An Analysis of the MVNO Business Model*

ANDERS LILLEHAGEN, LARS ARMYR, TERJE HAUGER, VEGARD MASDAL AND KARI-ANN SKOW

Anders Lillehagen (44) is Advisor at Telenor ASA's corporate Regulatory Affairs unit where he is engaged in all kinds of strategy and policy regulatory issues including international regulations. He received his Cand.Oecon. degree from the University of Oslo in 1986, his Master of Business Administration from Manchester Business School, UK, in 1992, and his Master of Technology Management in Telecom Strategy from the Norwegian University of Science and Technology in 2001. He joined Telenor in 1997 as regulatory advisor in Corporate Audit and became manager of Transport and Communications and the Norwegian Competition Authority.

anders.lillehagen@telenor.com

Lars Armyr

Lars.Armyr2@telenor.com

1 Introduction

The purpose of this paper is to analyse different Mobile Virtual Network Operator (MVNO) business models in order to validate their sustainability.

The mobile telecommunication industry is for the time being characterised by a lack of licences, high investments in network building, and deregulation of old monopolies. There is an increased complexity both in the market and in the industry, and there is a search for new business models for expansion.

The mobile market is a market still in strong growth with many players that want to get a slice of the pie. Each country has a limited numbers of available frequencies, and, therefore, can only award a limited number of licenses. As there are a lot of players that want to be mobile operators and only a few of them are able to get a license, both because of the limited number of licenses and the huge cost of building a mobile network, new types of players, MVNOs, have emerged. The regulators have welcomed the new players because they want to enhance competition for the benefit of the users.

An MVNO is a new business model, and faces several challenges, such as the obviously asymmetric agreement with an MNO. The strategic position for an MVNO will depend on the origin of the company. Possible origins are divided into three groups: retailers, expanders and integrators. Each position has different strategic options and possible strategic advantages, which are discussed in this paper.

2 Definition

In a high level description, a service provided by a telecommunication network is the result of an execution of a *function*. Some functions go hand in hand and cannot be separated either from a business or technology perspective. The smallest set of functions that cannot be further divided constitutes a *role*.

The "eco-system" of the telecommunications industry consists of several roles and interfaces between them. The providers of access, switching, transport, service platform, billing, customer handling, etc. each constitute a specific role. A *player* – or a *firm* – on the other hand is a collection of several roles.

It is important to make the distinction between players and roles. The traditional telecommunication operators will often cover many or all roles, mostly due to their history with monopolies and vertically integrated value systems. Breaking up these systems has given rise to new business players like resellers and service providers.

Rather than defining the MVNO as one new role, it makes sense to view an MVNO as a collection of roles. An MVNO could in principle undertake any role, but by definition it must, from a customer perspective, appear to be an MNO, having the same interfaces towards the customer as an MNO. In addition, the MVNO cannot hold its own licensed radio spectrum.

The question for an MVNO is how "deep" (with customer facing being the highest level, and radio access provisioning being the lowest) into the value system it should go. The MVNO has to consider which facilities to own and run, which to outsource and which to lease from the MNO and what type of agreements it should seek with partners in order to appear as an attractive choice to the customers.

3 The Mobile Business Landscape – an Analytical Approach

A business model may be defined as an individual company's set of choices about what to do and how to do it. In this section, some frameworks used to evaluate sustainability of MVNO business models are described. Keywords are network externalities, complementary services / products and value configuration.

Many various environmental aspects may be of great importance. Focus of approach is business strategy, industrial organization and competitive power, but other aspects such as underlying needs of the customer and government policy (regulation) may be crucial.

---

* *The article is based on a paper by Lars Armyr, Terje Hauger, Anders Lillehagen, Vegard Masdal and Kari-Ann Skow.*

The Value Chain, Value Net and Value Networks frameworks are discussed. In addition, the difference between effectiveness and strategy and increasing return are discussed as well.

Value Chain

The standard approach to the analysis of industry attractiveness is Michael Porter's Five Forces framework [1]. The attractiveness of an industry, such as the telecommunication industry, depends on the state of competition. Competition in an industry is rooted in the underlying economic structure of the industry. The state of competition in an industry depends on five basic competitive forces. The figure below gives a picture of the Porter's "Five Forces" framework: The power of the five forces – Suppliers, Buyers, Potential Entrants, Substitutes and Rivalry among existing firms – depends on some major factors and characteristics listed in the work of Porter.

