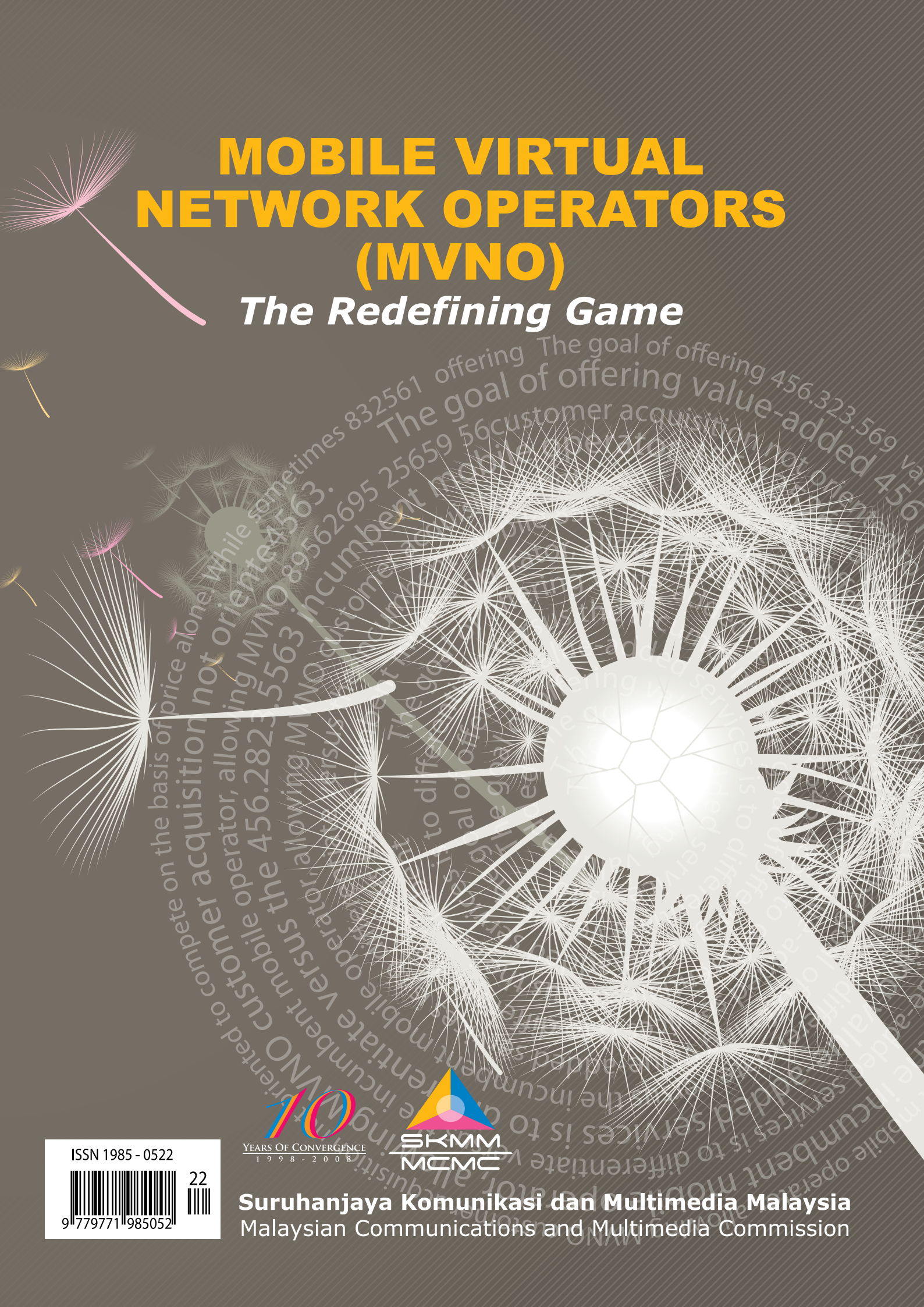
MOBILE VIRTUAL NETWORK OPERATORS (MVNO)

The Redefining Game



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10 YEARS OF CONVERGENCE 1998 - 2008

SKMM MCMC

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CONTENT

FOREWORD

The Malaysian Communications and Multimedia Commission (SKMM) is working on a number of special industry research reports planned for the year of 2008 and it is with both honour and great pleasure, I present to our readers the industry research report on *Mobile Virtual Network Operators (MVNOs) – The Redefining Game.*

The report features a brief overview on MVNOs industry including the development, growth and focus of MVNO in Malaysia and worldwide. There is a brief discussion on overall approaches of MVNO, namely discount MVNO; lifestyle MVNO; advertising-based MVNO and ethnic MVNO.

Furthermore, there is also a brief discussion on the impact of MVNO upon the Mobile Network Operators (MNOs) and the mobile market; its socio-economic benefits, including economic costs. The discussion also covers revenue resources, cost, roaming issues and pricing model in the MVNO market.

Plus, there are analysis and discussion on success and failure factors in the MVNO industry, including how far a MVNO model is sustainable depending on the value it offers to customers as well as its host Mobile Network Operator (MNO). The analysis covers a comparison of the MVNO companies worldwide.

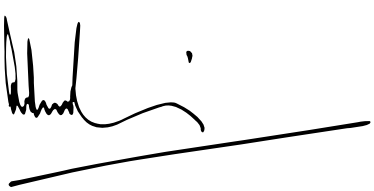
The analysis in the publication are based on various information sources such as internal information from the SKMM as well as external data and information purchased or obtained from other companies, including public sources of news, industry views, research reports and other database sources.

A soft copy of this report can be obtained from the SKMM website at:

http://www.skmm.gov.my/what_we_do/Research/industry_studies.asp

I trust this report will provide useful information to the readers and can serve to bring to light some perspectives to propel the communications and multimedia industry development in Malaysia. We look forward to hearing your feedback, which will help us improve our industry reports in the future. Please send your comments to webmaster@skmm.gov.my.

Thank you.



Datuk Dr. Halim Shafie
Chairman
Malaysian Communications and Multimedia Commission (SKMM)

EXECUTIVE SUMMARY

Mobile Virtual Network Operators (MVNOs) have gained a lot of foothold in the global mobile telecommunication industry and have even attracted much interest in Asia lately. MVNOs are basically resellers who do not own any network facilities, purchase airtime at wholesale rates from Mobile Network Operators (MNOs) and then resell wireless subscriptions to consumers through its own branding and other value added services. As widely observed, there appears to be three generic categories of MVNOs – resellers, enhanced service providers and full MVNOs, with each having a different mix of infrastructure and operational tasks depending on the breadth and depth of its relationship with its host network, the MNOs. However, MVNOs today go beyond being a simple reseller (first generation model). MVNOs now have taken the approach of being a full MVNO (second generation model) capable of providing a more compelling service mix to the end users than simply discount voice only.

Comparative studies have shown that, MVNOs also have four generic classification models based on their marketing strategies – discount MVNO, lifestyle MVNO, advertisement-based MVNO and ethnic MVNO. Each marketing strategy leverages on the niche market it targets and the service and product differentiation opportunities. While the MVNOs greatest strength is being able to identify and target markets in need of their services, their greatest weakness is the lack of economies of scale as compared to MNOs.

Nevertheless, with mobile technological advances, higher bandwidth and more applications that spur the demand for wireless usage, the MVNO model remains attractive for new players with potential entrants cutting across industries with majority non-telco based operators such as retailers, financial institutions and media companies. As several non-telco based MVNOs have demonstrated, United Kingdom (UK) leads success in MVNO business. There are many other industry drivers contributing to the development and proliferation of MVNOs which include market opportunity, technology evolution and competitive dynamics. In addition, to be a successful MVNO, service providers not only need a good business model, they have to have an appealing value proposition that is not only going to attract, but hold on to customers that are unique.

