

IMPLEMENTING PUBLIC PLATFORMS FOR MOBILE PHONE CONTENT SERVICES: STANDARDIZATION IN AN ERA OF CONVERGENCE

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Abstract

Mobile Telecommunication standardization in Europe builds on a history formed by European and International standardization bodies, the governments as regulators and the R&D departments of PPT-owned telecommunication operators. This paper describes the standardization approach related to the implementation of the public CPA (Content Provider Access) platform and business model for provision of content services for mobile phones in Norway. CPA builds on complementary services and common incentives for mobile telecommunication operators and content providers to create an open, transparent and easy to access service platform through standardization, but is at the same time developed outside both the scope and the central control of standardization organizations and their standardization practices. The nature of this process can be attributed to processes of convergence. Applying an Information Infrastructure perspective, we discuss the standardization process as open, where the trajectory of development is determined by heterogeneous actors with different and possibly conflicting agendas, powers, needs and incentives. Our aims are both to identify and describe new approaches to standardization as well as new kinds of standards within telecommunications.

Keywords: content services, CPA, convergence, standardization, mobile telecommunication, fragmentation

1 INTRODUCTION

Long withstanding predictions and processes of convergence between information- and communication-technologies envision a future environment of new mobile devices, services, business opportunities and usages (for example Branscomb and Keller 1996; Kakihara et al. 2002; Mansell 1988). European governments' policies and action plans are also placing strong emphasis on the convergence of information and communication technologies in their efforts in constructing and developing a new and competitive "eEurope" (e.g. COM 2002). However, *convergence* does not come by itself or is driven solely by technological breakthroughs or the political and centralized will or actions of governments. Convergence is a process bringing together different and heterogeneous actors as well as markets and technologies, a process not only bringing synergies but also challenges. The power of deciding (pushing in various directions) the trajectory of convergence is dispersed among heterogeneous actors with different and possibly conflicting interests, powers and agendas. The conflict of interests are also augmented as the future landscape of actors and their assets, responsibilities, relations as well as the boundaries between them is open and unknown. Even if convergence is technically achievable and appropriate, key actors are still likely to keep and defend their assets and market positions. One arena where these processes are unfolding is the one of standardization.

Technical standardization plays a crucial role in the development of innovations within the mobile telecommunication sector, as for example NMT and GSM in the Nordic and European context. These standards did however emerge in a certain context, in particular facilitated by international cooperation between the R&D departments of PTT-owned telecommunication operators (Godoe 2000). Through standardizing organizations, researchers representing national European telecommunication operators and the industry have discussed and harmonized technological platforms that did not previously exist. Largely, these actors were homogenous in preferences, interests, and priorities and thus were well prepared for consensus making. The standardization of CPA on both the business model and platform level unfolds outside the scope of existing telecommunication standardization institutions, but also their control. This can be attributed to the many levels of openness that signifies convergence processes. For example, the actors now engaging in negotiations and coordination are either unknown to each others, or in fierce competition. The nature of convergence is also magnifying the conflict of interests between the Mobile Telecommunication Operators (MTOs) and the content providers as the borders between their businesses and assets are blurring and possibly shifting.

Telecommunication markets are today increasingly liberalized. Sector specific regulation has been replaced by ex-post anti-trust legislation and the monopoly of the PPT-owned operators is deregulated. One side effect of these processes is that the R&D departments of telecommunication operators have lost their cooperative ties, not only because they are in fierce competition (nationally and internationally), but also because of the fear of anti-trust legislation. The process of convergence is at the same time resulting in the deterioration of the ability and power of telecommunication operators to control standardization and innovation alone. Even if their control have been challenged through history by national governments in particular related to telecommunication policies (discussed by e.g. Haug 2002; Manninen 2002), convergence through the development of the CPA standard is currently bringing to the field a range of new actors, in particular relatively small and heterogeneous content providers.

