the *ex ante* establishment, which refers to establishing terms *prior* to the determination of the standard (and specification). While, as mentioned, a commitment to FRAND is in some ways an ex ante declaration of terms, the term ex ante in these contexts is usually taken to refer to a more comprehensive declaration of terms, and typically includes the concept of ex ante declaration. While ex post is as mentioned the norm, ex ante term setting allows for a number of improvements specific to the issues that currently afflict telecommunications standardization. It has never been implemented on larger scale, except insofar that RF terms can be considered a form of ex ante royalty setting, but there are nevertheless a number of proponents of implementing ex ante royalty setting in modern standardization contexts.

The common understanding of the concept of ex ante declaration on a meaningful scale, therefore, comprises two significant differences in terms of licensing behavior as compared with the current norm. Firstly, there is the difference between the economic rationales of actors ex ante and ex post the setting of the standard. Naturally, the projected exploitable economic value of the technology in question will alter dramatically depending on whether or not the specification is set, and whether or not it is clear if the IPR

related to the technology will be possible to convincingly declare essential. This means that in the ex post situation, actors with essential patents to license are fully able to exploit the dominant position that the technological lock-in effect creates, and will not be forced to relate their terms to competing technologies, except to the extent that this is required by other policies, such as royalty caps and FRAND obligations. In an ex ante setting, however, actors are still uncertain of the true potential value of a technology, and will be forced to take the terms declarations of competitors into account. This, in a way, helps to negate the skewed market consequences of technological lock-in in the field, while allowing for the control over the standard that also results from technological lock-in.

The second significant difference is the act of declaration itself, which is a necessary component in the shift to ex ante term setting. Setting terms prior to the setting of the standard itself is of course meaningless unless this is done publicly – if the chosen licensing terms are fully declared to all potential licensees to the extent that they are set. Without such declaration, there will be no benefit to an ex ante consideration of licensing terms compared to an ex post strategy, and it will be impossible to hold actors to their obligations. This is in itself obvious, but the declaration component of ex ante term setting must be understood and appreciated in terms of the effect it would have on the standardization system, as the lack of transparency, and the secrecy of the current system, underlie much of the current system's failures and successes. Openness regarding terms would create a drastically different dynamic, the effects of which will be discussed in greater detail in the tools section of this thesis.

9. Conflicts within the system

As has been demonstrated thus far, the telecommunications standardization system is the result of a number of processes coming together to form a hybrid market which exists at the intersection between regulation and openness. The market is ostensibly no longer centrally regulated, but is still largely governed by the SSO's that uphold a more static approach to market interaction, and the dynamic interplay between the members of these bodies helps create the structures that make up the system. With such a diverse and unique context, it is inevitable that there are conflicts within the system, and as the interests of the actors determine the very structure of the system, the conflicts constitute some of the underlying foundations of the system as such. Therefore, in order to understand the system as a whole, it is necessary to examine those conflicts that are most structurally relevant for the system, and to understand their effects on the actors in the market.

9.1 Disparity in IP control throughout the value chain

Within the standardization system, there is a clear quantitative disparity in terms of IP control, a situation which has been alternately labeled a problem, a necessity, and a useful inevitability[50]. IP ownership is concentrated in the 'early' parts of the value chain, as is typical of systems where research-intensive products are packaged and sold by others than the original inventors. IP holdings taper off as one proceeds through the chain, until the final actors have very little standards-related IP of their own, if any. IP-control, naturally, is the means by which those actors without direct contact with the market manage to maintain their presence and negotiation position throughout the market. Without this means of control, the actors closer to the market would be able to use their presence on the market to create an inordinately strong bargaining position, as they would effectively control access to the customers. Actors earlier in the chain would then have to accede to the demands of the retailers, or approach the market themselves, foregoing the advantages to efficiency and core focus that are possible when the creation of the physical product can be left to others. IP-control, then, is the natural means by which an actor can specialize in a specific niche early in the value chain, and still retain a degree of control over the finalized product – if by no other means then at least through the ability to sue for infringement.

However, the disparity in IP control is beginning to chafe at some actors, who view the concentration of power that IP implies as an unbalanced restriction on the freedom to act of down-stream actors. The

50 Tellingly, one interview subject compared the disparity to "the product disparity between retailers and customers."

costs, primarily, of removing the IP obstacles and obtaining access to the intellectual content through licensing are a cause for concern, and some actors claim that these costs have accumulated to a point where they are hampering the very possibility of providing a reasonably priced end-product[51]. While the effects on end-product pricing may be exaggerated, or to a considerable extent attributable to other factors than licensing costs, the secrecy and lack of transparency regarding licensing situations have created a speculative environment where actors make ostensibly objective claims aligned primarily with their own interests. For example, informal assessments by major IP-holders in the industry hold that licensing costs indirectly contribute somewhere between five and ten percent of the final retail cost of any given mobile terminal, whereas similar assessments by operators close to the market estimate that such costs constitute up to thirty percent of the same retail price. Furthermore, it is often claimed that the transaction costs of negotiating the numerous licenses necessary for standards compliance are, in and of themselves, prohibitive, as the number of actors, declared essential patents, and, of course, licensing arrangements, increases with each generation of telecommunications technology.

9.2 Submarine Patents and Hold-up Situations

One widely acknowledged cause of conflicts within the current standardization system, and a source of criticism against hands-off SSO dispute policies is the problem of submarine patents. Submarine patents, in the perhaps most widely used definition of the term, have been defined by a US court as patents which "remain 'submerged' during a long *ex parte* examination process and then 'surface' upon the grant of the patent," allowing the patent holder to "demand high royalties from non-patent holders who invested and used the technology not knowing that patent would later be granted."[52] This problem was a definite source of conflict in the first-to-file patent system of the United States, and was therefore addressed by US Congress in 1994.[53] The implemented changes proved largely successful in dealing with the problem, and submarine patents are now, in most fields, a rare occurrence rather than an unpredictable, ever-present threat.

In telecommunications, however, the threat of submarine patents has far from disappeared, and is considered to be a mounting problem with each generation of telecommunications technology[54]. This can largely be ascribed to the effective spread of standardization, and the effects of standardization on

51 "The price to our industry of the proposed licence fees are greater than the annual revenues to our industry from the activities requiring a licence," Paul Davey, Strategic Relationships Executive Vodafone Group Plc
52 *DiscoVision Assocs. v. Disc Mfg., Inc*., 42 U.S.P.Q.2d 1749, 1756 n.11 (D. Del. 1997)
53 The change instituted a 20-year term of protection from the date of patent filing, as opposed to patent grant, in USC 35 § 154, a change spurred to a large extent by implementation of the GATT and NAFTA agreements.
54 Standards, Open Standards and IPR, presentation by Paul Davey,

actor behavior in terms of technology adoption. In a standardization context, the concept of submarine patents is widely accepted but does not refer specifically to patent applications and the examination process. The term is used on a more general level, on which submarine patents can be defined as patents which confer a disproportionate advantage on one actor after other actors in the field have taken important, irreversible decisions without being aware of the existence or significance of the first patent. This definition still includes the traditional form of submarine patents, but also includes the standardization-specific concept of technological 'lock-in' as a contributing factor. Due to the current structure of the standards creation process, submarine patents can emerge at any time, after other actors in the industry have passed the 'point of no return' in their decision-making process.

In standards-oriented fields, the point of no return for actors fearing submarine patents is of course the actual setting of the standards (or specification). Once a standard has been set, members are more or less committed to using the technologies specified in the standard, and are thus vulnerable to claims from a submarine patent holder whose technologies have been included in the standard specification. This is the effect generally known as 'technological lock-in'[55], and is a necessary cornerstone of an effective standards setting process – without a firm commitment to a specific collection of stated technologies, a standards specification in no way guarantees effective interoperability or compatibility. As this effect is both well understood and predictable, most SSO's have taken measures to reduce the risk of submarine patents, including drawing up policies that require members to openly declare their proprietary claims on technologies that will be included in a standards specification. The specifics of an effective declaration process is a hotly contested issue – at the moment no SSO's require their members to declare pending patent applications, and many SSO's opt not to make any demands of disclosure at all - but ultimately the greatest submarine patent threat is not addressed by such policies, as they can only be enforced (if at all) against members of the SSO, who would be bound in either case by the relevant respective licensing terms. The problem, naturally, relates rather to the scenario where actors outside of SSO's make proprietary claims on technologies that have already, through their inclusion in standards specifications, been 'locked in' to the business activities of the SSO members. As these actors are not bound by the terms of SSO membership policies, they have no incentives to declare their patents before the standard is set, nor is it in their interest to conform to FRAND licensing terms.

