

# 3G MNVOs financial perspectives

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## ABSTRACT

The Mobile Virtual Network Operator (MVNO) business case described hereafter, is based on 3G business cases, particularly regarding the technical infrastructure, but the 2,5G underlying infrastructure as an initial step is also taken into account. Following the definition of appropriate service sets, and taking into account demand scenarios established within the project, this work has been focused on developing a techno-economic model, based on TONIC tool. Tariff structures have been applied to compute the key economic indicators, Net Present Value (NPV), Internal Rate of Return (IRR) and payback period. This investment analysis was carried using the tool, which was developed by IST-TONIC [1].

## I. INTRODUCTION

As a growing number of countries are assigning third generation mobile licences, there is exponential growth in the number of firms working in this sector which have been left without license in the race towards mobile telecommunications, widely regarded as a business opportunity characterized by an extraordinary potential for profit. On the other hand, license fees rose to such heights in some countries that they now act as an economic burden for the “winning” companies. This situation favours solutions for those building their business without a radio access network. Many firms, which are working or not in the mobile sector worldwide, have expressed their interest to enter this market through the networks operation or the service provision channel. For those, which have been left without license, a new channel to enter the market and take part to this big game is the MVNO channel.

EU IST-TONIC [1] project is a precursor in the investigation of the economic side of such deployments and consequently this work is the first step in the assessment of the market conditions, the architectures and the potential for a profitable business case of a MVNO.

## II. NETWORKS AND ARCHITECTURES

MVNOs are beginning to appear in the 2G mobile communications market. They form partnerships with infrastructure owners or rent network resources and

focus on developing their own service offerings, essentially in content and portals.

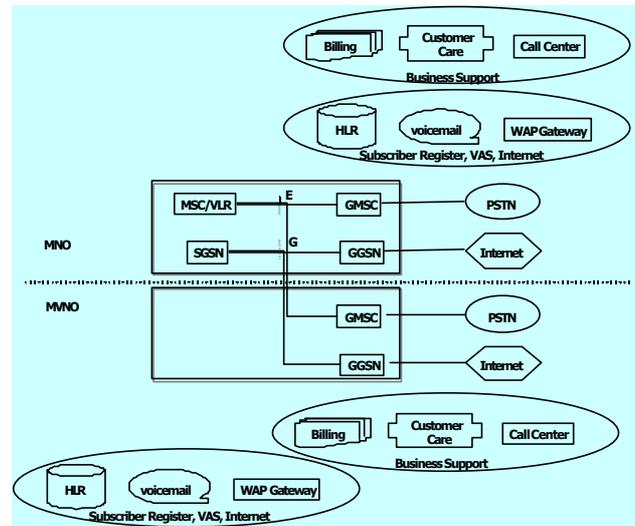


Figure 1: Illustration of a 3G MVNO network (based on Release 99 UMTS architecture)

A mobile virtual network operator provides cellular services without owning spectrum access rights. From the customers' point of view, a MVNO looks like any other cellular operator, but a MVNO does not own or operate base station infrastructure. Figure 1 illustrates the MVNO idea.

There are different scenarios for a MVNO approach and consequently different architectures for the MVNO such as:

- A full MVNO, with its own SIM card, network selection code and switching capabilities as well as service center but without spectrum [2].
- IA-MVNO (Indirect Access MVNO) or Enhanced service provider without SIM card, but with own core network (circuit switched and/or packet) and service facilities, e.g. own IN or IP application servers. [3]
- Wireless ISP without own core network; basically an Internet portal providing wireless IP services.

### III. ASSUMPTIONS AND OUTPUTS OF THE BUSINESS CASE

As initial time frame for this Full MVNO case, a ten-year period has been selected for the early estimations regarding the profitability for both 2G and 3G MVNO cases. In order to calculate discounted cash flows a discount rate of 10% has been selected. This value is a mean value among the major European Telecommunication Operators [4]. The modeling takes into account two kinds of basic deployment areas: a large European country such as Germany or France, and a small European country exemplified by Scandinavian countries. The models represent generic countries, e.g. countries with similar demographic characteristics.

Specific demand scenarios have been built for this business case and revenue streams generated from traffic had been calculated. The costs comprise service platforms and possibly middleware investments, as well as yearly expenses for capacity rental, which can be derived from the network costs, as well as commercial and customer care costs. This business case seeks to evaluate the economic feasibility of service operators, whether they are independent or within a network operator group owning the infrastructure.