MTOs give content providers access to transport and billing services (premium charged SMS) through the implementation of CPA platforms. This enables the provision of content services to subscribers with a feasible business model for billing the content. The CPA standard has evolved in Norway through small-scale efforts within and between different MTOs, in tight cooperation with entrepreneur spirited content providers. CPA provides a business with a total annual turnover of 600 million NOK (€ 75 million) in 2003, a substantial growth from 400 million in 2002. The services are typically ringtones, logos, jokes and simple information services such as stock quotes, phone directories and

weather forecasts. In addition, interactive-TV enabled SMS as a return channel is a growing business, counting for 15 percent of the turnover.

The standardization of CPA has unfolded outside the scope and the control of the telecommunication standardization regime, and therefore requires new and different institutions for coordination. CPA is not a result of technical standardization prior to the implementation of the CPA-platforms. It is built on the coordination among the MTOs and an evolutionary technical implementation as the market and the nature of the services become apparent and further develops. Within this environment, MTOs have the power to influence the development of the standard, but the power is unevenly distributed among them as well as shared with the content providers. As the standardization process is made open by convergence, these actors together face the paradox of conflicting interests while at the same time having a common and strong need for cooperation and standard making.

One fruitful approach to study standardization in an environment where convergence is central is to conceptualize the communication platforms as Information Infrastructures (II). On the one hand, II gives us the conceptual lens with a focus on the heterogeneity of the actors as well as the open and socio-technical nature of the process. On the other, the prevailing institutionalized standardization practices and innovation regimes. With an emphasis on these factors and the tension between them the challenges of convergence and the need for flexible standardization processes, standardization institutions as well as standards emerges more clearly.

Methodologically, this paper primarily draws on interviews with central actors regarding the development of the CPA business model and the implementation of CPA-platforms in Norway. During 2003, interviews were conducted with the two Norwegian MTOs, six content providers, the Norwegian Post and Telecommunication Authority, the Norwegian Competition Authority as well as the branch organization for the content providers. The employees interviewed from the content providers and MTOs were a mixture of technical and marketing people. The relevance of the chosen organizations and interview objects were identified during interviews commencing in one of the MTOs. The interviews were basically open ended, supported with a simple interview guide. In particular, the interviews were all focused around the development of the CPA standard and the industry of content services for mobile phones and the challenges it poses. While following the current development of the CPA market and its new applications, a reconstruction of the historical development since 1999 was provided by one of the MTOs.

2 INFORMATION INFRASTRUCTURE AND CONVERGENCE

Several researchers have used II theory to describe processes of standardization within organizations or communities of organizations (for example Ciborra and Failla 2000; Hanseth 2000; Monteiro 1998; Rolland 2003; Star and Ruhleder 1996). These contributions provide an understanding of standardization and standardization processes linked to local practices and institutions, factors not sufficiently captured with economic theories of standardization alone (for example Besen and Farrell 1994; Shapiro and Varian 1999; Succi et al. 1998). In this paper, II as a theoretical lens is applied on the industry-wide and public CPA standard, its standardization process as well as the central actors in this process. Inspired by earlier applications of II theory we put emphasis on the open, flexible and socio-technical nature of an ongoing standardization process.

While traditional telecommunication systems are vertically integrated and characterized by being closed and having a specific purpose for a limited repertoire of usages, the essential aspects of II is that they are a: “shared, evolving, open, standardized, heterogeneous and socio-technical construction” (Hanseth 2002, p. 7). An II, by its nature, serves a wide range of users, user communities and types of applications (for example Ciborra and associates 2000; McGarty 1992; Neumann and Star 1996). The II evolves through change, but at the same time, changes are always extensions of what already exists. This is not only related to the installed base of technology but also to innovation regimes, dominant designs, regulations, user practices etc. In the case of CPA, the ongoing changes are out of central

control and appear as manifestations of the combination of agendas and actions of a variety of heterogeneous actors. As we also appreciate CPA as a flexible standard, we conceptualize the processes of standard making and diffusion into the marketplace not as distinct, but as interlinked and ongoing processes (Star and Ruhleder 1996).