55 The term lock-in is borrowed from the field of economics, where it is also called "path dependence" – a scenario where an inferior solution dominates because the costs of switching to superior alternatives are prohibitive. In the current case, the switching cost is of course exclusion from the standard, and thus from interoperability.

9.3 Hold-up Licensing

A second, usually complementary problem that faces the telecommunications industry in the era of standardization is that of 'hold-up' licensing practices[56]. Hold-up is described as the situation that arises when the owner of essential IPR waits until lock-in has been achieved in a standard, and then uses this position to charge supracompetitive prices for the technology. As the other actors are then committed to using this technology in order to achieve a compliant implementation of the standard, the IPR-holder is free to ignore the pressures of the market that would otherwise drive down the price. This situation is similar to that of submarine patents, but there is no requirement here that a patent is 'submerged' – a patent that is used as a basis for hold-up licensing might very well be flagged early on in the standards setting process, but with the assumption that access to any essential patents will be available on reasonable terms (or, as will be discussed later in this thesis, fair, reasonable, and non-discriminating).

For many, this is one of the most astonishing assumptions of the standardization system - the assumption that certain price levels are 'reasonable' even if they are lower than what actors may be willing to pay. The rationale, of course, is that within the standardization system, the voluntary price levels that actors are willing to accede are artificially inflated by the lock-in effect discussed previously. Once actors submit to the lock-in effect, their willingness to pay no longer reflects any form of 'natural' market price levels, and the correlation between market value and quality that is a natural underpinning of the free market system no longer exists. In response to this, the widespread assumption of 'reasonable' price levels has arisen –without a price level set by dynamic market interaction, a constructed view of appropriate pricing arises, based to a large extent on individual approaches to the valuation of IPR´s, which helps keep the various actors on relatively reliable footing despite the absence of a stabilizing invisible hand (the most widely accepted definition of reasonable pricing, FRAND terms, will be discussed at a later point in this thesis). Diverging from this perceived norm, and opting instead to charge an individually determined price for access to essential IPR´s, results in behavior perceived as hold-up licensing.

9.4 Submarine patents and hold-up – a question of interpretation

As stressed in the definition of submarine patents and hold-up licensing, these behaviors (particularly hold-up licensing) are primarily, if not entirely, a matter of the perception of a behavior. The actions

56 Recognizing the procompetitive potential of royalty discussions in standard setting, Deborah Platt Majoras

taken by actors engaging in these behaviors are, on the surface, the actions that constitute regular, 'reasonable' interaction in the standardization system. Licensing, for example, is always carried out after a standard is established and the lock-in effect sets in – licensees are contacted after they choose to perform a compliant implementation of the standard, which is by default after the technological standard has been finalized. At this point, royalty rates are also determined as a result of individual negotiations between the parties. Royalty rates cannot be declared ahead of time, for a number of reasons, and proprietary patents are not always declared by members – in the last couple of years, several major IPR-holders have initiated the practice of scrutinizing earlier patents to map them against the specifications of the standards, and thus apply old patents to new standards structures.[57] In category, at least, these behaviors, which constitute the standard modus operandi for all IP-leveraging within the standardization system, match the behavior of submarine patent-holders and hold-up licensors[58] exactly.

The primary characteristics that are generally agreed to constitute marks of 'unreasonable' behavior, and distinguish this behavior from normal licensing practices, would appear to be an intentional refusal to declare patents[59], in order to create submarine patent situations, and price-setting that is markedly higher than 'reasonable' levels. While there is an assumed consensus among many parties within the current standardization system as to where to draw the line that determines these behaviors, this consensus seems to correspond rather well with the position of those parties in past, ongoing and nascent conflicts – a definition drawn to party lines rather than objective evaluation. The definition of reasonable pricing, for example, is particularly difficult to ascertain as anything separate from the economic interest claims of the different actors, and the outrage expressed at many times is often 'political noise' rather than an indicator of a deeper structural malady. A general indicator of reasonable pricing can in some cases be obtained retroactively by performing a study of past actor behavior, but this is difficult to do on a wider level as most license agreements, and their terms, tend to be closely guarded secrets. These difficulties must be kept in mind in the following examples of behavior that has been labeled 'unreasonable' in the history of the standardization system.

57 Interviews.
58 Often referred to as 'patent trolls,' using a phrase coined by former Intel assistant general counsel Peter Detkin in 2001; the phrase is poorly defined, as pejoratives typically are, but seems to generally refer to those actors who out of self-interest would allow the goal of leveraging IPR into profit to interfere with the goal of bringing products to the market.
59 While the discussion is usually expressed in terms of declaring ownership, it is often more relevant to declare essentiality; the issue of ownership of a patent is a public matter, but the essentiality of its claims to a standard is impossible to discover through any realistic regimen of patent searches.

9.4.1 The MPEG LA Submarine Patents

In 2004, the Open Mobile Alliance began to finalize the process of establishing a Digital Rights Management (DRM) standard. The goal of this standard was to establish a regimen for measures intended to limit the opportunity for digital piracy of content in mobile phones, by setting safeguards against the unauthorized duplication or modification of data such as movies or music files. The expressed scope of the OMA DRM standard was "to enable the controlled consumption of digital media objects by allowing content providers to express usage rights," and was intended thus as an initial step towards allowing content providers control over the freedom of behavior of customers – not only was the standard limited in scope of application, but also in terms of the tools used[60] and was considered a stopgap measure to fill an urgent need for a standardized initiative in the area. It was hoped that this initiative would be easily implemented by members, and to assist in this, technologies were opted for with very few or no blocking IPR´s.

The members of OMA who participated in setting the standard were not, however, independently responsible for the creation of the technologies that was selected for use in implementing the DRM measures. The OMA DRM standard (1.0) was made public on the 25th of June, 2004, and within a month, another standard setting organization, MPEG LA, made an official call for companies to analyze this standard and determine whether or not they could claim that the technologies included were covered in any way by proprietary IPR´s – to determine, in effect, if any other actors 'owned' the new DRM standard. This call was quickly answered by a number of organizations who were not members of OMA, including ContentGuard, Intertrust, Matsushita, Philips and Sony, who quickly joined MPEG LA in order to present a concerted license regime for the OMA DRM standard. All of these organizations naturally asserted that implementation of the OMA DRM standard constituted an infringement of their intellectual property rights, and initially requested a royalty fee set at one dollar for each mobile device implementing the standard, in addition to payment of 1% of the cost of any transaction in which content protected by the DRM in question was transferred. This royalty requirement would of course be added on top of the existing licensing arrangements, and would raise the price of a cell phone substantially while contributing a limited increase in functionality.

The royalty requirements presented by MPEG LA immediately gave rise to sharp criticism from trade associations and industry actors, calling the demands "onerous, impractical and unclear"[61] and demanding changes. Not only were the demands criticized as excessive in terms of price, but the proposed terms would be difficult and costly to implement, and would significantly hinder adoption of

60 The tools used developed were 1) a Rights Expression Language, 2) specific Content format, and 3) Metadata.
61 MEF (Mobile Entertainment Forum) Statement on MPEG LA licensing program for OMA DRM V1, 21 March 2005

the standard. While the intellectual property protection position of MPEG LA was relatively clear cut, and a full-on legal battle would have most likely allowed the MPEG LA consortium to block the adoption of the standard, the consortium compromised in the face of criticism and presented a reduced fee of 0.65 USD for each device sold, and a transaction royalty of 0.25 USD that would only be levied annually on the number of users of any DRM-protected subscription services. This reduced royalty scheme, still called by pundits "the most expensive royalty operation ever,"[62] still met with opposition, and was rejected as being "unreasonable and unworkable"[63] by many. Licenses for the original DRM standard were issued by MPEG LA in the beginning of 2005, but it was clear by then that the license package in question would not enjoy widespread adoption. Instead of working together, OMA and MPEG LA had become competitors for the standardization of mobile DRM, and some have gone so far as to claim that the consensus destruction resulting from MPEG LA's royalty requirements was a contributing factor to the lack of a homogenously adopted mobile DRM standard.