In his book "Competitive Advantage" [4] Michael Porter suggested analyzing the "cost leadership" and "differentiation" strategies by means of the value chain model, which has become the standard approach to these analyses. An effective competitive strategy according to this approach takes offensive or defensive action in order to create a defendable position against the five competitive forces.

Value Net

The Value Net can be seen as a generalization of the Five Forces framework. Complementors are added as a new dimension. The Value Net emphasizes that the value to the customers can depend on a package of complementary services and/or products. Logically, complementors will influence the attractiveness of an industry. Figure 2 gives a picture of the Value Net of a company.

Terje Hauger (52) is Advisor at Telenor Business Consulting where he is engaged in strategy issues and organisation development. He graduated from the Norwegian School of Economics and Business Administration in 1975 and received a Master of Technology Management in Telecom Strategy from the Norwegian University of Science and Technology in 2001. He joined Telenor in 1995 as Director of Quality and Security in Telenor Business Solutions. Previously he has been working as management consultant with Coopers & Lybrand and Railo International, and as researcher at the Institute for Social Research.

terje.hauger@telenor.com

Vegard Masdal (33) is Research Scientist at Telenor R&D. He holds a Master of Science (1991) in Electronics from the Norwegian University of Science and Technology and received a Master of Technology Management in Telecom Strategy from the same institution in 2001. Since joining Telenor in 1994 Vegard Masdal has worked with large-scale deployment of telecom and computer networks. Main current interests are business models and business strategy.

vegard.masdal@telenor.com

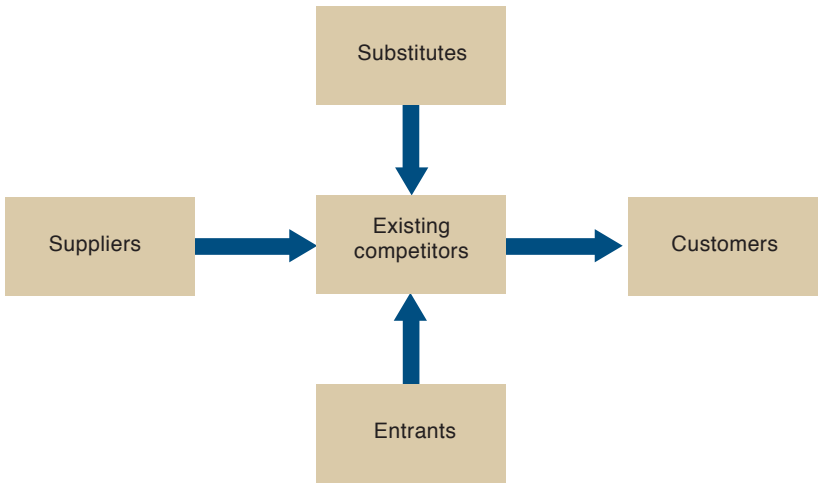


Figure 1 Porter's Five Forces

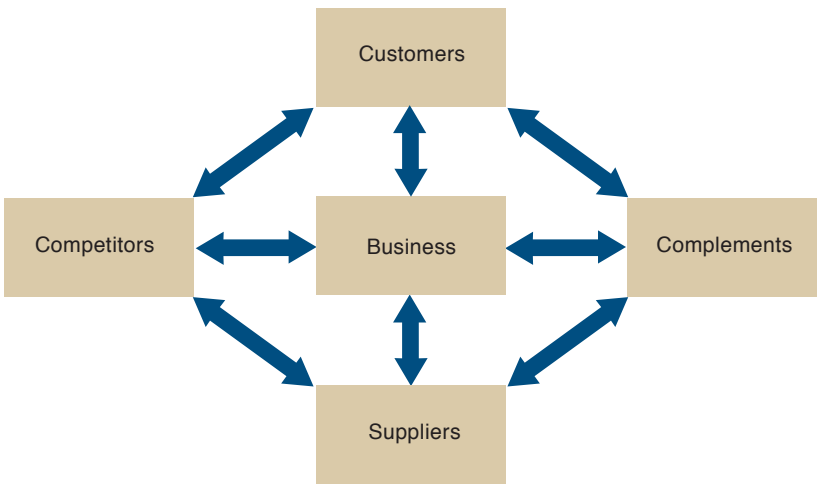


Figure 2 The Value Net

Kari-Ann Skow

kari-ann-hybbestad.skow@telenor.com

A player is a complementor if customers value your product more when they have that player's product than when they have your product alone. A player is a competitor if customers value your product less when they have that player's product than when they have your product alone.