Although most MNOs have come to accept the existence of MVNOs in the market, there still stands the fact that MVNOs have increased the competitive market pressure in the industry, sometimes, in direct competition with the MNO market. Subsequently, there is increased risk of cannibalisation of the MVNO by the MNO, which usually has comparatively high control of the MVNO. It is interesting to note that on the upside, MVNOs do provide economic benefits to the MNOs as they appear to provide good opportunities such as increased subscriber base, moderate subscriber churn, and increased traffic depending on their agreement or business relationship with the MVNOs. In other words, the incumbent is positioned to benefit in terms of market penetration and expansion, better network utilisation, lower operational costs due to higher economies of scale and generation of additional revenues through wholesale volumes.

On the other hand, as the number of MVNO players increase, so do the risks involved. As estimated by analysts, it takes on average, USD25 million to USD50 million and two years to launch a MVNO[1]. Setting up an MVNO is almost a monumental task as each step up in its service delivery chain poses some entry barrier and launch risks. The MVNO's cost and pricing models are also important elements as they will determine if it would be a sustainably profitable entity. Consequently, not every MVNO that is launched is able to

[1] *"Entering the Wireless Market – What You Need to Know to Launch and Operate Your Own Wireless Business" by Ovum, 2006*

survive long enough to breakeven in terms of profit. MVNOs have mixed success across the world and there appears no one unique success formula. Key findings have shown that strong partnerships, leveraging on brand, wide distribution channel, a solid customer base, relevant value added services, good planning, ample access to capital and strong execution team are important elements for a winning MVNO model.

Even though there are barriers and risks involved in launching an MVNO, it is noteworthy that the number of MVNOs has grown steadily worldwide over the years, with United States (US), UK and countries in Europe leading the way. Industry analyst, Blycroft Publishing, estimates that there were 230 active MVNOs in 2006. By early 2007, according to consultancy firm, Takashi Mobile, there are 360 planned or operational MVNOs worldwide. Additionally, research by Informa Telecoms and Media estimated that subscriptions to MVNO will reach 150 million worldwide by 2013. In the US, Tracfone, Virgin Mobile, US and Boost Mobile are among the major players who have successfully adopted the MVNO business models. Evidently, UK has one of the biggest MVNO markets in the world with Virgin Mobile, UK being the first MVNO in the country and Europe and notably the most successful. The presence in Asia is also being felt lately with renewed interest beginning from 2006. To date, Hong Kong is the highest MVNO penetrated market in Asia with 720,000 customers representing 7.5% of Hong Kong's market penetration. Overall, MVNOs are expected to have increasingly significant impact in the telecommunications industry.

Meanwhile, in terms of regulation, different countries have differing approaches in their regulatory regime towards MVNO business. Industry trends indicate that a supportive regulatory environment is important for the developments of the MVNO industry. In fact, MVNOs in US and UK are observed thriving due to unregulated environment, where regulators take a non-interventionist, but "watchdog" or monitoring stance towards the voluntary MNO-MVNO relationships. However, markets like Hong Kong have MVNO-related regulation that requires 3G licences to open up to 30% of their network capacity to unaffiliated MVNOs while in Italy, there is strict prohibition towards MVNO entry.

Like many other countries, the Malaysia landscape shows readiness for MVNOs. Factors such as increasing mobile subscribers, high number of prepaid subscribers, diversified demographic structure such as different ethnic communities and so far non-intrusive regulatory regime are encouraging developments in the MVNO market in Malaysia. Recently, there are four pioneering MVNOs in Malaysia, namely Merchantrade Asia Sdn Bhd, REDtone International Bhd, TuneTalk Sdn Bhd and XOX.com Sdn Bhd. These open windows of opportunities for non-telco operators to add more mobile applications and services. It will be interesting to see how MVNO developments unfold and enhance the telecommunications landscape in Malaysia.

INTRODUCTION TO MOBILE VIRTUAL NETWORK OPERATORS (MVNOs)

There has been an exponential growth and focus on Mobile Virtual Networks Operators (MVNOs) in the telecommunications industry worldwide in a period just short of a decade. Many mobile markets have seen some activity in the MVNO space, with much renewed interest in this market in the last two years. However, where there are many MVNOs in a country, the new entrants invariably face a highly competitive marketplace.

DEFINING MVNOs

At present, there is no common and agreed definition on what constitutes an MVNO. Regulatory bodies around the world have come to adopt various definitions and different forms of regulatory intervention depending on the extent to which an MVNO relies on the facilities of the Mobile Network Operator (MNO). Generally, MVNOs are companies that do not own a licensed communication band, but resell wireless services under their own brand name, using the network of another Mobile Network Operator (MNO). A few examples of MVNO definitions are as follows:

Industry Definition of MVNO

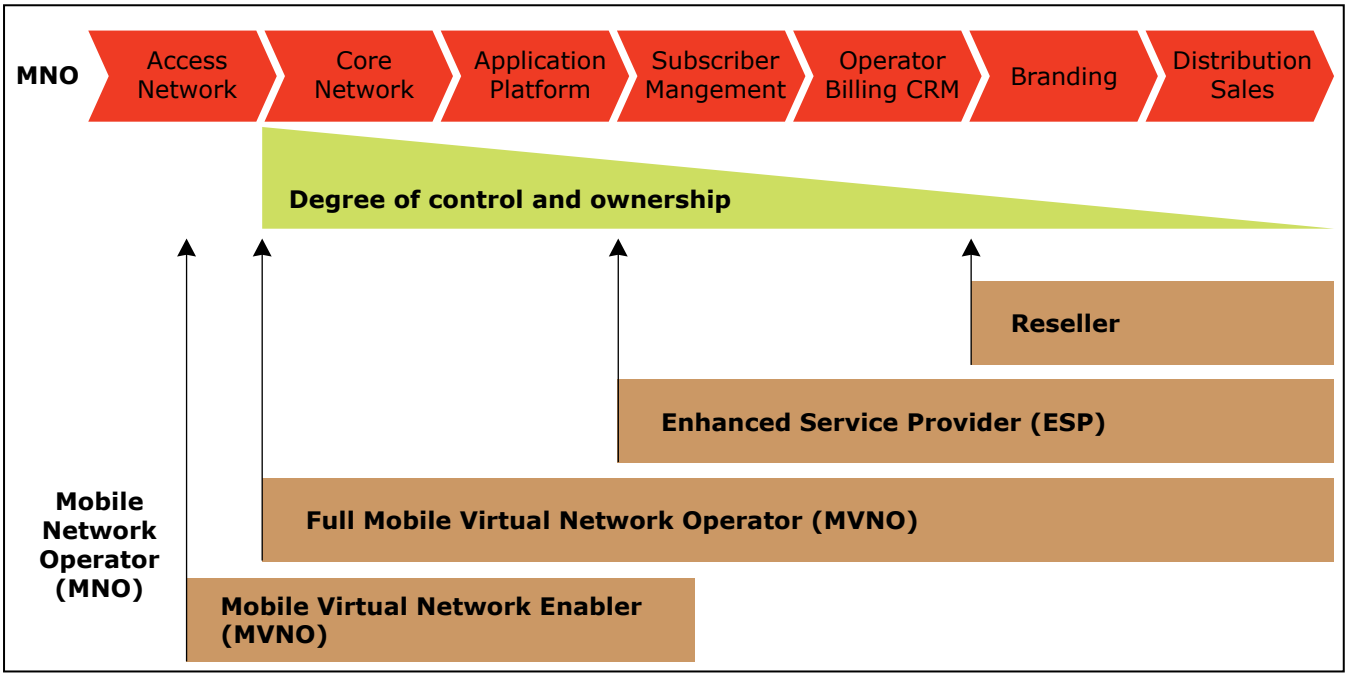
Source	MNVO Definition
Analysys Research	Have specific network capabilities of their own, such as their own number ranges, SIM cards or core network elements. A light MVNO has a little mobile network capability other than the management of Subscriber Identity Module (SIM) cards, while a heavy MVNO invests in various infrastructures. MVNO offers distinct mobile services, which appear to customers to be independent from the underlying host network.
Pyramid Research	Provides mobile voice and data services to end users through a subscription agreement, without having access to spectrum. MVNO negotiates to buy excess capacity for re-sale to customers through commercial agreements with licensed mobile network operators.
KPMG	Enhanced service provider that independently brands and markets its wireless service, usually targeted at specific market niches and supported by an existing customer base holding some affinity with the brand. Owns the customer but uses the telecom network and radio spectrum of a MNO.
Telecomspace.com	A Global System for Mobile (GSM) phenomenon where an operator or company does not own a licensed spectrum and generally without own networking infrastructure. MVNOs resell wireless services under their brand name and use regular telecom operator's network. MVNOs buy minutes of use from the licensed telecom operator and then resell minutes of usage to their customers.
Ovum Consulting	Resell air time and services bought from the licensed MNOs, adding in some features such as branding, alternative channels to market, billing and customised services.
UK Office of Communications (Ofcom)	Invest in some hardware allowing it to differentiate its offer to the customers and make it less dependent on the MNO's capacity. Has full control over the customer who will have to sign a contract with the provider and issue their own SIM cards.
US Federal Communications Commission (FCC)	Resellers offering service to consumers by purchasing airtime at wholesale rates from facilities-based providers and reselling it at retail prices.
Office of the Telecommunications Authority (OFTA), Hong Kong	Provides mobile telecommunications services to customers through interconnection with and access to the radiocommunications infrastructure of a MNO.
Malaysian Communications and Multimedia Commission (SKMM)	Organisation that does not have assignment of 3G spectrum but is capable of providing public cellular services to end user by accessing radio networks of one or more 3G spectrum holders.