Within standardization committees, the issue of openness is framed and control is achieved and maintained by creating a “closed” arena where the actors are homogeneous (Mansell 1990) and the agenda and participation is institutionalized (for example Schmidt and Werle 1998), even if the struggle with governments and their national policy and national industry interests related to the committee standardization of the NMT and the GMT shows that this is not necessarily a binary open or closed situation (Haug 2002; Manninen 2002). CPA is developing outside such institutional frameworks and the coordination among MTOs and between MTOs and content providers is played out on an open and unrestricted arena. With such a perspective, standardization is an open process, related to who and what is a part of the II, who is designing what and who has the power to determine the trajectory of the further developments. At the same time, this diversity is in it self a call for standard making as well as adoption of standards (Branscomb and Kahin 1996).

As telecommunication networks are the worlds’ biggest systems, standards and standard-making is for them a crucial activity, and standards can be defined as “... abstract specifications of the necessary features of a component that make it compatible with the rest of a system” (Schmidt and Werle 1998, p. 3). Conceptualizations of telecommunication standards tend to focus on the level of entire systems, as for example NMT and GSM, describing standards for bandwidth, transmission frequencies, protocols, codes, signaling conventions, modulation procedures etc. (discussed by e.g. Fomin 2001; Manninen 2002). In this paper, we discuss standardization related to telecommunication, however not capturing an entire system or generation of mobile telecommunication, but related to the rather small-scale efforts of implementing CPA-platforms. With a focus on II as extensions of what already exists, this is also a discussion of the GSM standard since a II has no end-point neither in time nor space (Star 1999). At the same time, our discussion takes into account a wide range of heterogeneous actors, as the ongoing standardization process requires successful coordination among MTOs, content providers and governmental institutions. These actors must on the one hand coordinate certain technical standards as interfaces to the CPA-platforms. On the other, and more important, they must also create non-technical standards to enable a transparent, open and easy to access market for content services.

Discussions related to standardization processes tends to see the standardization as either formal, de facto or de jure (for example Hanseth et al. 1996; West 2003). The standardization process we discuss does not necessarily fall into either of these categories, as it is not a result of formal procedures, evolutionary market selection or law-making by authorities. The process can be more appropriately conceptualized as a process where we recognize fragments of these categories, and where these fragments together provide the necessary support for the ongoing standardization process. When we study processes where technologies, markets, actors etc. that were previously independent and distinct, that now become integrated and mutually dependent, standardization reveals a process based on convergence through fragmentation. As the process is open, the power of participating and setting the agenda is fragmented and distributed, even if unevenly, and the assets, incentives and mechanisms driving standardization are dispersed among the different actors. The convergence process now surfacing related to CPA is not only based on how the different actors nurture and define their interests, but also is a redefinition of what the telecommunication and the content industry and technology is in itself, by blurring and moving the borders among them.

3 CASE STUDY OF THE CPA-PLATFORM AND BUSINESS MODEL IN NORWAY

3.1 CPA as a business model and platform

Content providers utilize the mobile telecommunication system as a transportation channel for content in the Norwegian market. They do however also need a cost-effective billing system to take care of the relative inexpensive services (limited to NOK 60 (€7), a limitation defined by the two MTO by their available rating classes. Content providers are also concerned with getting access to the whole national market of mobile subscribers. At the same time, MTOs do not define producing, marketing and branding content services as their business. Concerns about relating the brand of the MTO to non-utility services (and further “adult entertainment”), the challenge of pricing services correctly in the content market, as well as a history of sub-optimal walled garden approaches provides strong incentives for combining forces with content providers. Aligning their interests, the CPA standard meets the needs of both the MTOs and the content providers. In addition, it also provides the transparency and ease of use required by the mobile content consumers to create a prosperous market.