To draw the map of the whole Value Net of a company (function) of the telecommunication industry is more and more challenging due to increasing complexity of relations between companies (functions) within the ICT business landscape. The number of companies and types of unbundled functions are increasing. Companies can to various degrees be both horizontally and vertically integrated. In addition, companies can be present in several countries (local markets). Further, the number of different technologies (e.g. access technologies), the number of products and applications etc. is increasing. Various sources of payment, e.g. from subscription, advertising, and transaction, can also increase the level of complexity and the relations between roles and companies.

Nalebuff and Brandenburger [2] apply the Value Net model to illuminate competitive and cooperative business strategies for the digital economy and see the relations between the companies as a game. A game has players and the added value that each player brings. A game has rules that structure the interaction between players. The game is also affected by perceptions, what the players believe. A game can only be changed by changing one of the components. The term co-opetition, coined by Noorda, is introduced to describe strategy in a business landscape of both competitors and complementors. A company's strategy towards different types of players has to be different. An example based on pricing and value to customers describe the importance of different strategies. If companies price their competing products independently, price will come down as companies try to compensate for lower margin by gaining profit from increased market share. The reverse situation is true for complements. The natural incentive is to set price too high, which makes the total package too expensive. Complementors should agree to lower prices. This is why we see so much bundling. It's a way of bringing the price of a complementary package down. According to Nalebuff and Brandenburger, there are three approaches to the problem; Do it yourself, Form an alliance or Set up a proprietary business.

Value Networks

Stabell and Fjeldstad [6] suggest that Porter's Value Chain framework is only one of three generic value configurations – the other two being "value shop" – which describes a firm where value is created by mobilising resources and activities to resolve a particular customer problem (e.g. hospitals, professional services and educational institutions) – and "value network" – which may be used to model firms that create value by facilitating a network relationship between their customers using a mediating technology (e.g. telephone companies, transportation companies, insurance companies and banks).

Fjeldstad [7] claims that the Value Chain model (and the related Five Forces model) do not reflect the strategic logic of mediators, and in particular fail to incorporate positive network externalities both as a source of competitive advantage and as a barrier to entry and innovation.

Positive network externalities introduce unique strategic challenges. A new service has relative low value to its first customers; whereas cost is typically highest in the introductory phase. However, because the value of the service is dependent on who else adopts it, it may be difficult to target customers on an individual basis. Consequently, in many cases it is impossible to levy a realistic charge for the service or equipment in this initial phase, leading to "give away strategies" seen in areas such as mobile telephony or Internet browsers.

Like the value chain, the value configuration model distinguishes between primary and support activities: Primary activities are those that create value for the customers, which in the case of telecommunications are those involved in selling and providing a service. Support activities are engaged to perform effectively the primary activities of the firm.

According to Fjeldstad [7] the primary activities of a telecom operator's value network are:

- *Marketing and contract management*, which consists of activities associated with inviting potential customers to join the network, the selection of customers allowed to join, end the initialisation, management and termination of contracts governing provisioning and charging.

- *Service provisioning*, which consists of activities associated with establishing, maintaining and terminating links between customers, and billing for value received. Billing requires measuring customers' use of the network capacity both in volume and time.

- *Network infrastructure operation*, which consists of activities associated with maintaining and running a physical and information infrastructure. These activities keep the network in an alert state, ready to service customer requests.

Support activities include product and process development (development and implementation of new services, reconfiguration of network infrastructure, development of new technology and implementation of standards), human resource management and procurement

Fjeldstad [7] denotes multiple firms contributing to the creation of a service as a co-productive value system. In such industries co-production takes place both between horizontally interconnected firms and between vertically layered firms. Unique structural properties of the telecommunication industry following the patterns of horizontal and vertical co-production are critical to understanding the nature of competition.

Mediators co-produce value in a layered structure in which the network service of one mediator serves as a platform for a higher-level service. Several companies may serve the same customer, but at different levels. Fjeldstad [7] uses electronic payments over the Internet as an example: Currently, the telecommunications network serves as the platform for the Internet service, which in turn serves as a platform for the electronic payment service. The customer typically subscribes to all three and they are used concurrently to produce the desired service, i.e. electronic payment. The banks mediate payments by credibly exchanging transactions between accounts, the Internet service providers mediate standardised packets between IP-addresses, and the telecommunication operators mediate bit streams between phone numbers, so that, together the firms co-produce the payment transfer service in a layered business system. In the simplest case, with only one firm at each level, the firms supply the same customer with different components of the service. The firms have a strong impact on the value of each other's respective services, but they are not, in the conventional sense, suppliers or customers of each other. It is the common customer of all three networks that typically pays each contributor separately.