9.4.2 Qualcomm Hold-Up Licensing

The second situation illustrating potential or on-going conflicts in the system is not a discrete event, but rather a series of behaviors by an actor in the system; behaviors that have often been considered hold-up licensing or at least tantamount to such. The American company Qualcomm has long been known as an actor that refuses to uphold many of the generally accepted norms of the standardization system, or that at the very least interprets those norms differently. The difference in perspective here is one that has been touched upon in the discussion of MPEG LA, namely the difference between seeing essential IPR as a measurement of the investment an actor makes in a standard, and seeing it as a measurement of the potential for hindering the standard that's available to an actor. Theoretically, any actor in control of a patent that is clearly essential to a standard will be able to block the adoption of that standard by either refusing to license out the patent, or by licensing out at exorbitant rates. If the standard cannot be amended to circumvent the blocking patent, the standard will be abandoned. The opposite view holds that the obligations of FRAND, common to most SSO's, oblige participants to ensure that that their licensing terms are proportional, relative not only to the number of other essential patents mapping on to the standard, but also relative to the investment the actor has made in the technologies underlying the specification.

The easiest means of economically quantifying the investment an actor makes in a technology is of course the amount spent on research and development leading to the advance in question. There is an assumed that in most cases, a large investment in research and development will lead to great

62 "Phone DRM: the most expensive royalty operation ever," The Register, April 21st 2005
63 GSM Association Press Release, May 4th 2005

advances in technology; that such advances will lead to a greater degree of adoption in the setting of the standard, and that this will ultimately be reflected in a large number of essential patents owned by the same actor. The reasoning, therefore, espoused by proponents of proportionality, is that ownership of a large percentage of the patents essential to a standard entitles an actor to a larger proportional share of the royalty base for that standard. This logic is at both perfectly reasonable within the standards context, and at the same time perfectly foreign to typical free market dynamics – considerations of resources invested and the profits of other actors are generally not something actors are forced to make when planning their own business strategy. The mechanism by which such behavior is encouraged and enforced, in theory, is of course the underlying agreement to abide by FRAND principles, which will be discussed at a later point in the essay.

Actors who do not interpret FRAND to include limitations on licensing behavior related to proportionality naturally act differently, and Qualcomm is one actor that has become a prime example of explicitly refusing to view FRAND as a binding obligation to observe principles of proportionality derived largely by consensus. Qualcomm has repeatedly refused to participate in a number of initiatives to establish royalty caps and controlled licensing terms, and has even gone so far as to explicitly state that for the standardization of W-CDMA technologies, which are included in the so-called 3G standard, Qualcomm expects to be able to charge a ten percent royalty of the sale of the end product if a single claim of a single patent owned by Qualcomm is infringed by the product (i.e. if the standard is implemented). This statement, per definition, contradicts flatly the ambitions of Ericsson and other IPR-holders to maintain cumulative royalty rates at a single digit level, as it is a clear announcement that Qualcomm's share alone will surpass that level. It is also a clear statement that Qualcomm does not consider proportionality or relativity to be criteria for FRAND behavior.

Qualcomm's actions and statements have been criticized by other actors as incompatible with the purposes of standardization. While Qualcomm had been a significant contributor to the GSM standard, with its CDMA technologies, its contribution to wideband CDMA (W-CDMA) for the 3G standard was far less significant, yet the actor made statements to the effect that it expected a similar royalty proportion from implementers of 3G as it had received from GSM implementers. In the value network this would be represented as a minimal flow of technological value (represented by the single claim) from the actor, and a demand for disproportionate monetary compensation. The response to this has not only taken the form of complaints, but most recently also discussions on potentially forming a patent pool within the ETSI membership specifically designed to exclude Qualcomm's technology

area, as well as a formal complaint before the European Commission by a group of European IPR-holders asserting that Qualcomm's "excessive royalties" are "in breach of competition law"[64]

Qualcomm's behavior, however, shouldn't be viewed simply as a recalcitrant attempt at maximizing profits at the expense of progress, and attempts to cap royalty rates, while currently perhaps extremely necessary, are not simple acts of charity. While IPR-holders such as Nokia and Ericsson stand to lose licensing revenue on their essential patents by instituting a cap on licensing fees, they stand to gain a comparable amount in terms of in-licensing. As manufacturers of base stations and mobile terminals, these actors would obviously have to pay whatever license fees are set for that manufacturing. Being both IPR-holders and product developers, these actors can seemingly act against their best interests while actually lowering their licensing costs. This is the counterargument used by Qualcomm to reject royalty capping, and while it is not always applicable, and oftentimes irrelevant (when, for example, the party experiencing excessive royalty rates holds no IPR of its own), it demonstrates the complexity of the potential for conflict in the standardization system.

9.4.3 The Motorola GSM approach

In the late 1980's, the so-called GSM project, referring to the standardization of the so-called GSM generation of mobile telecommunications technology, was taking shape. In this process, European actors such as Ericsson had been significantly involved in providing and promoting some of the integral technologies that were to be implemented in the standard. During this period, Ericsson, like many other actors involved in the process, chose to patent restrictively, allowing the process to develop gradually and holding off on securing intellectual property rights. This patenting behavior was based on older IPR strategies that were more focused on the successful widespread adoption of the standard through technological superiority, and far less on the need for a comprehensive IPR network to facilitate such diffusion.

Other actors, particularly outside Europe, had already begun to abandon this strategy of the 'gentlemen's agreement' not to patent. Motorola, as one of the few non-European actors involved in the creation of the GSM standard, opted to increase its patenting pace based on the decisions that were being taken in the standards setting organs, and secured a number of patents on technologies essential to the new standards. Some of these technologies were in many respects based on the advances pioneered by Ericsson, as a result of Ericsson's investments in both research and development and

64 "Qualcomm committed to standard setting organisations that it would license its technology on fair, reasonable and non-discriminatory terms. In spite of this and in breach of competition law, Qualcomm is charging excessive and disproportionate royalties. This means ultimately that consumers may have to pay more than they should for their mobile handsets." Kasim Alfalahi, Vice President IPR Licensing and Patents, Ericsson AB – Company statement to the Commission, October 28th, 2005

standards setting organ participation. However, as Ericsson had not consolidated their creation with structural support in the administrative arena, they found themselves in the position of paying royalties for the use of technologies that, to a large extent, they had been involved in developing. While some felt that this was a violation of a certain moral right to the results of research and development, it was clear that Motorola had the undeniable legitimacy of the patent office on their side, and Ericsson was forced to settle in an out of court licensing arrangement.

To some extent, this situation is less indicative than the others cited in terms of demonstrating the problems inherent in the standardization system. It can be argued that the behavior of the European actors was outmoded and in fact inappropriate to the realities of a global standards system. Such a system must necessarily build on the widespread use of IPR, and barring the establishment of an authoritative, world-spanning administrative authority, it will be equally necessary for actors to maintain and monitor their own rights in this regard. After all, the behavior of Motorola, while considered inappropriate and perhaps immoral by many at the time, is difficult to distinguish from regular licensing behavior. While the situation could technically be classified as one of submarine patenting in the broadest sense, i.e. that of technological lock-in combining with an insufficient awareness of essential patents, Motorola cannot be said to have acted as a 'rogue' in the system, but rather only not 'in sync' with Ericsson's expectations. In the end, this situation was resolved through license negotiations, and prompted a clear change in patenting behavior on the part of Ericsson.

9.5 Changing the system through conflict

As is obvious by now, the standards system constitutes a hybrid market, with highly specific conditions and practices. It is no longer the regulated system of the PTTs, in which issues of product quality, compensation, and innovation were resolved through official decrees, but neither is it a free market, where such issues are driven by market forces and dynamics such as supply and demand, and competitive pricing. The standards system is a compromise between these models, and the problems and conflicts it experiences can typically be viewed as the efforts of the actors to establish the mechanisms that will serve in lieu of government regulation and free market pressures – all the while, naturally, defending their own interests.