Source: Various websites

DIFFERENT CATEGORIES OF MVNO

There is a wide range of MVNO models, from simple Reseller to Enhanced Service Providers (ESP) and even to full MVNOs. Even then, there is yet to be a sustainable winning formula, although there has been mixed success of MVNOs across countries.

MNO Position in the Mobile Value Chain



Source: Adapted from "Mobile Virtual Network Operator White Paper" by Nokia Siemens Networks, 2006

The appropriate business models in positioning, branding, marketing and partnership appeals as key factors for success. How far an MVNO has control and ownership over its business depends on the working relationship it establishes and builds with its MNO. In some cases, there is also another entity arising between the MVNO and MNO, which is usually a business model specialising in supporting the network-operator-side for the MVNO that is the services of the Mobile Virtual Network Enabler (MVNE)[2]. (Note: The discussions in the rest of this report focus on the MVNO model, although there is a brief introduction to the MVNE in a later section of the report).

In general, there are three categories of MVNOs, namely reseller, enhanced service providers and full MVNO. Each category has a different mix of network infrastructure and operational tasks in respective areas such as branding, ownership of SIM, network infrastructure including billing and customer care.

[2] *MVNE provides the technical architecture and may enter into a wholesale agreement with a host MNO to enable mobile service provision. MVNE does not directly provide services to mobile users. Instead, it acts as an enabler for any number of MVNOs Sourced from "Mobile Virtual Network Operator White Paper" by Nokia Siemens Network, 2006*

Categories of MVNO

Infrastructure and Operational Task	Full MVNO	Enhanced Service Providers	Reseller
SIM, National Destination Code (NDC)	Able to secure their own numbering range, offer own SIM card and have full flexibility on the design of the services and tariff structures.	Have the ability to secure their own numbering range, operate own Home Location Register (HLR) and offer SIM card with its own mobile network code.	Do not have own SIM card but still able to offer their own branded packages.
Network Infrastructure	Own or provide network facilities and network services such as towers, mobile switching centres, HLR and cellular mobile services.	Do not own or provide network facilities. Dependent on MNOs for network facilities and radio network; able to maintain some independence from MNOs as enhanced service providers are able to differentiate their products.	Rely on MNOs for access to the radio network and network facilities.
Billing and customer care	Carry out their customer care and billing in house.	Carry out their customer care and billing in house.	Carry out their customer care and billing in house.
Branding	Fully independent branding and customer ownership.	Independent branding, billing and high level of customer ownership.	Bundled branding and possible own billing.
Pricing	Own pricing	Own pricing, negotiation based	Own pricing, negotiation based
Licence*	* NFP (I) licence for network facilities * NSP (I) licence for network services * ASP licence to provide public cellular service to end users.	* NSP (I) to provide bandwidth services, cellular mobile services or mobile application services * ASP licence to provide public cellular services to end users.	* ASP licence for providing public cellular services.

** MVNO in Malaysian environment as per Guideline on Regulatory Framework for 3G Mobile Virtual Network Operators dated 16 February 2005*
Note: NFP (I) = Network Facilities Provider (Individual); NSP (I) = Network Service Provider (Individual); ASP (I) = Application Service Provider
Source: Various websites, Industry, SKMM

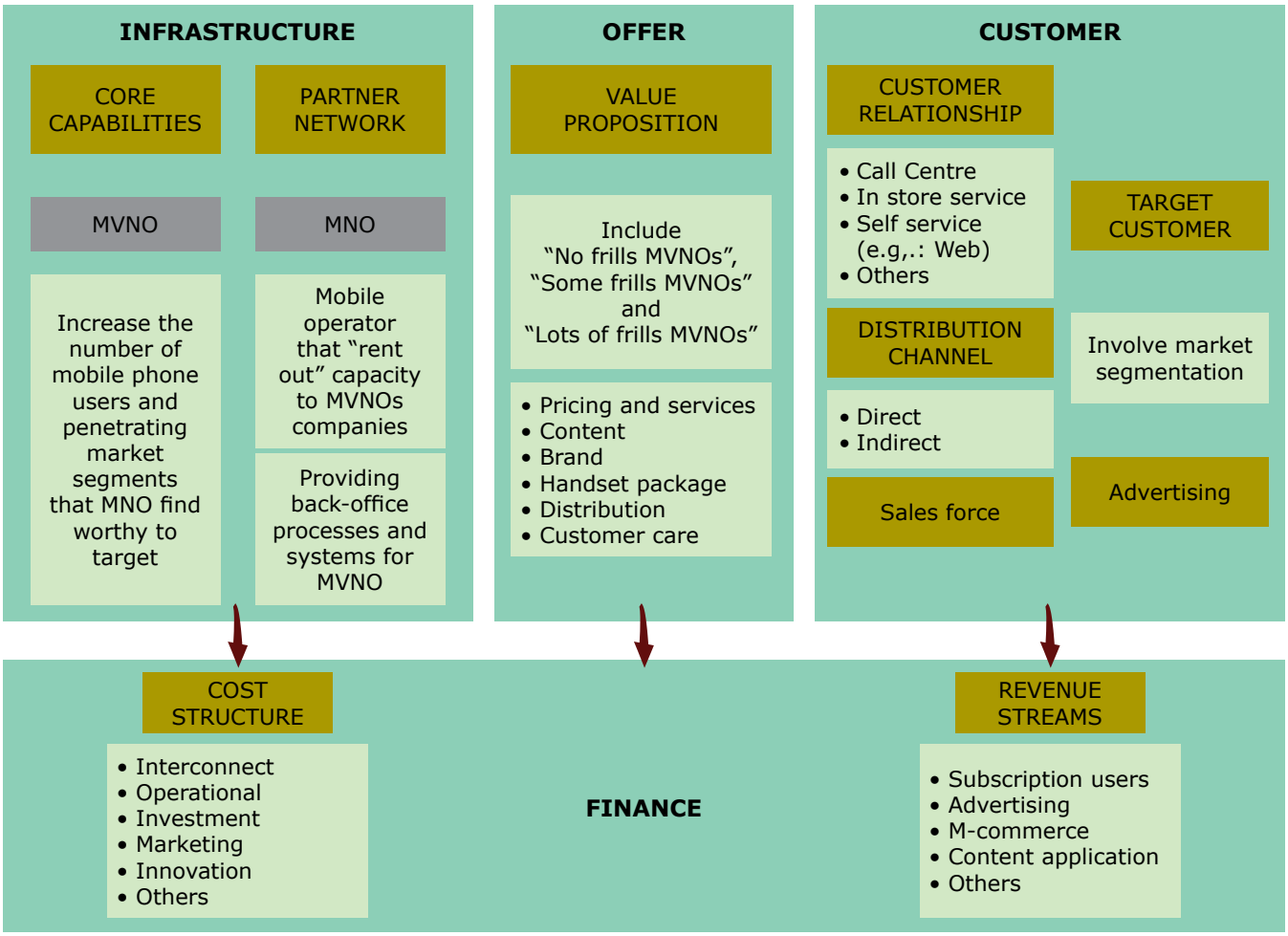
While MVNOs typically do not have their own infrastructure, some leading providers do deploy their own Mobile Switching Centers (MSC), and in some cases, even Service Control Points (SCP). Leading MVNOs deploy their own mobile Intelligent Network (IN) infrastructure in order to facilitate the means to offer value-added services. In this way, MNVOs can treat incumbent infrastructure such as radio equipment as a commodity, while the MVNO offers its own advanced and differentiated services based on exploitation of their own intelligent network infrastructure[3].