The layered structure of co-production in mediation renders the traditional concepts of supplier and customer relationships insufficient for describing and analysing relationships between mediators.

Value configuration analysis is based on the assumption that competitive advantage is found in the activities that a firm performs. Such firms offer value to their customers both through the access option and the actual use of services. Hence, cost and value must be associated with both.

Fjeldstad [7] argues that mediation services offered by value networks represent an extreme case of network externalities because the dependency among customers is the main product delivered. The service of a value network mainly delivers the customers' opportunities to exercise those dependencies. Size and composition of the customer base is therefore the critical driver of value in the value network, and the value of the service offered is affected by the characteristics of the customers that join the network. Capacity utilization is closely related to scale and is both a cost and a value driver, for while it may reduce unit cost, high capacity utilisation also may reduce service levels.

Increasing Return

The term "increasing return" denotes a situation where mechanisms of positive feedback make the leading player maintain his competitive advantage over the trailing player. Main characteristics of a situation of increasing returns are high upfront cost, network externalities and high switching costs for customers. Decreasing return denotes the assumption that products or companies that get ahead in a market eventually run into limitations.

The cost-structure of telecommunication networks is normally characterized by high upfront cost due to license fees and cost of equipment such as switches, antennas, etc. However, when the network is built, the cost of producing one additional call is very low. Telecommunications networks have this cost structure of high fixed cost and low variable cost in common with other products and services of the so-called "new economy" [3].

"Network externalities" denotes the fact that the main asset of a product lies not in the product itself, but in external factors such as how many other people are using it, i.e. demand-side economies of scale. One more customer to the network not only benefits that customer, but also customers already connected since this implies another person to call to.

Positive feedback is a more potent force in the network economy than ever before [3]. Positive feedback is not only related to the demand side, but also to the supply side. The source of positive feedback from the supply side is known as economies of scale in production: large firms tend to have lower unit cost. Both demand-side economies of scale and supply-side economies of scale have been around for a long time, but the combination of the two that has arisen in many information technology industries is new. The two sides feed back to each other making a multiplication effect. The result is especially

strong positive feedback and a popular paraphrasing is “the winner takes it all”.

Switching costs encompass all the costs incurred by a customer in changing to a new supplier. One example of switching cost is cost related to changing telephone number. Switching cost contributes to lock-in situations.

Effectiveness and Strategy

Strategy should not be confused with operational effectiveness. Strategic positioning means performing different activities from those of rivals or performing similar activities in different ways. Porter [5] argues that robust strategies involve trade-offs. A company must abandon or forgo some product features, services, or activities in order to be unique at others. Further, strategy defines how all the elements of what a company does, fit together. The large numbers of MVNOs, which appear to be similar, most likely lack a distinct strategy.

4 A Generic Business Model

Figure 3 illustrates all roles necessary to provide mobile communication services and the relationships between them. The model reflects the vertical layering in Fjeldstad’s [7] model described in the preceding section.

The figure shows four different interfaces between the customer and supplier roles: The sales role takes care of subscriptions and service initiation (corresponding to Fjeldstad’s “marketing and contract management”), Service provisioning comprises the continuous activities necessary to establish connectivity between customers, and corresponds to Fjeldstad’s category – apart from the fact that our model treats occasional interaction with the customer like invoicing etc. as a separate role (subscription management).

The roles in the lower half of the model correspond to Fjeldstad’s “network infrastructure operation”. In order to describe a business model for an MVNO it is necessary to separate access network operation from the operation of the transport network. To give room for different technical configurations that an MVNO may choose, we have also separated the switching/routing role. The service platform operator provides functionality that is common for many applications (authentication, accounting, authorization, catalogue services, presence management). Service provisioning may include telephony services, messaging services, Internet services etc. Each service represents a distinct role, and different players may supply each of the services. The sales and subscription roles in our model comprise administrative activities.

