The Voice Imperative
Providing Real-Time Person-to-Person Communication Services in an LTE-Environment

- Executive Summary -
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The market for mobile voice services is slowly reaching a point of saturation and the share in the revenue-mix of voice service provision is gradually decreasing. By providing open Internet access the mobile operators gave direct-to-consumer service providers the ability to make unpaid use of the operators’ resources, which they can employ to provide their own mobile services to the mobile subscribers. Amongst these parties are providers of Internet telephony services, offering a substitute to the operators’ voices services. At the moment however, these service providers are not able to deliver voice services with a quality comparable to that of the voice services of the operators due to the latency within the current network technologies.

The introduction of the LTE network technology is about to change this however. The increased network capacity and fully IP-based network architecture will provide Internet telephony service providers with an infrastructure to deliver their services to mobile subscribers with comparable quality as the current PSTN communication services. In order to minimize the disruptive impact of these emerging communication services, mobile operators will have to look at ways to adapt their communication service provision in such a way that they keep their current customer ownership and remain their subscribers’ preferred communication service provider in the upcoming fully IP-based environment. The objective of this research project was to give an advice to TMNL about how it should develop its communication service provision for this upcoming fully IP-based telecom environment. This lead to the following research question:

*How should TMNL provide real-time person-to-person communication services in order to achieve a sustained competitive advantage in the fully IP-based telecom environment that is expected to emerge in 2015?*

In its approach to answering this question, this research project has focused on the organizational aspects of the provision of mobile communication services. By looking at these services from a value network perspective, insight could be gained into the strategic consequences of different possible configurations for mobile communication service provision as different value network models entail different power structures between the actors in the value creating process as well as differences in their innovative abilities. By defining four distinctive model configurations and analyzing their strategic consequences this project was able to provided an advice on how TMNL should develop its service provision and fortify its strategic position. In formulating its recommendations, the project has taken the operator’s sources of sustained competitive advantage vis-à-vis the emerging competitors from the Internet domain as a point of departure.! Following the resource-based view of the firm as postulated by Barney (1991) and his definition of sustained competitive advantages this concept was defined as ‘a value creating strategy that is not simultaneously being implemented by these emerging competitors and of which these other firms are unable to duplicate the benefits’.

In order to be able evaluate the different value network models, a framework was constructed on the basis of scientific theory that assesses the viability of a model by looking at the governance structure of the value network as well as the performance of the value network as a whole:

- The amount of control an actor has in a value network was determined by its resource dependency relationships with actors in the value network it operates in and its disposition over certain bottleneck resources, giving it a strategic advantage over other actors and the ability to influence certain aspects of the value creating process more than the rest.
- The performance of a value network was determined by the level of vertical integration of actors within the value creating process and the openness of the network. The vertical integration of the platform provider determines the amount of room there is for an ecosystem of complementary product to come into existence and the openness of the network determines the innovative ability of this ecosystem.
The next phase of the research project constituted an extensive study of the telecom domain. By taking a number of generic roles in the field of mobile voice service provision as a point of departure a high-level representation of the value network for TMNL’s current voice communication service provision was constructed. This model gave insight into the actors involved in the current configuration of service provisioning, the relations between them and the roles they fulfill. Subsequently an analysis was made of relevant developments in the environment of the value network. Following the STOF approach by Bouwman et al. (2008), these developments were summarized into technological developments, market developments and regulation. The insight into these developments enabled the analysis of their impact on the value network and the accompanying consequences for the roles, the actors and the relationships. The results of these analyses were used as design variables for the construction of the generic value network models.

The study of the telecom domain also yielded an overview of the possible technological solutions that are available to TMNL for the provision of real-time person-to-person communication services in an all-IP environment. Different solutions were taken into account. First two interim solutions were put forth that leverage the current network architecture and cater for a fast deployment of voice services over LTE. Secondly two IMS-based solutions were presented that enable enriched IP-based communication services and finally two fully IP-based and carrier-independent solutions were elaborated on. As well as contributing to the construction of the models, these solutions were employed in the final phase of the project to translate the findings of the empiric phase into a more concrete advise in terms of the actual technological interpretation of the proposed communication service provision.