The MTOs make their value chain accessible to content providers through this arrangement based on a revenue sharing transaction model. Enabled by this standard, content providers reach economies of scale through easy access to the market, a viable billing solution as well as a possibility to brand through the use of short-codes (easy to remember phone numbers with only four digits). At the same time, the content providers offer innovative services and pricing policies related to entertainment and impulse consumption. They also have easy access to marketing channels, in particular as TV-broadcasters and “media windows”. The nature of these services, being highly susceptible to changes related to trends, hypes and media events, also requires the standard and the platforms to be flexible so as not to hamper innovation.

The CPA-*platforms* offer an interface with two related services for content providers: a transportation service to handle requests and delivery of content, and a related service for billing the customers. The CPA *business model* refers to a broader context of actors, coordination and standardization important for the market success of CPA. Primarily, it is crucial that every mobile operator in the market implements the platform to allow content providers to access the whole market of mobile subscribers as well as allow subscribers transparent and easy access to the services.

Buying content through CPA requires some simple steps for the customers. For example, if a customer would like to have the song “9 to 5” by Dolly Parton as new ring tone on his mobile phone, he will typically locate the required information for ordering the service on the web. The information needed for ordering the service are typically a phone-number (from where to order, for example 1985) and the content item name (“9to5” in this example). As a request for the service, the consumer sends an SMS containing “9to5” to the number 1985. The operator receives the SMS, recognizes the number 1985 and forwards the request as well as the customer’ phone number to the content provider over a simple TCP/IP interface. The content provider receives the request, recognizes 9to5 as the item, and produces and returns the proper content back to the operator by TCP/IP together with the consumer’ number and the contents rating class. The operator forwards the content back to the customer, and the content is charged on the regular mobile phone bill (accordingly for prepaid subscriptions) by the operator according to the rating class. Finally, when the customer pays his bill, the revenue is split between the operator and the content provider.

The CPA business model and its approach to meet the challenges of providing services to mobile phones in a market can be conceptualized as layers of standardization or coordination, together providing what is necessary to “build” the CPA-market. These layers are briefly summarized in table 1, and further described below.

Billing services
Marketing and branding
Transparent access for content providers and subscribers
Service innovation

Table 1. Layers of standardization/coordination.

The primary challenge for content providers is the issue of billing. Implementing, operating and managing a billing system for the content providers is not sensible, in particular as the content in general is inexpensive. Numerous billing systems would also introduce cumbersome registration processes for the subscribers. With no real current alternatives, this is one of the key reasons behind content providers' actual willingness to go into a relationship with MTOs on the terms of a not very favourable revenue sharing model (the operator' share ranges from 30 to 60 percent). Providing a layer of accessible billing services, the MTOs provide a solution to the challenge of billing without adding any significant functionality to their own systems more than e.g. queuing mechanisms for peak hours. At the same time, the responsibility of rating the services is delegated to the content providers. This implies that the MTOs have no control over the content, but also the flexibility that new content and services are added independently by the content providers. However, the MOTs are not only driven by the needs of the content providers in the standardization process. For MTOs, the cost of advertising and marketing content services is very high, at least compared to content providers with close ties to the media industry. As mentioned, the content services provided for mobile phones are also services the MTOs not always find appropriate to relate to their brand. As the content providers take the responsibility of marketing the services, they also take the responsibility of branding the services despite their controversial character.

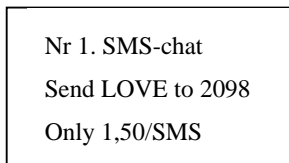


Figure 1. The simplicity of advertising provided by CPA

Particularly related to marketing, but also ease of use and transparency, the CPA market is built on the concept that any subscriber is able to order the same service from the same short-code, for the same price. This makes marketing much simpler than if services, number and price varied from operator to operator, necessarily resulting in advertisement more resembling user manuals than triggering consumption. MTOs must coordinate to enable this: First, there must be interconnection between the MTOs so that service requests and services can be passed freely between the different networks. Second, they must define, together with regulatory authorities, certain short-code series for the content providers. Finally, they must agree upon certain rating classes and protocols for service billing, so that despite the operator the service has the same cost for the customer. Together, this facilitates ease of advertising and service access, as exemplified by the ad in figure 1.