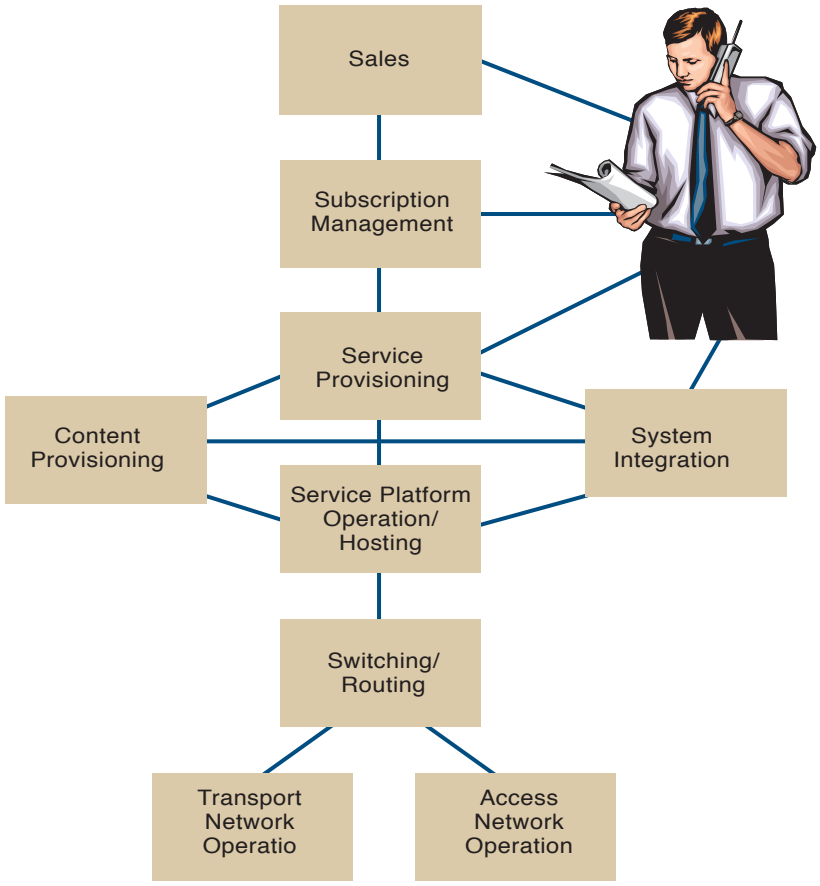
In a 2.5G and 3G world content will be of greater importance in mobile communication. Content provisioning is therefore included as a separate role in the model. Content provisioning relates to hosting of the content as well as to the services provided.

The last role included in the model is that of system integrator. This role comprises activities that integrate content and services into a whole in order to facilitate the customers’ use of the services.

According to our definition, a player acting as an MVNO must at least fill the sales and subscription management roles. At the same time, an MVNO *cannot* fill the access network operator role based on a licensed radio network (but may operate unlicensed radio access networks – e.g. WLAN). All other roles in the model may or may not be filled by the MVNO.

Which combination of roles a particular player chooses, depends on his present business and on which assets he brings into the mobile communication business.

Figure 3 A generic business model



5 Analysis of Sustainability

Our hypothesis is that sustainability of the MVNO business models will depend on where the company setting up the MVNO business, originates from. We have grouped the companies into three groups:

a) Companies originating from outside the Information and Communication Technology (ICT) Industry;

b) Companies originating from inside the traditional telecommunication industry; and

c) Companies originating from inside the ICT industry, but not as a telecommunication network operator.

The three groups are called Retailer, Expander and Integrator respectively.

The Retailer

Companies grouped as "Retailer" provides mobile services to its own customers and can perform various roles such as sale, distribution, billing, and customer management. But the characteristics that differentiate the Retailer are that the Retailer does not enter the mobile industry from a position as a telecommunication company or from industries of the communication eco-system such as application provider or ISP. The motivation to enter the mobile industry can vary from obtaining a new "own brand" product in its portfolio of products to becoming a telecommunication company with own network elements.

The Retail business will tend to be a low profit industry due to the following main characteristics:

- The suppliers of the mobile network, the Mobile Network operator (MNOs), have large negotiation power due to the necessity of the input, concentration (small number of potential suppliers) and the fact that MNOs have their own business of mobile service provisioning (the MNO and the MVNO compete in the downstream market). The MNO will most likely use the power to set condition that will limit the MVNO's flexibility of pricing – for example through "retail price minus" condition – i.e. the price structure and the margin. In addition, the MVNO will not be supplied with higher quality of the network services and degree of functionality than the MNO itself. The types of agreement (set of conditions) offered are limited, often only to a choice of elements from a standard agreement.