The goal of offering value-added services is to differentiate versus the incumbent mobile operator, allowing MVNO customer acquisition not oriented to compete on the basis of price alone. While sometimes offering Operational Support Systems (OSS) and business support systems for MVNOs, the incumbent mobile operators usually keep their own OSS/ Business Support System (BSS) processes and procedures separate and distinct from those of the MVNO.

All three MVNO, MNO (and Mobile Virtual Network (MVNE) where these occur) elements create a dynamic ecosystem structure that enables operational efficiency across different components providing support to the MVNO business.

[3] *http://www.mobilein.com/what_is_a_mvno.htm*

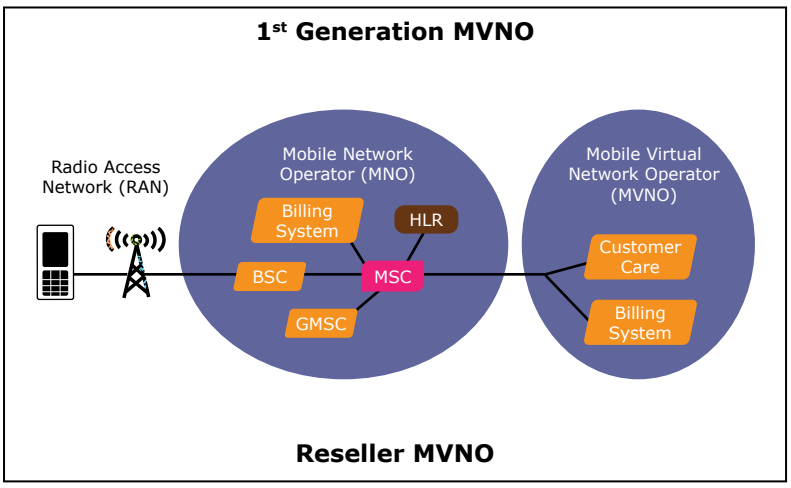
General Ecosystem for MVNO Services



Source: Adapted from various websites

MVNO EVOLUTION

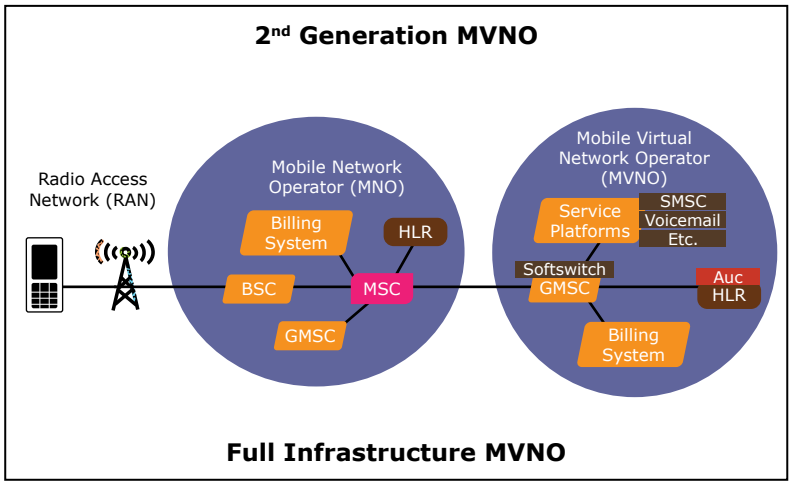
Over the years, the MVNO model itself has evolved, from the first generation model (reseller) to a second generation model or full infrastructure model. To date, the MVNO model scouts sophisticated approach towards consumers and potential target segments by providing compelling service mix to end users usually more than simply discount voice[4].



Source: "The HLR for MVNOs" by Blueslice Networks, 2008

First Generation MVNO
Reduce Capital Expenditure (CAPEX) and risk
Builds brand
Lead to price competition and niche specificity
Limited service creation capabilities and differentiation
Mostly rely on MNO's core network infrastructure and service platforms

[2] *"The HLR for MVNOs" by Blueslice Network, 2008*



Source: "The HLR for MVNOs" by Bluslice Networks, 2008

Second Generation MVNO
Decrease dependence on MNO network
Total subscriber ownership
Service creation and deployment agility
Harder for other resellers to enter market
MVNO service differentiation drives MNO success

CLASSIFICATION OF MVNO

Like its definition, there is no one classification for MVNOs. From an operator's viewpoint, there are generally four generic MVNO approaches based on its marketing strategies, namely discount MVNO, lifestyle MVNO, advertising-based MVNO and ethnic MVNO. As usually a basic goal of an MVNO is to appeal outside of the existing prevalent voice market, such MVNO strategies essentially target specific niche markets by taking advantage of service and product differentiation opportunities.

Discount MVNO

Discount MVNOs are relatively straightforward. It is based on lower prepaid or postpaid tariffs with basic voice and Short Message Service (SMS) services and is coupled with cheap cell phones and affordable pricing plans. In some markets, it can provide cut-price call rates to certain market segments. Most of the handsets offered are pretty basic, usually meant for those who just want a phone to make calls.

In a very competitive mobile market today, such opportunities to grow MVNO using this approach appears tough for sustainability. An example is Virgin Mobile in an earlier predominantly postpaid US mobile market which started off this way but has since evolved over time to include lifestyle features in combination with operational efficiencies.

Lifestyle MVNO

Lifestyle MVNOs operate by focusing on specific niche markets marked by demographics from younger users all the way to senior citizens. Handset lineups can therefore vary widely, as do services offered and pricing plans catering to what appeals in these respective market segments.

For example, in the US, MVNOs focusing on young adults are Helio and Boost Mobile offering games, music, videos and even mobile social networking such as MySpace application, while Disney Mobile and Kajeet are family oriented MVNOs. Great Call targets the elderly community offering simple handsets with larger than average buttons, 24-hour operators assistance and simple service plans. Basically, lifestyle MVNO market is not extremely price sensitive since the phones cater to the feature-hungry, not the value conscious.

Advertisement-based MVNO

A new trend in mobile phone content is the emergence of advertising on this communications platform. The advertisement-based MVNO offers free or subsidised mobile phone service in exchange for subscribers viewing a number of subscriber targeted advertisements. These MVNO's utilise a "one person per presentation" model where relevancy of any given advertisement is based on user demographics, questionnaires, and the like to build its revenues from advertising by providing a pre-set amount of free voice, text and content to the subscribers.

In other words, mobile advertising, when executed appropriately, is no longer advertising in its traditional sense; instead it effectively provides useful and relevant information to the subscriber in a personalised mode. An example of such a MVNO considered successful is, Blyk.