Certain actions, such as the aggressive royalty demands of Qualcomm and the submarine approach of the MPEG LA consortium, show a marked tendency to try to drive the system in the direction of free market rules. In essence, both actors based their course of action not on what the majority of the industry would claim *should* be done, but on what these two actors *could* do, based on maximal

exploitation of their respective positions. This is the *laissez faire* logic of the free market, and is an obvious refusal to recognize the implicit structures of the system. On the other side of the spectrum, efforts such as the complaint before the European Commission by, among other actors, Ericsson, are clear attempts to formalize the implicit structures of the system through the use of judicial decisions, creating formal acceptance outside the standards system for the norms established by the actors. While this does not represent a return to the fully regulated system of the PTTs, it is obviously intended to formalize existing structures and avoid a transition to an unregulated free market, where actors are free to exploit their strategic positions without concern for the current balance.

Ultimately it is clear that the system is still susceptible to change, and to efforts with the aim of bringing about change. The actions of the standardization actors in these conflicts must therefore be seen in a wider perspective – not only are they reacting to the realities of the standards landscape and the demands of other actors, but they are also constantly striving, consciously or not, to alter the terms on which future transactions will take place. Mapping the current system, therefore, is not only a useful tool for establishing an overview of the present situation, but is also a necessary means of planning for long-term strategy and changes to the system as a whole. Creating formal support for the existing structures of the system will require activities that reach beyond the current business arena and invoke structures on other arenas – such as legal challenges, which establish support on the judicial arena by creating case law and precedent that can be used to scrutinize future behavior. In this way, conflict is not only an unfortunate obstacle to progress, but also a means of creating a more robust standardization system.

10. Future scenarios

In this following chapter four probable scenarios are going to be discussed and analyzed in order to identify threats or potential with these future scenarios. The scenarios presented are derived from discussions with representatives at a major IP-holder in Sweden within the telecommunication industry as well as influenced by the ongoing discussions within the different SSO's between operators and IP-holders.

So far in this thesis, an overall perspective on the workings of the current European telecommunications standardization system has been provided. In this overview, a number of issues were identified that could be perceived as flaws within the system or sources of conflict. Some of these issues are more abstract, being issues only in relation to a perceived optimal system, whereas others are highly concrete and have already prompted actors to initiate measures that aim to alleviate these issues by implementing changes to the current structures of the standardization system. This is in line with another key conclusion of this thesis, namely the fact that the standardization system, being almost entirely a creation of market actors acting on a pseudo-formalized business arena, is a system in flux, capable of constant evolution and changes spurred by its members.

As a result of the fact that the system as such is defined by its members and participants, it is impossible to say in any meaningful way whether these initiatives can objectively be considered 'problems' in the system or merely tactical measures attempted by those members to increase their control and ultimate market share. As the system to some extent incorporates free market concepts of competition, there will be inevitably exist tension between actors, which will be expressed in various forms. This is not to say, however, that the system as such cannot be improved, either through shaping it towards subjective improvement based on the current position of the actor, or through actions intended to bring about a net gain for all actors. While assessing the possibility of such beneficial change is not within the scope of this thesis, it is recognized that changes to the system can bring positive effects, but also that an actor wanting to ensure that these effects are in line with its goals must be aware of the various means by which the system can change, and how these changes should optimally be implemented.

In the following four sections, therefore, a number of tools that allow actors to bring about such changes are analyzed and assessed for their strategic value to actors in the standardization system. As has already been discussed, some of these tools are initiatives that have already been identified and

proposed as changes to current structures. For example, the challenges to ETSI by the Vodafone-led coalition of operator actors incorporates several tools for altering the system that all aim to bring about a reduction in suspected unreasonable licensing fees burdening the standardized value change. For this reason, these tools should also be viewed as potential future scenarios of change in the system, as the tools may be implemented by any actor in the system with greatly different effect – what may appear to be a tool for beneficial change in the hands of one actors will be seen as a weapon in the hands of its competitors or customers. For this reason, the analysis primarily takes an actor-neutral perspective to these tools, but also notes instances where specific actor categories can employ the tools to clearly different effects.

The four tools chosen for analysis and discussion are:

- Implementing a policy of declaring licensing terms ex ante in standards organizations;
- Establishing restrictions on permissible royalties in licensing arrangements;
- Instituting patent pools to manage the processes of standardizing technological innovation outside existing standards organizations; and
- Creating new standardization organizations, or changing the member compositions of existing organizations.

Some of these tools are more likely to be implemented than others, and some have been recommended or even partly implemented in the past. The tools should be understood in a general context of a standardization system roughly approximate to that of the European telecommunications market today.

10.1 Ex Ante declaration

Shifting to an ex ante model for declaration of licensing terms is a tool for creating legitimacy in the administrative system of the SSO's, through increasing the structural support for the handling of IPR. This will have a number of benefits, and will create an analogue to the legitimacy on the administrative arenas enjoyed in markets where the connections between the arenas are more stable. One benefit will be the added reliability of the system experienced by actors, as the public declaration of terms will allow them to hold other actors to their stated commitments. The more specific these declarations are, the more reliably can actors be expected to uphold their commitments, on a near-contractual basis. The current situation, where actors commit only to a general FRAND obligation, leaves the process of actually determining the license terms fairly unpredictable. The benefits of shifting to an ex ante structure would primarily include increased transparency, reliability, and a shift in the competitive pressure within the system.

10.1.1 Competition Asymmetry

While there are many benefits to the adoption of an ex ante declaration of licensing terms, one of the most pressing reasons arguments is being advanced by standards implementing actors who are experiencing the effects of competition asymmetry. This asymmetry arises from a lack of continuity in the interface between the semi-regulated context of standards setting and the free market context which characterizes interaction with the end consumer. In the standards setting context, competition ostensibly only exists in terms of technical superiority – the best solution for a standard is adopted, regardless of cost or practicality. Naturally, as discussed earlier, this is not the entire truth of the mechanisms of the standards system, but it is clear that economic pressure is not a primary competition factor in the context of standards setting. In the free market context of standards implementation, where actors interact directly with the end customer, competition is primarily price-based, meaning that competitiveness is primarily achieved by reducing margins and cutting costs.

Competition asymmetry arises when the effects of competition at one extreme of the value chain do not sufficiently influence behavior on the other extreme, and competition takes place on different terms and with different objectives. There is always a degree of competition asymmetry inherent in any value chain, as the concept of the chain implies naturally that not all actors are immediately exposed to the end-level of the free market, but the typical tendency is for the competition pressure experienced by actors at the bottom of the chain to be redistributed upwards to some extent through the interfaces in the chain. In the standardization system, however, this is impossible due to the lock-in effect of standards setting. No matter how much economic pressure is exerted on market actors, their concerns will not necessarily affect the adoption of technology if the adoption process is shielded from economic pressure by the policies and institutions of the standards setting organization.

Shifting a system where license agreement terms are decided and disclosed ex ante would obviously alleviate the immediate problems of competition asymmetry, and would allow economic competition pressure to be distributed more evenly throughout the telecommunications value chain. While technology selection in the determination of a specification would still be performed on the basis of technical superiority, term setting would become a transparent process, visible to all interested parties. This transparency would allow SSO members to judge the level of commitment each member has to the principles of FRAND licensing, as it would be clear immediately what level of royalties each would be willing to demand. As a natural consequence of this, it would also be possible to enforce the consensus understanding of FRAND in practice, as it would be possible to adapt the specification and the ultimate standard being set to exclude those technologies where the IP-holder is unwilling to commit to what is seen

as fair and reasonable. Ultimately, as most SSO's build on the principle of open participation, this means that standards implementing actors close to the market will have the opportunity to provide their input into the situation and help shape the behavior of IP-holding actors.