The techno-economic modeling was carried out using the TONIC tool, which has been developed by the IST-TONIC project using the TERA tool [5] as the basis. This tool is an implementation of the techno-economic modeling methodology developed by a series of EU co-operation projects in the field.

Models for two main business profiles have been constructed. In the first profile, the MVNO is a telecom operator or a power company without a mobile license but well known as an operator aiming to complement/expand other services such as fixed broadband services. This will be the *Operator-MVNO* business profile. In the other profile, the MVNO is a high brand-value and large customer base company aiming to expand its business in the mobile area and therefore to take customers from every MNO. Therefore the churn effects must be taken into account as key element in this case. This is actually a *Service-MVNO* business profile.

Different demand models and service penetration rates have been defined in order to take into account these two different cases for a MVNO. This business classification leads to specific service packages offered by these potential MVNOs and has been attributed to MVNO business profiles. Finally, sensitivity analysis is performed in order to identify the impact of variations in key input parameters like the price of airtime that MVNO pays to MNO that can seriously affect the profitability since it must be acceptable by MNO and sets the window for negotiations between the two operators

### IV. RESULTS AND DISCUSSION

In this analysis, which is based on assumptions described previously, the profitability of MVNO both in large and

small countries has been presented through specific calculations. Furthermore, the two different business profiles associated with different plans for service provisions and specifically, companies focused on wide market like an operator or focused on lucrative market segments have been analysed. The profitability for all these cases is calculated.

The main economic results for the four basic scenarios are illustrated in Table 1. These results show that companies aiming to operating UMTS services can be benefited from a acceptable NPV and IRR figures. In more detail, operators investing in MVNO rollout benefit from more or less the same payback period and rather interesting economic figures. The service-oriented MVNOs are benefited from larger ARPU. This occurs due to better usage patterns of their customers and associated consumption, but they have to pay it to additional investments. It can be also observed that the investments are more or less proportional to the population for the large country but almost double for the small country. This difference is based on the necessity to offer coverage and therefore to buy equipment that is not fully utilised.

Table 1: Summary of the basic results.

Country type	Large		Small	
	Operat or like	Service Oriented	Operator like <sup>1</sup>	Service Oriented
NPV (M€)	111.7	244.3	71.7	12.1
IRR (%)	15.5	20.9	30	14.3
Rest Value (M€)	8.44	8.77	0.69	0.79
Pay Back Period (years)	7.7	7.1	5.8	7.7
Customers (million)	1,03	1,3	0,158	0,079
Investments (M€)	79,8	80,1	23.7	24,2
Running Costs (M€)	941	953,7	99,9	77,5
Revenues-Running (M€)	868,3	1.218	272,2	121,5
Investment Per (€) Connected Customer	19	19€	70	34

The below-described figures are for rather pessimistic market shares (all are considered more or less new entrants) and surely MVNO can wait optimistic results.

For the case of a small country, the initial position of the MVNO in the 2G world, is mandatory for a successful business in the emerging 3G market. On the other hand, stronger service differentiation is followed by larger

<sup>1</sup> For this scenario, it has been considered that the MVNO has a 2% initial market share in the 2,5G market.

investments while the payback period is remaining the same (Figure 2).

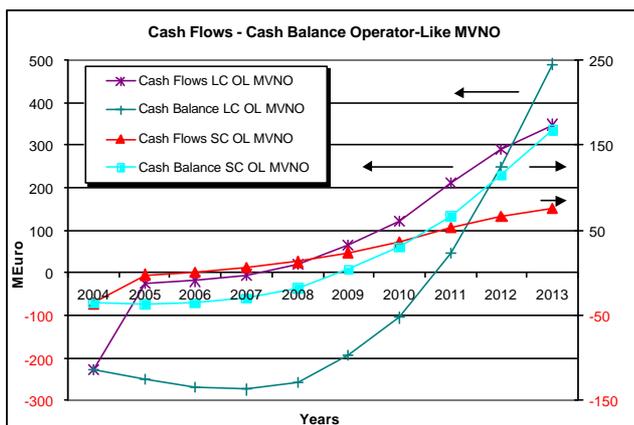


Figure 2: Cash balance and cash flows for a Operator-like MVNO operating in two different countries. (Large country  $\neq$  Left axis, Small Country  $\neq$  Right axis) (LC=Large Country, SC=Small Country)

The breakdown of total investments in the large country case is given in Figure 3. This chart confirms our earlier observation that the bulk of the CAPEX (> 80%) is accounted for the business running costs and therefore this is the main advantage of a well-structure MVNO.