Finally, the content sold by CPA is also not primarily created based on explicit needs from the users, but the needs are "created" by the introduction of innovative services. Being responsible for innovation, content providers have shown far more creativity than the MTOs. On the other hand, innovation is also problematic as the revenue on content is limited, an issue also related to the split between MTOs and content providers.

3.2 CPA as a process of innovations in the Norwegian market

In 1997, the two Norwegian MTOs provided a collection of utility services as news, stock quotes, weather forecasts and phone directories exclusively for their subscribers. As the MTOs were

recognised as the provider of the content services, utility became important as the services referred to the MTOs' brand. Services as "adult entertainment" and XXX jokes were naturally excluded. The nature of content services for mobile phones has however shown to be strongly related to entertainment. Combined with the high cost of advertising for MTOs without their own "media window", the walled garden approaches became costly and not very successful endeavours. In addition, the customers had to struggle with a range of short-codes, price differences and exclusive content from different MTOs. Therefore, in 1999, one of the MTOs took an initiative to reduce cost, risk and responsibility related to their brand by developing a different approach resulting in the CPA standard of today.

While the decision to change approach was clear, the management efforts and the investment in further implementation of the platform was limited within the MTO. On a day-to-day basis, only a few key people still managed by initiative and a spirit of entrepreneurship to implement and attract content providers. Luckily, they found their counterpart in a small (only two employees) content provider, primarily providing simple jokes. This was exactly what the market wanted. Without any commercial campaigns and real changes in technology more than giving open access to the content providers and coordinating with the other MTO, the first content provider was introduced in spring 2000. CPA very soon became an economical success compared to the old platforms. However, it was not before summer 2001 that resources formally were designated and a CPA division defined.

The implementations of the CPA-platforms are continuously changed to accommodate a highly fluctuating market. In the period of January to May 2000 after the launch of the platform, the traffic increased modestly. However, when May had passed, and a range of smaller as well as larger and more experienced content providers entered the market, the traffic was ten-folded in one month. During the following one and a half years, the CPA platform was extended to serve the increasing traffic and usage, in particular with a flexible middleware platform handling queuing of messages.

3.3 Interactive TV with CPA as a return channel

The CPA business model requires MTOs and content providers to find common interests and align them. One important group of content providers are TV-broadcasters, as for example the Norwegian Broadcasting Corporation (Norsk Rikskringkasting). When NRK produces TV-shows nowadays, management has implemented the opportunity to require the show to include interactivity with the viewers. Examples of interactivity are polls related to TV-debates and talent shows, viewers expressing their thoughts or questions related to a sports event, actively taking part in a TV-quiz or a chat.

With current available technology, mobile phones and SMS is the primary alternative together with wired phones enabling interactivity by providing a return channel for the viewers. CPA also provides the ease of use necessary to enable the viewers to impulsively take part in the TV-show. The service transparency introduced with CPA as well as the mobile phone penetration (Subscriptions per capita is 87.7% per July 2003 (<http://www.npt.no>)) in the Norwegian population also makes interactivity more or less available for all.

NRK is not directly connected to the MTOs, but uses two different service providers to handle SMS interfaces with the different MTOs. For NRK, there is no strong brand in the short-codes they use, and these are also related to the service providers (1987 and 2008). For NRK, the viewers have a much tighter relation to the TV-hosts than these numbers. There are also marginal revenues to collect for NRK, as it is split twice with MTOs and service providers. As a result of this, in combination with a concern that prices will drop in the future, they are continuously searching for different and more attractive return channels, both in terms of a higher revenue share but also more and stronger interactivity with the viewers.