10.1.2 Further Benefits

Establishing an ex ante declaration structure would, as mentioned, also lead to added transparency, as members of the SSO's will be able to openly evaluate and debate the interpretation of the terms posed. Each actor will still be bound by the obligations that exist in the SSO policy, such as FRAND licensing, but the interpretation of those obligations will no longer be hidden in secret license arrangements but will be available for discussion by all members. Whether or not an enforcement mechanism is established to complement the ex ante declaration policy, such discussions will inevitably help shape the consensus on how FRAND should be interpreted and allow actors to make more informed choices. It is also very likely that the transparency of ex ante declaration will motivate actors to adjust their royalty requests to adhere more closely to the consensus baseline, in order to avoid the risk of being excluded from future standards collaboration.

In terms of facilitating efficient actor behavior, introducing an ex ante declaration policy will also obviously reduce transaction costs, as the need for lengthy negotiation will be lowered. Actors will be able to make informed choices regarding the choice of licenses early on in the standardization process, and the actual process of negotiating the license will be primarily a question of confirming the terms and add the inevitable details, which will be far less costly in terms of time and resources than establishing a mutual understanding of applicable FRAND concepts within the context of the negotiation.

10.1.3 The risks of ex ante declaration

While altering the standardization system to incorporate the ex ante declaration could resolve many of the perceived problems in the current standardization system structure, there are also potential risks to implementing such a tool. One reason is the obvious contradiction between the concept of price fixing as regulated in antitrust laws and the consensus made possible by the ex ante declaration of licensing terms. One of the central tenets of most antitrust regulation systems, after all, is the prohibition on the collusive determination of pricing.[65] Collaborating to jointly set a price that is not, as such, determined by supply and demand and market conditions removes the consumer-beneficial effects of competition, and can create a situation where price levels are artificially inflated. Any situation where actors,

65 In European antitrust regulation, for example, this is expressed in Article 81 of the EC treaty.

particularly competing actors, jointly and explicitly state the price levels, or the levels of factors influencing price, such as royalties, of a product before it reaches the market is therefore, on the face of it, a direct violation of competition law, which would be the case in terms of ex ante declarations of license terms.

Competition law, however, as mentioned earlier, is fairly unique among the legislative norm structures in that it is highly sensitive to the consequences of regulation. Unlike criminal law, competition law measures aim entirely to achieve a beneficial effect on market conditions, and if certain principles are violated to achieve that effect, such behavior is still considered legal within the greater context. In the case of ex ante declaration, it is recognized that there is a clear potential for greater benefit than harm, as the current structure of the standardization system invites greater anti-competitive effect than would exist in a system utilizing ex ante declarations.[66] For this reason, the risk of meeting opposition from antitrust authorities when using this tool is most likely minimal.

10.1.4 Implementation aspects

Another problem that would most likely arise if an ex ante regime were to be implemented would be an increase in requirements on the administrative systems of existing SSO's. In order to ensure that ex ante declarations are recorded, disseminated, and comparably structured, some form of central administrative function will be necessary. This in itself will require an increase in structural complexity that can be costly and time-consuming, as few SSO's are currently prepared to take on such active roles in standards work, and the administrative cost would only increase once members begin to dispute the implementation of ex ante declarations. Since consensus would have to be reached on the level of detail to be included in the declarations, the time-period to allow for declarations, and the sanctions for incomplete or absent declarations, it would be necessary for the SSO's to also manage complaints, disputes, and questions of interpretation to a satisfactory degree, all of which would require great investments in administrative structure creation.

Finally, the introduction of ex ante declaration would most likely delay the process of setting the actual standard, though it is uncertain by how much. While the ex ante declarations would make the overall process more transparent, it would still be possible for actors to try to wield influence through power games and politics, by, for example, trying to obscure the terms of their declarations while appearing compliant, or attempting to exploit the time of their declaration to force early commitment. On the whole, such tactical manipulation, combined with the additional administrative effort, would mean that standards setting as such would become a slower process compared to the already

66 One proponent of this view is the chairman of the US Federal Trade Commission, Deborah Majorah Platt

cumbersome structure of today. It must be kept in mind, however, that to some extent this delay will be offset by the increase in efficiency in the licensing process as such, which will mean that subsequent development and dissemination of the standardized technology will be far more efficient.

10.2 Royalty restrictions

Another tool for changing the current standardization system through altering reigning SSO policies is that of restrictions on the level of royalties permissible to demand in a license negotiation. To some extent, FRAND obligations fall within this category, as they require members to maintain a 'reasonable' royalty level, yet the vagueness of such obligations typically means that they are not viewed as royalty restrictions per se. For royalty restrictions to be effective as a tool for resolving issues in the system, it is necessary for those restrictions to be explicit and fixed, so that they have an appreciable effect on actor behavior. The restrictions that will be dealt with in this section include royalty free licensing, and capped royalties.

10.2.1 Royalty free licensing

Royalty free, or RF, licenses are a well established practice in many other standards; standards that are often referred to as 'true' open standards. The ambition with such licensing schemes is to create standards that are unencumbered by proprietary IPR claims, which is accomplished by ensuring that access to the intellectual property being standardized is granted on an unequivocally free basis to all interested actors without discrimination. This requirement applies not only to direct monetary compensation, whether running or fixed, but also to other forms of compensation such as cross-licenses and similar arrangements. For this reason, it could be more accurate to call this licensing arrangement compensation free instead.

10.2.1.1 The Benefits of RF Licensing

The strategic reason for adopting RF licensing scheme is to open up innovation, through maximizing access. By making sure that all actors in the field are free to access the technologies in the standard without obstacles of compensation requirements, the innovation as such becomes open in the sense of contribution, participation, and access to results. The reasons for doing so vary from the idealistic to that of sheer necessity, but in the case of telecommunications standardization, the motivation would primarily be the fact that increased adoption makes the standard a more suited tool for shaping the market to fit the purpose of creating added downstream revenue opportunities. If the extent of adoption can be maximized, the customer base for the products based on the standard will most likely

constitute a significant part of the available market, barring any unforeseen, typically technology-related, developments, such as the invention of a clearly superior alternative.

When deciding on the use of RF licensing as a strategic tool for market shaping, a choice has to be made by each actor between the forecasted product-based revenue and royalty revenues. If RF licensing, for example, is considered a necessary prerequisite for the successful adoption of the standard, which could be the case in a global market with several competing standards within the same field, then that must be a factor that inevitably weighs against potential product revenues. On the other hand, if RF licensing is not necessary for the standard to be 'successful' but is nonetheless capable of extending the scope of adoption, the gains in potential product value might not be sufficient to outweigh the risks of establishing RF as a policy – especially as such a policy might not only be costly to implement but difficult to remove once implemented. While it is possible, it is rare to be able to balance the two revenue opportunities inherent in the innovation simultaneously – by licensing out IPR on a non-discriminating basis, after all, one enables potential competitors to achieve similar technical advantages, and becomes less able to compete on the basis of innovative superiority.

10.2.1.2 Benefits of Implementing RF Licensing

Implementing RF licensing schemes faces no particular legal or formal obstacles, and is therefore possible to implement without great investments in the structural capabilities of the SSO's. While it is true that the act of determining compensation ahead of time in collusion is a typical violation of antitrust regulation, this form of legislation sees primarily to the actual effect on the market of behavior that could formally be considered anticompetitive. Even if an agreement is technically in violation of antitrust recommendations, it will not be illegal per se if it leads to demonstrable positive effect for the competitive environment on the market and the ultimate customer benefit. As RF licensing maximizes technology diffusion, boosts research and development, and leads to improved product lines, the fact that it could be seen as a cartel agreement does not mean that it is an illegal cartel agreement.

One could potentially argue that a reigning RF licensing scheme on a market shuts out those actors who cannot reasonably afford to make their research available on these terms, as they do not have enough of a presence on the market to support their activities through product revenue. These arguments are unlikely to influence the competition law authorities, as the primary object of competition law regulation to support healthy market activities. Those actors who are not intending to maintain an active market presence are not, after all, the focus of competition law as such, and might be considered obstacles to traditional market activities rather than providing actual benefits.