Ethnic MVNO

The ethnic MVNO approach can certainly be a good idea in a market where a huge foreign community base is present. For example, in US there is a substantial presence of Chinese community based there and this includes immigrants, students and business traders with ties in China. To bridge the telecommunications gap for Chinese speaking people residing in the US, in 2006, Red Pocket Mobile was launched as the first US telecom operator with Chinese language characters and customer service agents who speak Asian languages providing free international long distance calls known as "Asia is a local call".

According to research by Piran Partners, the subscribers of ethnic MVNOs can be the new immigrants to a country and also people with family roots in other countries with higher than average disposable income and a need to keep in touch with family back home. They represent a genuine source of new, high quality mobile phone customers, much needed in a competitive communications market so highly characterised by churn.

PROSPECTIVE MVNOS

As the mobile market matures over time resulting from increasing customer base and intense competition resulting in moderating margins, there is an increasing need for products and service differentiation to maintain market share or acquire new customers. This together with new mobile technological advances, such as higher bandwidth and more applications, the demand for the usage of wireless service will spell opportunities for not only existing service providers but also new entrants.

Hence, the MVNO business model remains an attractive one in these times, especially those with strong brands and extensive distribution channels. Even fixed network operators, and indeed non-telco based operators like retailers, financial institutions, media companies and automotive companies stand a relatively good chance in positioning itself as an MVNO, or working in partnership or alliance with an MVNO, by leveraging on their existing brands as well as optimising their distribution network.

Prospective MVNOs

Industries	Brand	Distribution Network	Product Diversification	Strategic Options	Examples and Potential Examples
Fixed Network Operator	• Partly global brands	• Established distribution channels • Existing customer base	• Fixed/mobile convergent • Fixed and mobile bundles	• Modest opportunity to expand into new businesses	• BT, UK • AAPT, Australia
Retailer	• National brands which are strong in retailing but not implicitly suited for brand differentiation	• National distribution network	• Retailing diversifies into financial service industry (discount cards, leasing purchases)	• National offerings in the mass market • No experience in marketing for existing target groups	• Tesco Mobile, UK • Sainsbury's One, UK • 7-Eleven Speak Out, US
Financial Institutions	• National/ global brands	• National distribution network	• Product portfolio focused on financial services	• Good vertical opportunities for special applications (e.g. mobile payment)	• Rabo Mobiel (Rabo Bank), Netherlands • KFTCI, Korea • Standard Chartered (Potential) • Bank of America (Potential)

Prospective MVNOs (continued)

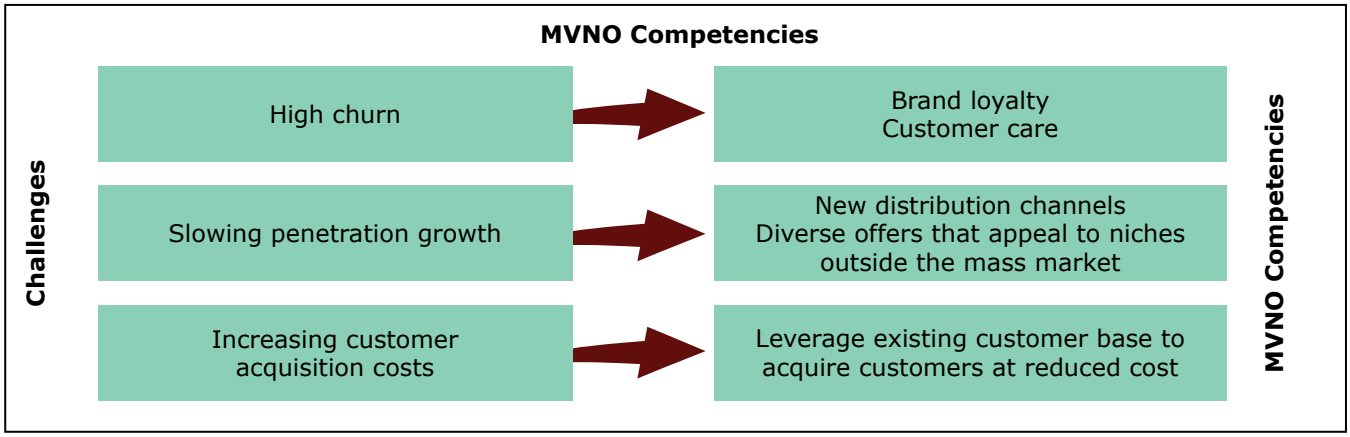
Industries	Brand	Distribution Network	Product Diversification	Strategic Options	Examples and Potential Examples
Media Companies	• Global brands	• Distribution through retailer outlets/direct sale	• Information and entertainment for classical and new media	• Global offerings for the mass market	• Mobile ESPN, US • Disney Mobile, US
Consumer Electronics	• Global brand for the mass and the niche market	• No or only few own Point Of Sales (POS) • Established distribution channels	• In general, part of a conglomerate with a diversified product portfolio	• Good global opportunities for offerings in the niche market	• Playstation (Potential) • Xbox (Potential)
Automotive	• Global brand	• Global distribution	• Car focused	• Global offerings for the mass market	• Toyota (Potential) • Nissan (Potential)

Source: "Port TV Mobile Virtual Network Operators" by Arthur D. Little Int. Inc, November 2001

WHY MVNOs?

MVNO as a wireless reseller or a cellular wholesaler purchasing wireless services from an underlying network operator at wholesale and, reselling these through their own distribution channels is not new. Indeed, MVNOs are deemed to have been around for as long as there have been cellular services as in the case of the US market.

More recent MVNO development sees these "resellers" also offering value added services that cater to specific niche markets as market saturation or maturity prompts product or services differentiation in a highly competitive mobile market to manage churn, accelerate slower subscriber take up and increasing customer acquisition cost faced by MNO, for example co-branding services. It has been generally proven that MVNOs to some extent have the competencies to meet the challenges usually faced by the MNOs.



Source: "MVNO Opportunities for Software and Information Companies", www.siia.net, March 2002

MVNO Drivers

Market Opportunity	Technology Evolution	Competitive Dynamics
USD10 billion to USD12 billion revenue projected by 2008 due to:	Maturing of 3G (high speed wireless networks) enabling media/entertainment offers	Slowing growth of the overall wireless market – thus making wholesale an attractive revenue source to the wireless carriers.
Opportunities for customer acquisition by non-wireless companies based on their existing core competencies such as content, brand extensions or efficient distribution channels.	Emerging integration technologies such as IMS (IP Multimedia Systems) which support integration of voice and data products such as video, music, and gaming making mobile a viable media content channel.	Consolidation of mega wireless carriers creating a need for differentiation.
Opportunities to capture non-consuming wireless customers through niche, targeted offerings.		Competitive pressure to continue to invest in improving the network.
Consumer market is mature and highly segmented, opportunities in niche/segmented markets require unique and integrated offerings.		
Mobile market is reaching saturation and the introduction of prepaid subscriptions has had a large impact.		
The focus in revenues is expected to shift from basic services to more content-based value-added services.		