4 DISCUSSION

In the case of CPA the MTOs have found common interests in an open garden and standardization approach. This appreciation of common needs is nurtured by one of the MTOs arranging an annual event for the content providers. The MTOs have also had a history of pro-activeness towards the content providers by providing the necessary support to enter the market. This role is however now taken by service providers with close relations to “media windows” as well as acting as integrators towards the different MTOs. At the same time, the development of CPA has challenged the history and the institutionalized practice of cooperation among MTOs and their institutionalized committee based standardization processes. As the standardization unfolds outside the framework of committees the common mechanisms for reconciling conflicting preferences are not present. The MTOs in the Norwegian market are daily in a fierce competition over subscribers and market shares which does not necessarily create an environment for cooperating more than necessary. This is reflected by one of the employees describing the relationship among the MTOs in creating and maintaining the CPA standard as “coordination, but *not* collaboration”. At the same time the standard has successfully been developed and implemented. The technical implementation of the CPA-platforms by the different MTOs has not followed any particular standard regarding its interface to content providers or the idiosyncrasies of the billing systems of the MTOs. The implementations have also developed over time to accommodate changes necessary to meet the requirements of the market and the content providers. This has materialized, as for example, refined queuing functionality to cope with peak hours, in particular related to TV-shows with time critical SMS-voting. The flexibility in the CPA standard thus allows the coordination between the MTOs to be minimal and not primarily on a technical level. The non-technical nature of the standard in the sense that it is really only the short-codes and the rating classes that are formally defined also leaves flexibility to the technical implementation of the platforms as long as they provide the required service level. A more technical and thus tighter coupled solution would have made the coordination efforts more complex as well as it would have required more resources and stronger management support as well as attention.

CPA requires new and different institutions for coordination of activities, standardization of interfaces and market approaches. These institutions have to be flexible enough to accommodate the rapid change in the actors’ constellations and the convergence of the different markets and technologies. The first content providers using the CPA standard had a history of delivering premium information/recorded services to wired telephones. As a part of the dot-com wave, a range of small and entrepreneur like actors from the software industry also entered the market, and lately actors with strong relations to “media windows” have established a dominant position. Even if MTOs and the content providers are providing complementary services within the CPA regime of today, the content providers have to follow the principles and the pricing policies (with standard agreements) of the MTOs, preserving their control. The primary consequence of this, the content providers argue, is that it necessitates the content to be cheap and more important hampers further service development and innovation. CPA acts as an enabler and provides the only viable standard and business model for providing content services for mobile phones in the Norwegian market. For the content providers, there is not one common interface to the different MTOs, and they thus need one agreement with and one interface to each MTO. As a new MTO currently enters the Norwegian market, content providers must handle yet another agreement and interface. To ease the negotiation with multiple MTOs and interfaces, integrators are taking care of these issues for the content providers. On the one hand, this eases the burden of negotiation for the content providers, but on the other, a new category of actors have a stake in the process. The openness of the standard thus paradoxically limits the incentives and flexibility of innovation by being supported by integrators.

The markets for the service we have discussed here are primarily national. There are, however, strong reasons to believe that CPA based services increasingly will get an international character. To assist content providers in their international operations, a common national interface to CPA-platforms should be available. International content provision in addition to the increasingly international

character of MTOs generates a need for international standards, even if the CPA-platform does not fall under the scope of institutionalized standardization practices. At the same time, the variety of services and the unpredictability of what kind of services users will adopt imply that the traditional hierarchical and time consuming specification driven model followed within telecommunication standardization will very likely not be feasible in this area. At the same time, telecommunication systems that cross national borders are global networks not controlled or coordinated by any single authority (Schmidt and Werle 1998) as there is no governance structure that can enforce standards globally (Funk and Methe 2001; Schmidt and Werle 1998). Thus, international standardization will call for other mechanisms. Similar national initiatives to standardize the market of content services for mobile phones, like CPA, is undergoing in several other countries, as for example, the Netherlands, Hungary, U.S. and China. A slightly different approach is the implementation of i-mode in Japan, where DoCoMo provides exclusive and screened services for their subscribers and thus not an open and industry-wide standard (e.g. Funk 2001). These standard and efforts related to the standardization process take different shapes and forms, in particular related to the history of cooperation among content providers, regulatory environment, the presence of content providers and the SMS-culture.