- Low entry barriers. If the MNOs give access to their networks, they seem to be willing or obliged by regulation to give access to everybody accepting their standard agreement and fulfilling a set of minimum conditions.

- High degree of rivalry due to low degree of differentiation among the retailers, limited value added and a relatively high number of Retailers due to low entry barriers. Differentiation can be difficult to achieve due to the same underlying quality of network and lack of complementary activities in the "eco-system" of the ICT, e.g. provision of application or content. The option left to the Retailer is price as the mean of competition.

- The Retailer will hardly be in a position to enjoy increasing returns. Both supply-side and demand-side positive feedback is linked to the network and the MNO. Even if the retailer invests in network elements and/or manages to build a club of customers faced with switching cost, increasing returns benefits the larger operator.

The key success factors for the Retailer to be sustainable (earning a positive profit relatively higher than the rivals) seems to be:

- Differentiation through better value proposal to the targeted customer group given that the targeted group is large enough. There are some ways of differentiation such as product features, service, product mix and brand-name reputation. Brand-name reputation is often mentioned related to MVNOs. The best way to add value is building on the idea of common interest among members of a community with common communications needs and requirements. However, it is not easy to find a good example of an MVNO without other engagement of the ICT eco-system, such as application or content. Virgin of the UK is an example of company with a brand and with a product mix, but Virgin is a content provider as well. Uniqueness through trade-offs is difficult to copy.

- Capitalising on owned facilities such as billing systems, distribution chain, customer care system, group of customers etc. If the cost of adding a mobile service product-line is marginal, the MVNO can sustain low margin. But the margin will be smaller with the downward trend of end-user prices and of traditionally mobile services (voice) and of average revenue per user. Tesco of UK may be an example of a company with low added cost of introducing own brand mobile services.

- The agreement with MNO – value proposal to the MNO. Both the MVNO and MNO would like negotiated conditions that enhance its

individual profit possibilities and power in the value system. Logically, the MNO should prefer MVNOs able to increase number of users and usage, complementary in market segments and user value to the MNOs own service provider and with potential to cannibalise the market share of the competing MNOs. The MNO's trade off is between loss in its service provider business and gain in other business levels. What matters to the Retailer should be the fit of negotiated conditions with its service concept, not necessarily the dept of access into the mobile network. To build and run a network with mobile switching centre, home location register and other network facilities requires high capital expenditure – high traffic volume to earn a profit – and higher competence level which may be a source of disadvantage compared to an experienced MNO. The MVNO's freedom to pursue individual strategies, such as pricing strategies, should be of high importance to the MVNO. The MNO and the MVNO may have common interest.

- Regulation. Without an obligation forced on the MNO by the regulator, the MNO may not wish to give access to its network. However, the MVNO may be better off with an agreement based on free will of the MNO.

The Expander

Companies grouped as "Expander" enter new segments or markets as a telecommunications network provider, e.g. fixed network operator expanding into mobile, mobile network operator expanding into a new geographical market.

The purpose of the Expander will be to get a better grip on the customer, to capitalize on resources such as competence and network facilities or to seek opportunities in new markets. The benefits and advantages to the expander depend on many factors, perhaps first of all added value to the customers, change of power and relationships within the Value Net and the company's uniqueness and defend ability. Synergies is a key word, because setting up a MVNO in a new marked with none or limited synergies, the new MVNO business will tend to be a stand alone "Retailer".

The key success factors for the Expander to be sustainable (earning a positive profit relatively higher than the rivals) seems to be:

- Increased returns. The move of the company should increase positive feedback, preferably both from the demand and supply side. In addition, increased functionality and pricing should increase switching cost locking in the customer.

- Increased value added to the customer making the customer pay more and/or increase number of customers and/or usage.

- Influence the game of business within the Value Net in light of the value network of layers of business landscape. The strategy of the Expander should be to build a defendable competitive position. The player should use the MVNO business as a strategic move to differentiate itself from the competitors – companies on the same layer performing the same or substituting roles. The MVNO business can be used as a tactical move as a response to competitors with a broader portfolio of substituting roles, e.g. bundling of various access technologies, or a move to become the broadest provider.