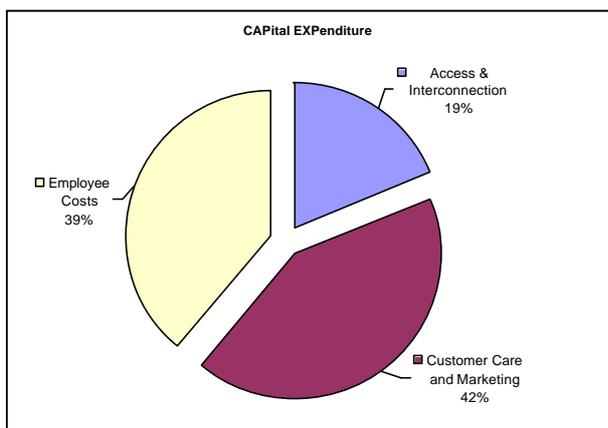


Figure 3: Breakdown of non-discounted Capital Expenditures (CAPEX), large country scenario.

Outlining the findings of this work, acceptable business opportunities can be observed through these calculations in terms of forecasted and actual mobile penetration across Europe. Agreements with Mobile Network Operators (MNOs) for spectrum usage and interconnection give to MVNO enough space for business opportunities and acceptable profit margins.

Sensitivity analysis used to identify the most critical parameters affecting the performance of the MVNO but also to find the impact of specific uncertainties regarding market inputs and business agreements such as interconnection costs. Usage and tariff levels have greatest impact, following by the market share at the end

of the study period, especially for the large country. Variations on interconnection price and churn have limited impact on the economic results due to MVNO's small customer base and market share.

For the adoption of the appropriate price for the interconnection between MVNO and MNO has been based on data from operators and reports. As the base value has been selected a price of 3 Euros per Mbyte per day. But since such a value is only based on current situation in the 2,5G market, sensitivity analysis has been carried out for the improvement of the assumptions. The maximum price for a positive NPV is 19 Euros (Figure 4) which gives more or less a large window for business and negotiations with the MNO.

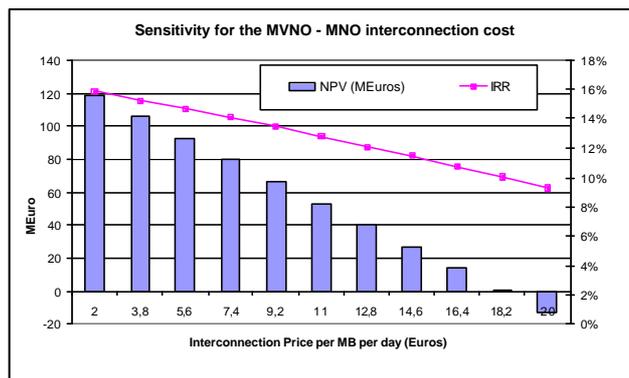


Figure 4: Sensitivity results for the interconnection price between MVNO and MNO

The usage level is the most critical parameter for the economic criteria NPV and IRR. The TONIC model links revenues with usage levels, which means that a 50% increase in revenue corresponds to a 50% increased in usage. Under these circumstances, it would be expected that network costs would increase accordingly. However, since network costs are essentially dictated by coverage constraints and not by capacity constraints, an increase in usage translates only as greater revenues, while the corresponding increase in costs is minimal, and relates to core network elements.

In the large country scenario, a 50% reduction in tariff/usage levels leads to a negative Net Present Value over the study period (-217 Meuros, Figure 5), and a 15% reduction leads to a null NPV, i.e., cumulative costs (CAPEX + OPEX) are only just recovered by 2011 (Figure 5). This information provides the operator with an idea of its latitude for changing rates in response, say, to sharp price reductions triggered by a competitor, all other parameters remaining equal.

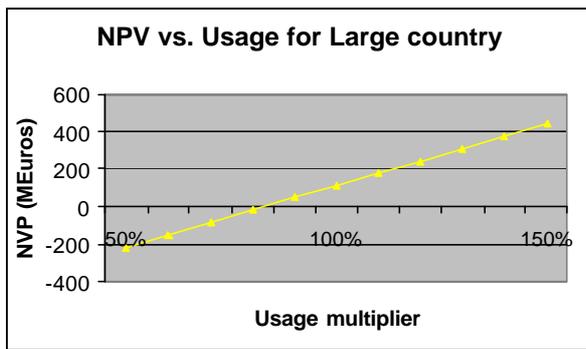


Figure 5: Influence of usage to the NPV for a operator-like MVNO in a large country

In the small country scenario, NPV is becoming null for a 50% reduction with respect to the nominal usage level (which is 20% greater than in the large country). The fact that it remains positive shows that the operator has significant room to manoeuvre in terms of usage and associated tariff level.