The implementation of CPA-platforms and the business model has largely happened without any intervention from the regulators and the authorities in general. Through distribution of short-codes (in the 1900 and 2000 series), the Norwegian Post and Telecommunication Authority (NPT) has had a supporting role in the negotiation between the MTOs. At the same time, NPT defines its mission as to secure access to high-quality telecommunication services to the end-users on the *level of transportation* through *ex-ante* regulation. By this limitation, based on implementation of EU legislation in the new Norwegian Telecommunication Act, content and thereby CPA is not the concern of NPT. The distinction between transportation and content is partly a preparation for convergence, as NPT in the future will continue to regulate telecommunication services, regardless of the kind of network of transportation. Even if the authorities represented by NPT have shown minor interest in the standardization process, they have still provided the crucial short-codes. At the same time, further needs for coordination becomes the responsibility of the different actors and the market.

As the CPA standard develops in an environment of convergence, standardization becomes fragmented. The standard is primarily a result of alignment through negotiations among different actors. At the same time, the development of CPA is highly dependent on developments and extensions of the GSM standards and the mobile phone itself, as for example the introduction of MMS (Multi Media Messaging) gives the opportunity to provide new services such as polyphonic ringtones. Thus, even though CPA is standardized outside committees, other parts of the infrastructure it builds on are. And MTOs are involved in these standardization processes, as well as how to control and implement these in their networks. The presence of market forces in this environment is not strong since MTOs are providing the only feasible business model, and the nature of this model removes any competition in service repertoire and pricing among MTOs. At the same time, however, the content providers are seeking new outlets as well as engaging in public discussions and forums to increase their bargaining power and share of the revenue.

For mobile subscribers, the CPA standard makes services transparently available despite which operator they subscribe to. At the same time, the focus of the services is not utility but primarily entertainment or very simple information consumer services. This is both a result of the pressure on the content providers to produce cheap content, and the nature of these consumer services as not necessarily meeting but rather creating fluctuating hypes and trends of user needs.

5 CONCLUSION

Through emphasis on standardization as an open, socio-technical and complex process of negotiations and alignments, its outcomes in technology and standards can be more clearly understood. Through ad-hoc negotiation, and not on the track of institutionalized telecommunication standardization, CPA is a shared standard and business model with related implementations among the MTOs and content

providers in Norway. As an open process, the standardization is closely related to processes of convergence magnifying the conflict of interests among the different actors through its blurring of borders between businesses and assets. At the same time, new actors find their role and nurture their interests in the coordination activities. As a result of this, content providers struggle with a pricing regime and a multiplicity of interfaces handled by integrators, in practice leading to scarce revenues and further marginal service innovation.

The openness of the standardization process does not result in a process simply driven by market forces. Even if standardization institutions are not playing role in the process, the MTOs still play on their strong relation to standardization of the underlying GSM technology as well as their control over the access network and billing services. Content providers are free to add new services and concepts, but they have to play within the frames provided by the MTOs. The lack of an institutional environment is more prevalent when it comes to the coordination among the MTOs. However, as the standardization has happened on a non-technical level there has been no need to standardize the underlying billing systems of the MTOs.

Coping with increasing usages in peak-hours as well as brand new service concepts, the implementation and standardization process of the CPA-platform and business model has shown highly flexible. On the one hand facilitating service provision, on the other hand hampering further innovation, the sustainability of CPA and its standardization approach will only be evident over time. At the same time, introduction of competing alternatives will necessarily be provided by other actors, further increasing the network of heterogeneous actors that need to coordinate. As a presage, the standardization process related to CPA provides us with interesting scenarios related to the standardization challenges the next generation of mobile telecommunication systems will meet.

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