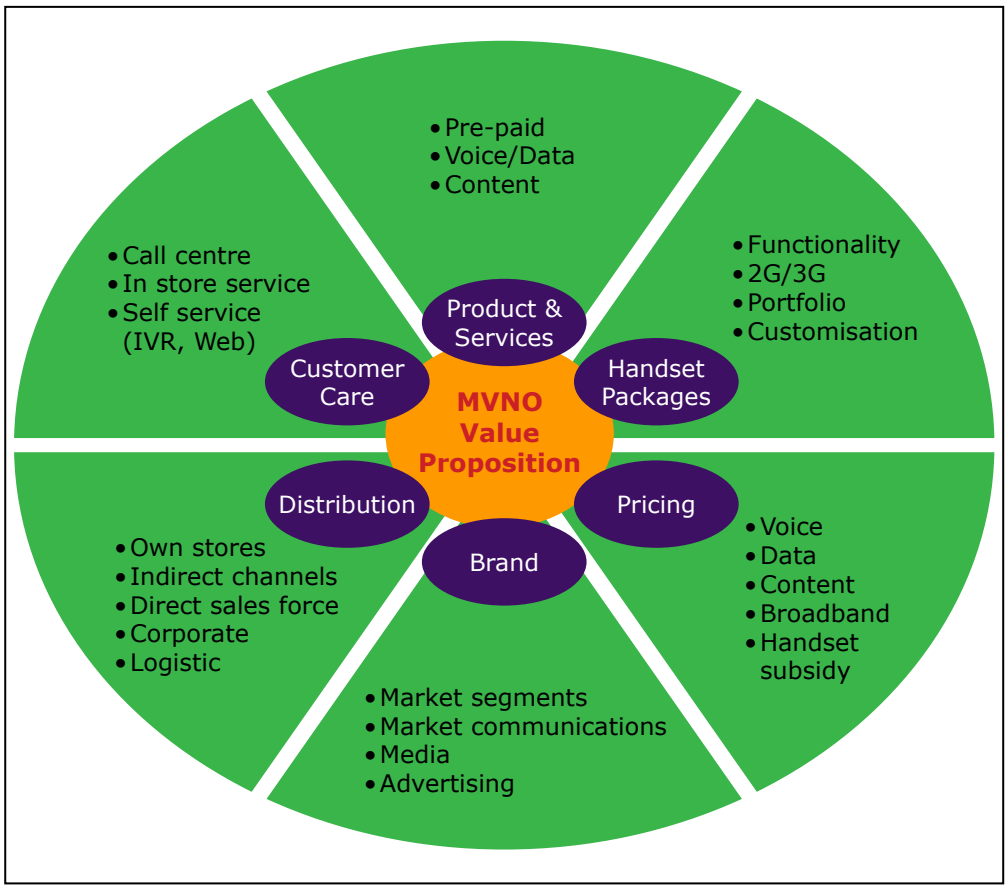
Source: "Mobile Virtual Network Operators: Converge in Action: Is an MVNO right for you?" by Deloitte, Technology, Media and Telecommunications, 2006; "Mobile Virtual Network Operators: Introducing the Business Concept of "One Does Not Need to Own a Cow to Milk a Cow", during seminar on Mobile Operator, Strategies and Games, November 2003

MVNOs Value Proposition

For end-users, value could be equated to the mobile experience derived from usage of the mobile services paid for. On the other hand, value to the service providers and network operators is related to revenue. Similarly, MVNOs base their strategies on creating values for their target market. They are also more inclined to consider consumer preference and identify consumer needs, to offer specific services with value-added perspectives.

According to Accenture, MVNOs base their strategies either on targeting a part of the marketplace that is currently unserved or underserved or, alternatively, by "hyper-serving" a segment of the population with an overwhelming value proposition that convinces consumers in that segment to switch from their current providers[6].

[6] *"Virtually Mobile" by Accenture, 2006*



Source: "The MVNO Opportunity" by Ericsson, September 2006

To be a successful MVNO, service providers not only need a good business model, they have to have an appealing value proposition that is going to attract and have customers holding on to that unique services or products offered. Given these inputs, the MVNO value proposition from end-users point of view can be divided into six segments which are customer care, product and services, handset packages, pricing, brand, and distribution. Each of these value propositions serves to differentiate the MVNO from the operators and at the same time still be coherent with each other, their segment needs, and spending disposition, when combined, producing the desired value proposition.

MVNO Value Proposition	
Customer care	- Dealing with customers in context. For example, agents of MVNO companies are trained to speak in the language of their base, responding to customers' complaint not with formalised platitudes but rather with colloquial expressions.
Product and Services	- MVNOs need to determine product is prepaid, postpaid or some combination of the two. - Identify voice services, data services and content that enrich customer's experience.
Handset Packages	- Understand the required device functionality and then construct a handset portfolio, identifying the proposed vendors
Distribution	- Represents a major cost. However, some MVNOs can derive significant cost advantages from their distribution strategy.
Brand	- Involves prospecting for potential subscribers, branding which positions and differentiates the MVNO, and use of the media to promote the brand.
Pricing	- Must differentiate the pricing; voice and data rates, content pricing and handset pricing.

Source: "Your Brand, Unplugged: A Strategic and Structured Approach to Launching an MVNO" by DiamondCluster International Inc., 2005

[7] *"Your Brand, Unplugged: A Strategic and Structured Approach to Launching an MVNO" by DiamondCluster International Inc., 2005*

IMPACT OF MVNOs

There is no doubt that the arrival of MVNOs will increase competition thus creating increasing market pressures. As MVNOs can provide both socio-economic benefits and economic costs to incumbents, MVNOs need to find the appropriate balance to moderate the possible incumbent loss of business or take advantage and turn them into opportunities. Findings have shown the following impact towards MNOs and the mobile market:

Impact of MVNOs to MNOs and the Mobile Market

Economic Benefits		Economic Costs	
Market Segments (Strategic)	Extending services to market segments that are not viable for the MNO e.g., niche market	**Market Share Cannibalisation (Strategic)**	In addition to losing traditionally postpaid customers to MVNOs, MNOs can also find themselves competing directly with MVNOs in the prepaid segment
Market Expansion (Market)	Expands market reach or brings more business in market segments where the MNO is already strong	**Price Erosion (Financial)**	MVNO can trigger price wars and undermine profitability of all players and driving the mobile market towards lower ARPU.
Network Utilisation (Operational)	Better network utilisation	**Branding Impact (Strategic)**	If MNO is linked to an MVNO that provides substandard quality service, the MNO will risk its own brand reputation by getting the blame from customers, rather than the MVNO for poor customer service.
Lower Operational Costs (Operational)	Most MVNOs do their own billing, customer service operations, collection and marketing and sales. This reduces cost burden on MNOs.	**Network Congestion (Operational)**	Though MVNO can increase MNOs network utilisation, it can also cause serious network congestion problem which leads to reductions in service quality.
Increased Profits (Financial)	Generates additional revenues through high wholesale volumes and/or through participation from premium price	**Increased Churn (Market)**	The increased number of available competitive alternatives may motivate customers to change their respective mobile service providers more frequently.
		Lower ARPU (Financial)	MVNOs promote prepaid plans that generate much lower ARPU where MNOs are forced to offer their own low-ARPU

Source: "Mobile Virtual Network Operators: Blessing or Curse? An Economic Evaluation of the MVNO Relationship with Mobile Network Operators" by NERA, 2006; "Mobile Virtual Network Operators" by Arthur D. Little Int. Inc, 2001

Minimising Cannibalisation Risk

As MNOs may, at some point in time during the development of a MVNO, see the MVNO as a threat to their business, there is inherent risk of MVNO cannibalising. To avoid such development, and to sustain itself in the business, it has been reported that some MVNOs have undertaken different strategies to protect themselves as follows:

1. Expand the business to a substantial size that the MVNO is able to compete with the other significant mobile providers. An example could be Virgin Mobile whose business has grown significant in size in a relatively short period of time that enables it to survive in a competitive industry.

2. The other strategy is to extend operations into a market that is small and difficult enough to dissuade the other operators from having interest to pursue the MVNO.

3. Alternatively, there is the "surrender" strategy whereby MVNOs are able to make a significant profit for themselves by expanding the business substantially enough to make it so lucrative for other carriers to be interested in buying it over.

MVNO LAUNCH RISKS AND ENTRY BARRIERS

The launch and operation of an MVNO require:
a. a wholesale agreement with an MNO;
b. start-up capital; and
c. capital to cover operational expenditures and consumer acquisition costs.