In terms of administrative structures, implementing a royalty free regime would require SSO's to take a somewhat more active role, yet there is little additional burden in the monitoring and enforcement of the terms. Actors will be unable to use market clout to push through license terms that could 'theoretically' be considered royalty free, and a refusal to license, or a refusal to license on RF terms, will be immediately obvious and can be disclosed as such by the intended licensee. Conflict resolution could be successfully carried out on the judiciary arena, as the commitment to royalty free licensing would be a contractual obligation rendering civil liability, and would not be difficult for the court to interpret.

Furthermore, the process of setting a specification would be far less encumbered by administrative obstacles, and considerations of IPR during the discussions would only need to be taken into account insofar as to ensure that no aspect of the specification is covered by proprietary claims belonging to actors outside the standard. Naturally, designing the specification to avoid technology clearly belonging to outside actors would be an administrative burden, but such considerations are always necessary to make in any standardization efforts.

10.2.1.3 Risks of RF licensing

While there are clear advantages to implementing RF licensing as a means of opening up innovation, there are also certain drawbacks to doing so. Enforcing a royalty free licensing scheme will have the obvious effect of serving as a disincentive to those actors whose primary interest in the standardization system lies in licensing and IP-related royalties. While actors who are both active in the product market and in licensing out their related intellectual property might be able to adjust, the actors whose core business area relies on licensing revenues will find it more profitable to remain outside the standards organizations that implement this policy, in order to ensure that they are not forced to commit to signing away their primary source of income. Royalty free licensing schemes are usually mostly suited to situations where the actors involved share a strong sense of a common goal and are willing to forego certain possibilities in order to achieve an end result beneficial to all actors.

The common goal motivating the adoption of a royalty free licensing scheme would be the maximization of the end-user customer base, at the expense of the midrange customer base. From the perspective of those actors whose primary goal is to sell products and services to the end-user customer, the customer base exists at the very end of the value chain, and a royalty free licensing scheme would not greatly affect the possibility of deriving economic benefit from this group. For actors whose primary goal is to license out and leverage IP, customers exist at a much higher level in the value chain, and committing to a royalty free requirement would sharply curtail their ability to

derive economic returns on their research and development. These actors would then be faced with a choice of how to respond to such a policy – either avoid the system altogether, with the effect that potentially crucial technologies are lost to the development of the standard, or attempt a hold-up strategy similar to that of the fabled 'patent troll'. While such behavior might be frowned upon, it could potentially be tolerated on occasion in a system where royalties are otherwise absent.

A further problem inherent in the royalty free solution is that the increase in the rate of technology diffusion will most likely be matched by a decrease in the rate of technology development. Even those actors who remain within the system and commit to the royalty free terms will be in a situation where committing all their relevant technologies to the joint standard can be discouraged. This is both a risk and a boon – as actors no longer have the ability to derive extra revenue from submitting technologies of dubious essentiality to a specification, their contributions will be limited to those technologies that are most crucial to the end result (the product on which they will make money). Standards will no longer be plagued by an overwhelming number of declarations of essential IPR, some of which have been evaluated to be of lesser value for the standard, but at the same time, the economic incentives for creating these peripheral technologies will be lowered, as it will no longer be possible to assure oneself of licensing revenue by declaring the technology essential.

The economic rationale behind research will shift in complex ways, but the end result will naturally be that technological process becomes slower and more focused. Most likely, research efforts will aim at contributing a moderate base-line of core technology development to ensure that the standard as such does not lag behind, and a more specific focus on crucial secondary technologies that are not essential in and of themselves. At the same time the technological scope encompassed by the standards might also shift in response to the problems in obtaining consensus, and the desire for actors to keep the scope of technologies being subject to RF obligations. The result will most likely be that future telecommunications standards, operating under an RF regime, would be smaller in scope but global in adoption, and that it would no longer be possible to standardize an entire 'generation' of cellular phone technology

10.2.1.4 Implementing RF licensing

The negative aspects of implementing RF licensing in existing SSO's would not take the shape, primarily, of legal or administrative hurdles. While the process of shifting to a new licensing regime would require an initial investment in structural creation to handle both the establishment of the terms and the process of information dissemination (as well as the process of coming to the decision of making the transition), this would not present an insurmountable obstacle. As mentioned earlier, there

are few reasons from an administrative or legal perspective why implementing an RF regime would be difficult, and as there is a great deal of experience of and tradition established with the practice of RF in other fields, the process can be reasonably facilitated.

The difficulty, however, in implementing an RF regime in the current telecommunications standardization system is in achieving consensus on the initiative. Many of the actors involved in the system are heavily dependent on their revenues from out-licensed IPR, and would strongly oppose the creation of a generally applicable RF policy. Actors such as Qualcomm, whose technological developments extend further than their product involvement, have opposed similar measure in the past, including such moderate attempts as the introduction of royalty caps, and would most likely refuse to include their technologies in any further attempt at reducing the revenue potential of their IPR. As these actors are members in their own right in the open SSO's, they are able to affect the development of SSO policy, besides also controlling technologies that are crucial for the development of current technological standards.

In order to overcome the obstacle of a lack of consensus, there are two primary alterations to the RF concept that can be implemented. First of all, the extent of RF licensing can be limited in certain respects, in order to ensure to try to minimize controversy. The area affected by the RF policy can be limited to, for example, certain projects, or certain technologies, or it can be limited to certain forms of IPR. Putting such limitations on the scope, however, will of course lead to a greater need for administrative structures – for example, determining the scope of IPR other than patents can be difficult, both in terms of establishing ownership, as copyrights are not registered in the same fashion as patents, but also in terms of reconciling the disparate views on the nature of software IPR. If software copyright were to be determined to be subject to an RF regime, problems would not only arise when considering American actors who have both patent rights and copyrights applicable to their software, but it would also most likely that most European actors would argue that their software is integrally implemented in a hardware solution, and would thus try to obtain patents that would not be subject to RF terms. Yet another way of limiting the cope of RF restrictions would be to base the limitations explicitly or implicitly on the actors that would be affected – to ensure that those actors most opposed to RF terms would not be involved in the development of RF standards. This is an obvious solution, but runs into the obvious problem of giving a clear appearance of unfair treatment.

The second limitation on RF licensing that can be implemented to minimize problems would be to determine, as alluded to earlier, that the RF obligation applies solely to licenses granted to other

members of the SSO, meaning that it would still remain possible to grant royalty-based licenses to actors outside the organization. This would have the effect of limiting the effect on royalty revenues of licensors, and would also ensure reciprocity in the licensing structures of participants in the standardization system. The perception that outside actors would reap the technological value created by the research of the SSO members without contributions of their own would be ameliorated, and incentives would be created for outside actors to join the SSO and contribute to the development of standards. The global dissemination of the standard in question might then be hampered, but secondary obligations such as FRAND could then be applied to the practice of licensing to non-members.

10.2.2 Royalty caps

Royalty caps refer to the practice of setting a cap, or a limit, on the amount of royalties members of an SSO can be permitted to extract for their licenses. Royalty caps can take a number of different forms, depending on which factors are considered most relevant: the caps can be relative to product price; the ceiling can be calculated on an individual or a cumulative basis, and the timeline for determining the cap can be adjusted or running. Much as in RF licensing, it is understood that the requirements of a royalty cap should not be circumventable through unreasonably onerous requirements of other forms of compensation such as cross-licensing, though it can be assumed that some forms of compensation, not obviously exceeding the value of the royalties as capped, could be permitted.

10.2.2.1 Benefits of implementing royalty caps

In effect, the difference between royalty caps and FRAND obligations is primarily that royalty caps constitute a tool for controlling licensing proceedings, and adding an element of administrative overview and control. While both measures aim to ensure that a functioning pricing approach is maintained even at the higher levels of the intellectual value chain, royalty caps include specific, explicit limitations that provide reliability and transparency in the system. Unlike FRAND obligations, instituting royalty caps in an SSO requires member consensus and will therefore create an open discussion of the terms that can be said to be reasonable for such caps. As mentioned earlier, one of the reasons for the current initiatives trying to bring about change in the system is the perceived lack of unreasonableness in the licensing fees levied, even though this is not based on any actual assessment of the royalties being paid in practice, as the specifics of such agreements are non-transparent and secret.