- Attitude of the MNO and regulation. The Expander would most likely prefer an agreement giving him access to the unbundled radio-network and make him able to control the routing of traffic, control the location of customer, provide technology roaming etc. The probability that the MVNO and the MNO will have different interest is greater than in the Retailer case. But Tele2 is an example of a telecommunications company with a MVNO business in Denmark, with access deep into Sonofon's (the MNO) network. The relation to the MNO can be a barrier to the Expander's business model. See section above regarding the Retailer case for discussion.

- Capitalizing on in-house resources such as network elements and competence of building and running a telecommunications operation.

- Other advantages such as brand, ref success factors of the Retailer case.

The Integrator

Companies grouped as "Integrator" enters other layers of the value network, e.g. an application provider or an Internet portal provider move into the mobile service layer.

The aim of the Integrator will be to get a better grip on the customer, enlarge the market / increase the total value to customers, influence the game between the companies of the value net to become relatively more powerful or to seek opportunities in new layers/markets. The benefits and advantages to the Integrator depend on many factors, perhaps first of all the actual position in the business landscape (relations and power within the Value Net), total added value to the customers, and the company's uniqueness and defend ability. Positioning through competence is the key for an integrator, because this will give a unique position, and might change

the relations between the players, hence avoiding the new MVNO business to be just a stand alone "Retailer". The key success factors of the Integrator to be sustainable (earning a relatively high share of the revenue stream) seems to be:

- Secure and increase the grip on the users and secure the channel to the users and the revenues. The grip on and value added to the customer can depend on roles of various layers, e.g. functionality of the Internet portal service can depend on information from the mobile network and mobile terminal. A company or a partnership between companies performing roles of several layer of the Value Network (vertically integrated) can lock out other companies. The MVNO business can also be used to reduce the power of the company(s) of the mobile business layer, and in that way increase the power of its own core activity/layer.

- Increased returns. The move of the company should increase positive feedback, preferably both from the demand and supply side. In addition, increased functionality and pricing should increase switching cost locking in the customer. The MVNO should not be evaluated independent of the whole operation of the company or corporate group.

- Increased value added to the customer making the customer pay more and/or increase number of customers and/or usage.

- Other advantages such as brand, re success factors of the Retailer and the Expander.

6 Conclusion

The value of telecommunication services and products to the customers depend on complementary services and activities. The business model of a company have to give the company (or the corporate group) a defendable position in the net of various complementary and supplementary services provided by companies performing different sets of roles. In addition, the net can also be viewed as a complex set of relations between the playing companies and interests. Further, the position of the company/corporate group has to enable the company to defend – preferably increase – its share of revenue generated by the whole Value Net.

The main key success factors are:

- Take advantages of increasing returns and customer lock-in.

- Stimulate high total value of the whole Value Net. Aim to achieve a win-win situation with the MNO and other partners.

- Powerful position in the whole Value Net difficult to copy or bypass.

- Be in or manure into a position where a relatively large share of total revenues can be tapped.

The analysis show that there may be a large number of sustainable business models depending on where the company/corporate group came from, the relations to other companies in the Value Net and the characteristics of the influencing business landscape. But the winner(s) in the ICT business landscape will tend to be the companies and corporate groups that have business models building on the above success factors. The business model of the MVNO business unit should be assessed in relation to other business units of the company or corporate group.

In general, the Retailer tends to be a low profit business. The possible business models of the Expander and the Integrator are difficult to generalize, but high profit companies will tend to build on the above success factors.

7 References

1 Porter, M E. *Competitive Strategy – Techniques for Analyzing Industries and Competitors*. New York, The Free Press, 1980.

2 Nalebuff, B J, Brandenburger, A M. Co-opetition : Competitive and Cooperative Business Strategies for the Digital Economy. *Strategy & Management,* November-December, 1997.

3 Shapiro, C, Varian, H R. *Information Rules*. Boston, Harvard Business School Press, 1999.

4 Porter, M E. *Competitive Advantage*. New York, Macmillan, 1985.

5 Porter, M E. What is strategy? *Harvard Business Review,* November-December, 1999.

6 Stabell, C B, Fjeldstad, Ø D. Configuring Value for Competitive Advantage: On Chains, Shops and Networks. *Strategic Management Journal,* 19, 1998, 413–437.

7 Fjeldstad, Ø D. The Value System in Telecommunications. In: Eliassen, K A, Sjøvaag, M (ed.). *European Telecommunications Liberalization*. London, Routledge, 1999.