Industry estimates are that, it takes on average USD25 million to USD50 million and two years to launch an MVNO[8]. Despite realising the potential for success, setting up an MVNO is relatively labour intensive and a massive task due to entry barriers that need to be facilitated and rather high "launch" risks as it is legendary that not all MVNOs succeed in their businesses. Furthermore, an MVNO must manage a wide array of responsibilities and relationships as it moves through the service delivery chain. For example, critical to the launch is the negotiation of wholesale agreement. Further to that, if an MVNO manages its own business, it has to purchase a customer relationship software application, a data platform and billing software[9] which are all elements in the service delivery chain. Each of the steps in the service delivery chain is linked with potential obstacles and partnership dependencies that could derail the MVNO's launch plan. A summary of the launch risks and entry barriers associated with each step in the service delivery value chain is shown in the table below:

MVNO Launch Risks and Entry Barriers in the Service Delivery Value Chain

	End-user	Launch Risks	Entry Barriers
Service Delivery Chain	Brand and distribution	• Brand design and cost effective launch • Selection and negotiation with distribution channels	• Lack of wireless distribution skills/ expertise • Brand building investments • High distribution costs or lack of capillarity
	Offer development	• Targeted and attractive offer design • Targeted and profitable pricing plan design • Selection and negotiation with key Content and Application (C&A) providers/partners	• Lack of wireless offer skills/expertise • High offer development costs • Lack of scale to negotiate with Certification and Accreditation (C&A) providers/partners
	Handsets	• Selection and negotiation with handset Original Equipment Manufacturers (OEMs) • Customisation handsets • Certification of handsets with MNO	• Lack of handset/skills expertise • High handset subsidies • Low volume of handsets to negotiate with OEMs
	Mobile data platform	• Selection and negotiation with mobile data platform providers • System integration between mobile data platforms and back-office systems	• Lack of mobile data skills/expertise • High integration costs • Lack of scale to negotiate with mobile data platform providers
	Back-office processes and systems	• Selection and negotiation with back-office providers/MVNEs • Management and system integration of multiple providers	• Lack of back-office skills/expertise • High integration costs • Lack of scale to negotiate with back-office providers/MVNEs
	Network	• Selection and negotiation with MNOs • System integration with MNO	• Lack of wireless network skills/ expertise • Lack of scale to negotiate with MNO

Source: "MVNO 3.0: How a New Breed of Wireless Providers will Bring Strong Brands in the MVNO Space" by Diamond Management and Technology Consultants, 2006

[8] *"Entering the Wireless Market – What You Need to Know to Launch and Operate Your Own Wireless Business" by Ovum, 2006.*
[9] *"Mobile Virtual Network Operators (MVNOs) in Israel: Economic Assessment and Policy Recommendation" by NERA Economic Consulting, August 2007*

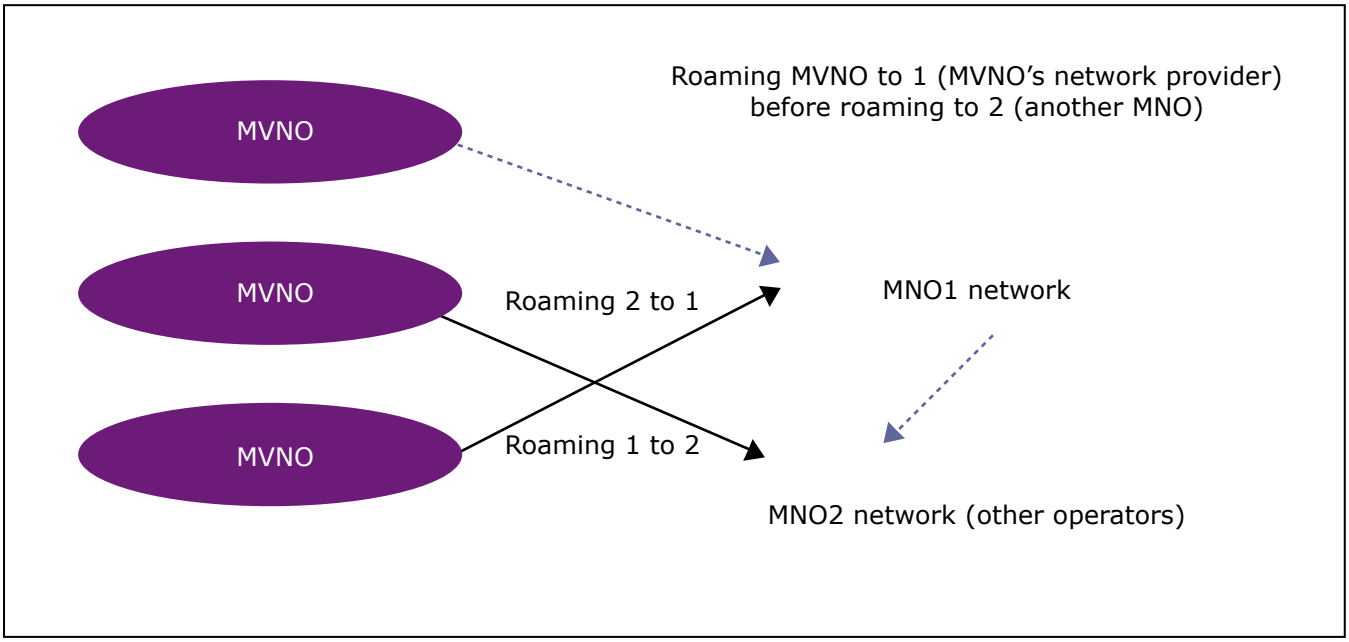
MVNO REVENUES, COST AND PRICING MODEL

Revenues

For an MVNO, the main source of revenue is usually from its customers where the customers pay for call connection and services. However, a business dependent on voice only is not viable enough today to obtain revenue margins. As an example, MVNOs which are resellers that resell voice plans usually obtains low-revenue margin proposition, generally in single-digits. Making money off voice minutes will be a persistent issue due to price erosion. Encouragingly MVNOs are able to improve margins in the range of 15% to 17% by selling value added data or content application services. Hence, in order to succeed by developing significant volume, an MVNO need to be able to also source other key revenue elements such as advertising or m-commerce on top of providing innovative value added data services. Such combinations or packages are unique sources of income that the MVNO can and is able to control totally[10].

Costs

Cost is associated with roaming issues. Roaming allows customers from one mobile operator (MNO or MVNO) to access the network of other operators (MNOs). Roaming between MNOs is usual in the sense that customers of MNO1 roams to the network of MNO2, and some customers of MNO2 roams to the network of MNO1.



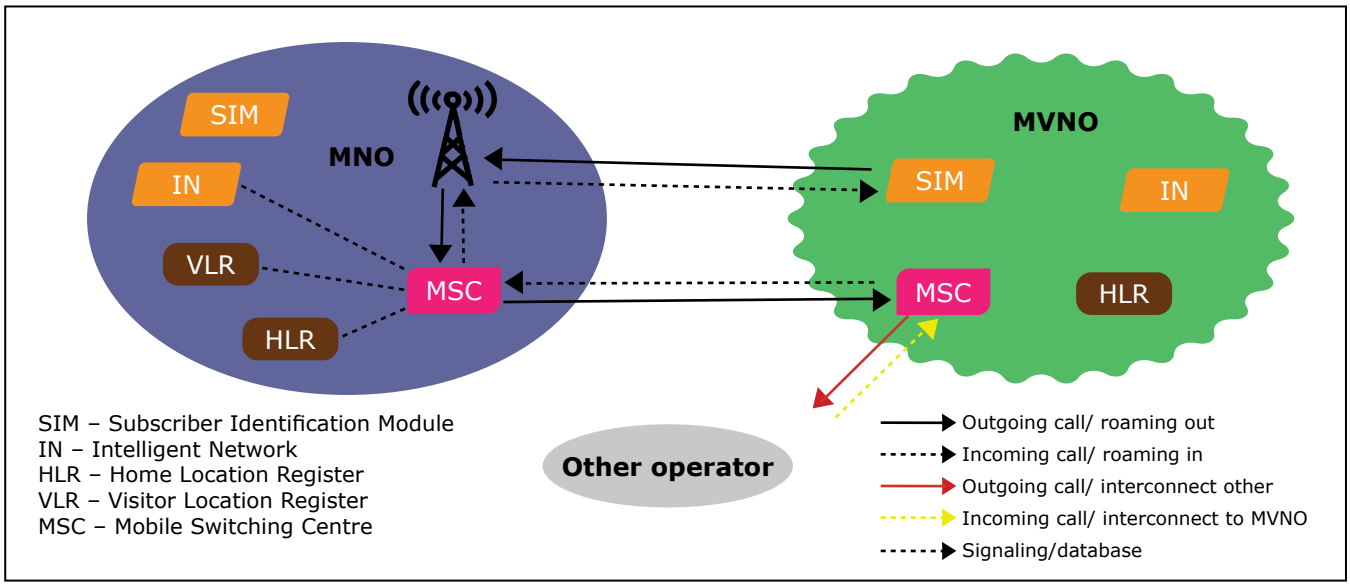
Source: Adapted from "Option Pricing of Mobile Virtual Network Operators" by Telektronikk Vol. 4, 2001

The situation is different for MVNO as it does not own its own network, thus no customers can roam directly to other MNOs or MVNOs. However, all customers of the MVNO have to roam to the network of the supporting MNO before roaming to other operators.