With an openly discussed and agreed-upon royalty cap in place, licensing negotiations would be somewhat speeded up, as parties would have an immediate assumption of the baseline value of the

arrangement they would be negotiating for. This increase in efficiency would be offset, however, by the increased dependency on reliable valuation and measurement tools. Each license would not only have to take into account the monetary value of each aspect that is included in the license, so as not to exceed the cap, but there must also exist a continual consensus and shared valuation basis for the current total sum of licenses being required, and the ultimate product value derived from the technologies being standardized. Depending on how such issues are dealt with, license negotiations in conjunction with royalty caps might be either faster or considerably slower than such negotiations under FRAND obligations.

10.2.2.2 Risks of implementing royalty caps

A clear risk that can arise when changing standardization structures through establishing royalty caps is of course the risk that arises whenever royalty opportunities are restricted – the risk that actors with heavy investments in research and intellectual value development and few opportunities for deriving product-based revenue will no longer support the system. A royalty cap, much like an RF regime, requires consensus from all members of the organization in which it is to be effective, and if the cap is seen to impact royalty revenues excessively, that consensus will be difficult to attain; conversely, if the royalty cap is considered to be high, IP implementers will chafe at the now transparent burdens they would be facing. Naturally, therefore, negotiations preceding any such alteration of existing structures would be lengthy and require an in-depth analysis of the state of the system and the requirements of each actor. For an intellectual value creator, the projected results of the cap would have to be weighed against the costs of investing in the research and development that makes its intellectual value contributions possible, whereas an intellectual value implementer would need to make a similar evaluation against potential product revenues. While the current existence of the thriving telecommunications market means, de facto, that such a tradeoff is possible, the process of agreeing on a mutually acceptable tradeoff between objectives would be time-consuming and costly.

Furthermore, as mentioned earlier, the implementation of a royalty cap could significantly delay the process of actually negotiating licenses based on the standards set. While the current system is not overly sensitive to delays in such negotiations, as they can now typically span several months, delaying them further could hamper the dissemination process necessary for standardization activities to have their intended effects. One means of preventing such delays from becoming unmanageable would therefore be to institute a separate body or institutions capable of neutrally monitoring the process of licensing to determine the valuation grounds applicable to projected product value, and the current state of licensing as related to the standard in question. Such an institution would monitor the overall cumulative royalty level, and be able to advice on the possibility for actors to remain within the

realm of the cap. Again, however, establishing such a body would require a heavy administrative investment, as well as a clear consensus, which is why such practices may not be possible to implement in existing standardization organizations.

10.3 Patent Pools

One of the main solutions presented by some actors within the telecommunication industry during the discussions made in the SSO's is patent pools. By introducing patent pools some actors hope to achieve low royalties for many essential patents. "A patent pool is an agreement between two or more patent owners to license one or more of their patents to one another or/and third parties".[67] Or as some might prefer: "A patent pool is the aggregator of intellectual property rights which are the subject of cross licensing, whether they are transferred directly by patentee to licensee or through some medium, such as joint venture, set up to administer the patent pool".[68]

Described in words a pool management or patent holding entity is formed outside the SSO's and functions independently from it. This patent holding entity will be the legal entity so to say that will examine all incoming patents that want to be part of a pool. When admitting a patent to this entity the procedure of the examination begins as to determine if the patent is essential to a technology or not. All essential patents will then be categorized and sorted dependent on the nature of the patent. All licensing term negotiations will take part through the patent holding entity that is the key to the patent pools and the royalties are proportional to the number of licenses necessary for a compliant implementation. The idea behind this is to sort all patents essential for a standard into one pool that will be granted one price for all the patents in the pool. This will have as an effect the reduction of costs from the licensee as there is only one negotiation having to be made with the patent holding entity and not with each licensor independently. At the first glance the patent pools will both save money and time for the licensees. However, there are some downsides to a model as such.

10.3.1 Consequences of establishing patent pools

Even if the people working within the patent holding entities are representatives from different companies influencing all decisions made about the patents essentiality, these decisions are subjected to subjective notions. SSO's today only look at defining the standards without acknowledging which patents exist and are included in the standards as such. The new patent pooling system that is proposed will in a way extend the authority of this new entity. Besides from the fact that the patent essentiality

67 Examensjobb patent pooler
68 ibid

will take much time to define, there will always be the problem of people working with the determination will have a hard time of being unbiased or have a holistic picture of the amount of patents existing. There is however a positive aspect of having a committee doing such assessments and that is that the technologies becoming standards will be easier connected to the exact patents, and licensing will become easier since potential licensees will pay a standard fee for all the patents included in the patent pool and needed for the standard. This will save some time for the licensees and licensors that will not be subjected to timeless discussions about licensing and make it easier for the licensees to find the patents essential for a technology and thus not infringe unintentionally.

Even if the members of this new entity are objective and able to distinguish which patents are included in the new standards and thus essential, the time aspect will increase dramatically. The process risks becoming too long for the essentiality valuation, since there will be patents submitted from all IP-holders that would like to have their patents pronounced as essential to the standards. There are an unmanageable amount of patents in the world and the numbers are increasing by the day, the prediction is that the essentiality valuation of all incoming patents will take too much time endangering the new system. However this problem can be limited through implementing specific policies and roles for the submission of patents and evaluations. The patents pools should concern specific technology areas and have a limited number of members with a limited number of patents to make the assessment less time consuming. However, implementing such rules of restriction can be difficult since the number of standardization members is quiet large and everyone want to become a part of the standards with their technology.

By implementing a patent pooling system the risk of the process being time consuming and not satisfactory for all involved is high. It is hard to find a committee that will be not biased and have the competence and staff to examine and determine which patents are essentials to which technologies. Nevertheless, even if this system were to work from an administrative way, there is still the difficulty of dividing the licensing fees among the different actors owning the patents. The idea with patent pooling is that the licensee will pay a fixed royalty fee for accessing all patents, but what will that fee be and how will it be distributed among actors? Some may say that these are just detail questions, but the problem still remains in companies having the intellectual rights for their technologies have to be able to compete not with only the actors within the standards but all actors inside, which will be harder through a system as such.

Patent pools can have as a direct result that actors choose to "operate" outside the patent pooling system because it is less time consuming and the possibility of earning more money because of the individual negotiations increases. There will always be actors outside the system (patent trolls, submarines) that will not be obliged to the patent pooling rules and licensing fees will be subjected to individual negotiations as now and without the FRAND policy there is a risk of royalties becoming too high for some patents. However, not all actors are part of the standardization organizations, but the positive effects of a standardization organization increase as the members increase and the standards become more widely accepted. Having a patent pool system that in a way decreases the competitive advantages can drive some actors away, wanting to compete in a more individual basis.

Before determining if patent pooling is a good system or not, one has to take into consideration both pros and cons with this system. There are ways of limiting some of the problems with such a system if policies and rules are made in advance. Having for example a limited amount of actors and patents in each technology specific area can result in actors getting more license fees than before and in a less troublesome ways, since because of the user-friendliness approach of the patent pools for the licensees they are now able to easier determine how much and to whom they have to pay the fees without worrying about paying overprices. As for the licensor it becomes more easy to control the money inflow and are still able to have individual licensing agreements for the patents left outside the system and be lucrative in that way.

10.4 New generation standardization bodies

There are different kinds of standardization bodies and organizations. Some are larger than others, more exclusive when it comes to members and more specialized into technology areas. Consortia are a kind of standardization bodies that are governed by policies created by the members of the body. The members are exclusive and not everyone can become a member. In contradiction to those there are the standard organizations that are governed by governmental institutions and membership is open for everyone who wished to become a member. Consortia are a forum where different actors on the market and members can discuss and decide upon new standards. Most patent key actors are members of multiple consortia and standard organizations in order to influence decisions upon future standards in a better way. Consortia create their own standards and have different rules when it comes to licensing technology. While some standards organizations try to lobby for FRAND terms when licensing others have more open rules when it comes to that. Being a member of an influential consortium or standards organization can make or break a company with many patents.