In order to take a wide scope of possible value network models into account and make them generic rather then specific, the models were designed by laying the nexus of service provisioning with different actors in the value creating process. Subsequently the models were related to the developments in the mobile domain that contributed to their materialization. The following generic value network models were discerned:

- **An operator centric model** laying the nexus of the communication service provisioning with the mobile telecom operator. The service provisioning in this model is tightly coupled with the operator’s network resources and the service platform enabling the enriched communication services resides in the control layer of the operator’s network architecture in combination with a software client on the subscriber’s handset. As this platform enables fixed mobile convergent services the operator’s service portfolio can be accessed over different access networks.

- **A device centric model** where mobile handset functions as the first point of reference to the subscriber for his voice service provision, giving the device manufacturer the most potential influence on the subscriber’s service usage. This configuration places the central platform of the communication service provision with the mobile handset that supports both the fully integrated front-to-end operator’s mobile voice service provision and the decentralized end-to-end Internet-based service provision.

- **A service centric model** where mobile service and mobile access provision are offered by different actors and an Internet-based communication service provider plays a central role and is responsible for most of the roles regarding voice service provisioning. The communication service is carrier-independent and can be offered on a mobile handset over WLAN as well as the operator’s mobile broadband network. The mobile operating system also plays an important role in this configuration since it serves as a software platform enabling the Internet telephony client software to be installed and used on the mobile handset.

- **An aggregator centric model** making a third-party service aggregator determinant for the service provision. The aggregator functions as a portal and combines and integrates the services of multiple Internet-based communication service providers into a single unified user interface. It offers a single starting point towards mobile communication services, but the subscriber still needs separate user profiles with each of the service providers to access their contacts.
The four generic value network models were evaluated by looking at the resource dependencies and division of gatekeeper roles determining the balance of control in the value network and the vertical integration and openness inherent to in the model that influence its performance. By conducting semi-structured interviews with experts in the field of mobile communication, both from within and external to TMNL, insight was gained into a number of stakeholder perceptions about how the models relate to the elements of the framework defined earlier in this research project. Furthermore the respondents were inquired after their perceptions regarding the likelihood and desirability of the different models as well as the operator’s sources of competitive advantage.

Overall, the operator centric model was considered to remain dominant for the following years, however not sustainable in the light of the developments in the mobile domain. Most respondents perceived the decoupling between service and access provision present in the service centric model as very likely to manifest itself in the mobile domain. However not within the timeframe considered in this research project; the operator centric model and the service centric model will remain to coexist in parallel for years to come.

After evaluating the different models on basis of aggregated empirical data gathered during these interviews, it was concluded that none of the value network models satisfies both conditions for a viable value network model. In those models where the governance structure was favorable for the mobile operator, the overall value network performance was assessed to be quite low. Similarly the models that were likely to produce a high level of network performance, showed a very decentralized power structure and a very limited ability for the mobile operator to influence the value creation process. In comparison to TMNL’s current voice service provision, the models displayed a gradual shift and decrease of the operator’s control over the value network due to the decentralized organizational structure and increasingly loose couplings between the different actors. This was reflected in its disposition over bottleneck resources as well as its relationships of dependency with the other actors. The emerging decoupling of service and access provision gives the Internet-based service provider a large amount of autonomy and flexibility in its service development, which enhances the overall innovativeness of mobile communication service provision.

As the different models are expected to coexist it is clear that the mobile operator will loose a fair amount of control over the value creating process. Its position as the mobile network operator will still make it indispensable, but it depends on how he leverages this whether this will provide it with a source of control and a way to provide added value. The increased decentralization of service provision drives the mobile domain towards a more open market model.