The nominal saturation levels for subscriber penetration are respectively 95% in the small country and 90% in the large country. Only the -50% variation is examined, since the subscriber saturation level cannot exceed 100%.

In the large country, if this saturation level is reduced to 50%, the NPV is negative (-114 MEuros), and it is zero for a 20% reduction, which means a level of 72% for the total mobile penetration (Figure 6). This information is good news for the operator, since overall mobile penetration already exceeds this critical point. Again, the parameter for overall penetration was modified with all other parameters remaining constant.

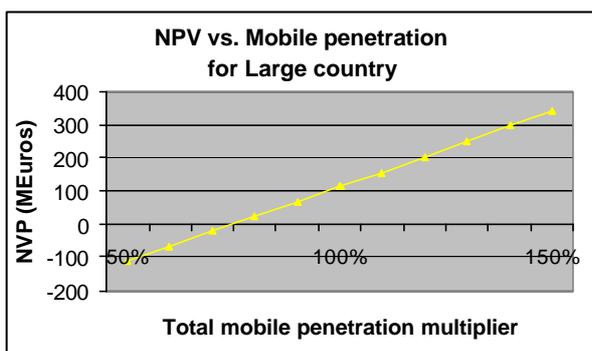


Figure 6: Influence of the mobile penetration to the MVNO's NPV

In the small country, we can't find a null NPV for overall mobile penetration of 50%. Here again, this level has been largely exceeded in the Nordic countries, hence there is no cause for concern over this parameter.

In the large country scenario, the 3G MVNO is assumed to have a 2% market share throughout the study period. However, the impacts of variations in both start and end market share is of great interest. The graphs show that the beginning and end market shares indeed affect NPV

and IRR. For the small country, only an initial position of more than 1% can lead to a profitable business. But this is probably the case for every company aiming to enter 3G market. On the other hand, a larger end market share can overcome this.

## V. CONCLUSIONS

The increasing, almost exponential growth of interest of companies, working or not in the mobile sector, entering this market is self-evident and many of them are looking for specific channels to start offering services. The channel of MVNO is either complement to service provision channel or to operator channel but it is still a way to take part to in this big game.

This paper is the first step in the assessment of the market conditions, the architectures and the potential for a profitable business case of a full MVNO aiming to operate in a large or small European country focused on either wide market or lucrative market segments.

In this analysis, which is based on assumptions described herein, the profitability of MVNO both in large and small countries has been presented through specific calculations. Furthermore, the two different business profiles associated with different plans for service provisions have been analysed. The profitability for all these cases has presented and acceptable for shareholders NVP and IRR figures have been calculated.

Acceptable business opportunities can be observed through these calculations in terms of forecasted and actual mobile penetration across Europe. Agreements with Mobile Network Operators (MNOs) for spectrum usage and interconnection give to MVNO enough space for business opportunities and acceptable profit margins. MVNO can still be an attractive opportunity for companies since both infrastructure costs (which can be high due to difficulties to obtain volume discounts) and interconnection costs are not too critical. Marketing and entry costs in general can be a burden for a potential MVNO but this can be overcome from a high brand firm or an already operating company. Although revenues from the provision of broadband services are missing from current MVNO business plans this could be another opportunity for the MVNO to expand its business in the future.

The work carried out will be continued in order to address issues such as different business profiles, strong service differentiation as well as risk analysis associated with different options.

European mobile operators and service providers interested in entering the 3G market can exploit this information but a wide audience of this report can be seen also foreseen since, for example, European 2G and 3G operators could become MVNOs on USA and vice versa. Therefore, in reality, the MVNO way to 3G games represents a profitable option for all involved parties.

## References

- [1] <http://www.ist-tonic.org/>
- [2] Virtual Mobile Services: Strategies for Fixed and Mobile Operators, April 2000, by OVUM.  
[www.ovum.com](http://www.ovum.com)
- [3] OFTEL Statement on Mobile Virtual Network Operators, September 1999.  
<http://www.oftel.gov.uk/competition/mvno1099.htm>
- [4] D. Katsianis et al, "The financial perspective of the mobile networks in Europe", IEEE, Personal Commun. Mag., Dec. 2001 Vol 8, No 6, pp 58-64
- [5] <http://www.telenor.no/fou/prosjekter/tera>