Consortia are created to ensure better conditions for its members when introducing new standards. When big actors on the market decide upon a standard they will try to form it as to include their own patents to gain royalty. For the members inside the consortium the licensing terms are often more preferable and for those outside the body. The reason behind creating new consortia is to create forums for members with special interests and knowledge will be able to collaborate with better conditions. When changing the rules of a standardization body and incentive for starting new consortia were the rules do not apply becomes apparent. This can create an environment were few influential actors come together and form standardization bodies and implementing standards by excluding others. This could create a chaotic atmosphere and making the standardization process something controlled by few actors on the market striving for their own winnings. As mentioned earlier the standardization processes flourish as the members increase, since there is less division on the market as to which technologies to implement. The acknowledgment one gains on the market by owing essential patents to these standards is larger since more actors/members are aware of the owning structure and will honor it since they would otherwise risk having others infringing on their turfs.

Starting a consortium is not problem-free. It costs a lot to establish a new consortium and there are a lot of details that have to be worked out in order to begin. Actors that are going to become members must have incentives to start in a forum like that and the rules created must be satisfactory and followed by everyone. Having a situation were members of standardizations organizations pushes for changes in the system can create a climate for actors wanting to create new forums in order not to be part of the changes. This may create conflicts when actors will try to create consortia to lobby for their own winning and exclude as many non essential actors as they can.

Actors create consortia to reach different objectives that are technology specific, members specific or even geographical specific. In the event that IP implementers such as operators would see the need for altering current standardization systems for example there will be incentives for them to create an exclusive consortium where their interests are supported or at least discussed. Being the means to the end users in the telecomm industry, they have the structural power to drive for changes that will create advantages for them and their end users. Creating a forum were the operators can in unity strive for changes can mean some alterations in the existing system of standardization were operators will have more power in participating during standards creation. Operators could also create consortia with some of the actors with essential patents and create a monopolistic market where they will license technology only belonging to the members of the consortia. However, this in a way goes against the

notion of standardization that has as an overall objective to pass standards that everyone will implement in order to create user utility.

IP holders have also incentives for creating consortia with each other excluding operators that strive for changes. If they eliminate all voices for change they are able to control the standards and the fees connected to them in a better way. The risk in such a situation is that licensing fees can become higher and in some cases technologies outside the consortia may be preferred by the operators because of the lower cost. However, some actors have a lot of essential patents and are able to drive for new standards and implementation of those in a way that small individual actors never will be able to. Some actors have thus not complied with the rules of the standardization organizations that they are members in and disregard licensing rules and infringe on others patents. Examples of these include patent trolls and submarine licensors as previously discussed in this thesis. IP-holders as such can easily be excluded through the creation of new consortia were membership is limited and controlled. In this way members part of the consortium can be united under the same rules and objectives and becoming more competitive to other actors and their technologies.

11. Conclusions

It is clear from the analysis presented in this thesis that a market characterized by standardized collaborative development innovation and coordinated technology diffusion differs greatly from what is perceived as typical free market conditions. Such markets take on unique identifying characteristics based on the actors involved in creating the standardization structures, and are thus necessary to study as phenomena in their own right, rather than apply conventional models of economic theory. The European telecommunications market is a clear example of this, and the thesis demonstrated the unique qualities and structures that combined to form a standardization system in which actors interacted to create a market, and to maximize their compensation possibilities.

Describing the standardization system required the utilization of models adapted to the situation, and thus the thesis attempted to present new ways of categorizing and understanding standardization activities that reflected the importance of intellectual value flow. By first categorizing intellectual value, and then mapping intellectual value creation activities into an intellectual value network and an intellectual value chain, the thesis presented a holistic means for understanding the standardization system, which emphasized comprehensiveness over practical detail. A key feature in this approach was the emphasis on intellectual property activities, which take on a far more significant role in a standardization market.

Using the analytical framework presented, the thesis then analyzed actor behaviour within the standardization system to identify the potential conflicts and the possibilities for alterations in the system. A clear and recurring feature identified in the system was a lack of clarity when it comes to the rules and policies of the SSO's that in many ways provide the fundamental structures of the system. This lack of clarity has already prompted initiatives to change existing structures by some actors. The SSO's themselves are reflective of the unusual nature of the standardized telecommunications, and contain many complicated flows of influence and actors that have multiple roles at different times where in a climate of competitiveness and collaboration actors are forced to discuss new technologies and decide upon future standards while carrying for their own interest. The explicit decision of SSO's to avoid taking a strong role in the administration of intellectual property matters, and policies such as FRAND which build on vague and unexamined compromises between actor interests were identified as contributing factors to the conflicts in the current system.

One of the main such conflicts, prompting the initiation of the thesis project as such, was the challenge by the Vodafone-led coalition of operators, attempting to bring about an overhaul of the licensing system in European standardization. Based on this initiative, four different scenarios were identified, presented and analyzed, with the objective of understanding how actor initiatives could alter the structures of the standardization system and impact the compensation possibilities for other actors in the system. These scenarios were presented in the form of tools enabling change, reflecting the fact that the uncertainty and flexibility in the system could allow the strategically aware actor to implement such changes proactively, controlling the changes rather than being threatened by the. In this way, each tool was seen as a means for the different actors to maximize the control in the exploitation of the system.

The first tool analyzed was the adoption of royalty restrictions, either in the form of RF licensing or royalty caps. Clear and unambiguous royalty restrictions would create transparency and reliability in the system, and would allow IP implementers such as the Vodafone-led coalition to feel that undue licensing costs were not being imposed. It was found that both of these alternatives curtail the potential revenue stream from intellectual property within the system, as licensing revenues are limited in both scenarios, they differ drastically in many respects. RF licensing was shown to be fairly simple to implement and administrate, but very difficult to maintain without a cohesive sense of purpose and incentives outside of IPR licensing. Royalty caps, on the other hand, could easily become overburdened by administrative hurdles, and would be difficult to create necessary consensus around.

The second tool analyzed in the thesis was the implementation of an ex ante declaration regime, meaning that licensing terms would be established and declared prior to the setting of any new standard. This was found to be an optimal tool for reducing perceived competition asymmetry, and for creating administrative oversight mechanisms predictable reliability in the system. However, it was also found that an ex ante declaration would require additional investments in administrative structures within the system, and while it would most likely create a more efficient and competitive IPR handling mechanism, the initial creation of such a structure would require both compromise and lengthy preparation.

The third tool analyzed was the creation of a separate patent pool, independent of existing standards setting organizations. Even if such a process could be lengthy and difficult to implement until some routines and policies are worked through it can be a potentially good way for IP-holders to reach out to more licensees. By creating patent pools for specific technological features makes it easier for the

licensee to license the correct patents. For the IP-holder of the essential patent since there will be a limited amount of patents in the pool they will divide the winnings amongst the patent holders. Still the IP-holders are able to approach licensee with patents outside the pools that can be of equal interest to the licensee and those can be negotiated outside the patent pooling system. In a way the patent pools can be seen as the basic package one has to license for having the rights to a specific technological feature, but for the upgraded version the licensee will have to negotiate the licenses separately with the IP-holder as it is done today.

The final alternative looked at was the creation of new standards setting organizations. Most of the current major SSO's have existed for a long time and during that time new consortia with different objectives have risen to fill the void left by the standards organizations. However not easy to create a consortium there are many that have tried and some are still alive and running. The rise of new standardization organizations should not be seen as a direct threat, but as something with potential. Even if operators come together and form a consortia of their own or together with some of the IP-holders, there will still be the same opportunity for the remaining actors to do so as well. Having IP-holders creating consortia to exclude other IP-holders can also be seen as an opportunity to create forums for discussion between those who are likeminded. By creating a consortium with actors that have the same objectives can create a climate of competitiveness on the market that will better fulfil the needs of the end-users and the IP-holders as well.

Ultimately, no single tool was seen as a comprehensive solution for the sources of conflict identified in the system; instead, the importance of a strategically aware perspective and an understanding of the mechanisms for intellectual value creation and management were singled out as key factors in surviving such changes and, if necessary, promoting them. Each tool presented could equally well be seen as a threat, and the primary recommendation of the study, therefore, is to further develop solutions based on such perceived threats, to create a foundation for turning the risks into opportunities.

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