In order to forty its position in this changing environment, TMNL must leverage its sources of sustained competitive advantage and create a situation where its own resource position directly or indirectly makes it more difficult for others to catch up. It must base its strategy on its strengths and develop its future strengths from its current strengths. This entails that it should not only focus its strategic analysis on the mobile industry but also on the company itself. The analysis of TMNL’s sources of sustained competitive advantage have yielded the following results:

- TMNL should not leave the front-to-end service model and refrain from developing carrier-independent services
- TMNL should leverage the abilities of its physical resources, not only with regard to its own service provisioning but also towards third-party service providers
- TMNL should leverage the long-lasting service relation it has with its subscribers

These elements were used as the basis for the advice to TMNL on how it should develop its real-time person-to-person communication service provision in the fully IP-based telecom environment that is expected to emerge in 2015.
In order to TMNL to implement a service configuration that does satisfy both conditions for a viable value network model, it must look for a model that incorporates aspects of both the operator centric and the service centric model. This thesis proposes a twofold strategy for achieving this situation that consists of deploying fixed-mobile convergent communication services that maintain a tight coupling with the underlying infrastructure while nurturing an ecosystem of complementary third-party service providers through the provision of an open interface towards its network resources.

In developing its service portfolio, TMNL should focus on those services that require a dedicated connection such as voice & video calling and in-call file sharing. By taking its mobile voice service provisioning, for which TMNL has a long lasting-lasting service relation with its subscribers, as a point of departure and by developing its IP-based service provision from there, TMNL will keep a close relation with its subscribers in this new environment.

It must acknowledge however that it does not have the organizational abilities to compete on equal terms with Internet-based service providers and thus not venture into the realm of Internet-based and carrier-independent services. Rather it should incorporate the merits of service centric model by leveraging its network infrastructure as a service platform towards third-party service providers. By putting forth its network as a platform, TMNL can draw a development community to its own network resources and partially shift the ownership of the service creation environment away from the mobile operating system and back to its own network. This will provide it with the ability to create added value in a service centric environment towards Internet-based service providers and thereby indirectly to its own subscribers by providing services such as carrier billing support and contextual information about the subscriber. It will open up new sources of revenue and stimulate third-party service innovation while endowing the operator with a certain amount of control over the outcome of the value creating process. This way TMNL can also differentiate in which types of services it will grant access to its resources and for instance deny these services towards Internet-based substitutes to its communication services provision while allowing it to services in the periphery of communication such as social media, presence and instant messaging.

These conclusions lead to the following recommendations

- **Focus on Front-to-End Service Provisioning and Implement VoLGA**
  TMNL should stick to those services that can be tightly coupled to its network infrastructure and implement VoLGA for the provision of voice services over LTE. It should not venture into the realm of Internet-based and carrier-independent services, since it does not have the organizational abilities to compete on equal terms with Internet-based service providers.

- **Offer both Fixed and Mobile Connectivity and Implement IMS**
  TMNL should extend its network services towards the provision of both fixed and mobile connectivity. This way it will strengthen the relationship with its subscribers and increase its customer ownership. By implementing IMS in the control layer of its network architecture, TMNL will be able to extend its portfolio towards the provision of fixed-mobile convergent services.

- **Provide Voice Services over Alternative Access Networks**
  Through enabling its subscribers to connect to its core network and its services with a softphone over an IP-based access network, TMNL can take a first step towards the provision of fixed-mobile convergent services and has the ability to counter one of the USPs of Internet telephony services providers: cheap calls from abroad.

- **Leverage Network Resources as a Service Platform and Develop Network APIs**
  By putting forth its network as a service platform and developing Application Programming Interfaces to interact with it, TMNL will have the ability to leverage its network infrastructure as a service creation environment and to create added value towards Internet-based service providers. This way TMNL can open up new sources of revenue and draw a development community to its own network resources, thereby partially shifting the ownership of the service creation environment back from the mobile operating system.