Consequently, MVNO pays for interconnection cost to MNO for both outgoing and incoming calls and interconnection payments to other operators for completing outgoing calls[11]. Additionally, MVNOs have other key cost elements such as operational, investment marketing and innovation costs to manage.

[10 & 11] *"The Mobile Virtual Network Operator Concept: Truth and Myths" by Telektronikk Vol. 4, 2001*

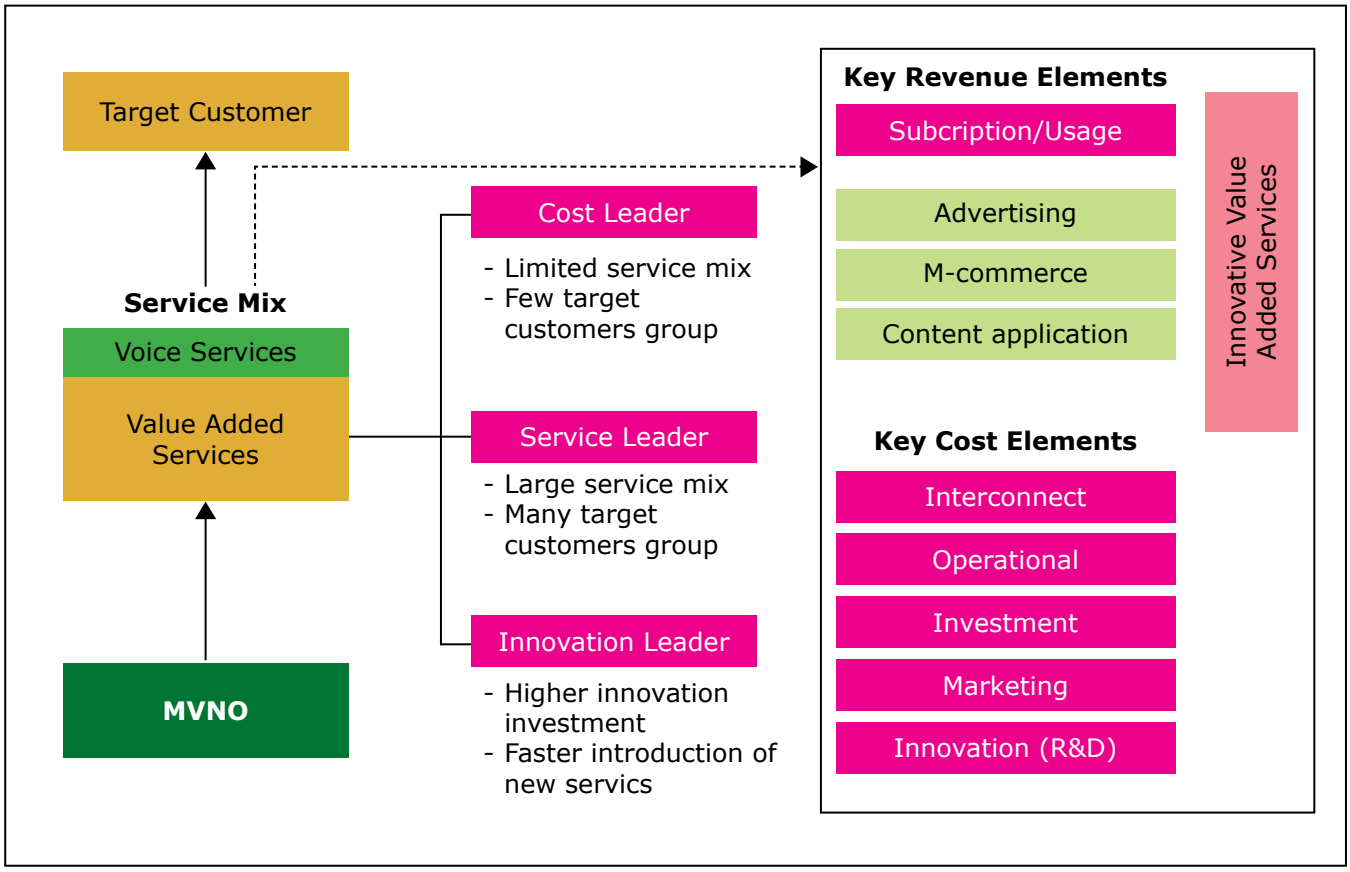
MVNO's Customers Making and Receiving Calls Architecture



Source: Adapted from "How do the Price Agreements Affect the Business Case of an MVNO?" by Telektronikk Vol. 4, 2001

Summary of the revenue and cost elements for a MVNO is as follows:

Revenue and Cost Elements for an MVNO



Source: Adapted from "Mobile Virtual Network Operators: Introducing the Business Concept of "One Doesn't Need to Own a Cow to Milk a Cow" during Seminar on Mobile Operators, Strategies and Games, November 2003

Pricing

Pricing is an important element in the communications services business. For the MVNO, the right pricing can tip the balance enabling the MVNO to become a profitable entity. On the other hand, the adverse effect of poor pricing can incur fatality. A win-win situation in price negotiations between the MNO and the MVNO is desirable for sustained opportunities offering enhanced returns all around, both in the short and the long term. Striking the balance with a view of a win-win formula would offer MNOs the benefits that MVNO can offer to its return on business investments, and for the MVNOs to invest for anticipated returns, which one or the other would not obtain without this mutually beneficial relationship in the first place. In short, having a share of the bigger pie goes a long way for derivation of necessarily sustainable returns on investments.

Our findings have shown that there are a number of different tariff models that can be applied by MVNOs on pricing strategy. The provision of tariff should also reflect the nature of the MVNOs, whether it is a pure reseller or a full MVNO.

There are two possible general tariff model options between MVNOs and MNOs either with or without regulatory interference, which is the generic models of retail minus and cost plus. As the dynamics of the details in such pricing models cannot be adequately touched in this report, suffice to note here that the basics of such costing models are as follows:

Tariff Models		
Determined by MNO	• Tariff model "Retail minus" • Retail price – Negotiated price	• Low MVNO margins • Discourage price competition • Defend MNOs position and interest
Determined by the Regulator	• Tariff model "Cost plus" • Cost price + agreed premium/ margin	• Higher margins for MVNOs • Freedom to compete on price

Source: Adapted from "MVNOs in the Middle East: Threat or Opportunity?" by Delta Partners, July 2007

UNDERSTANDING THE SUCCESS AND FAILURE OF MVNO

MVNOs are observed to face a series of operating challenges in the diverse markets in which they are implemented. The success and failure of MVNOs appear dependent on a mix of factors. Although there appears high launch risk for MVNOs worldwide, successful ones do exhibit sustained business success, and new MVNOs have invariably continued to enter the market.

Nevertheless, how far an MVNO model is truly sustainable depends on the value it offers to customers as well as its host MNO. Several MVNOs like Virgin Mobile and Boost Mobile in US have demonstrated ability to outlive others in a competitive landscape due to appropriate business model capitalising on their strengths.

Success Factors

MVNO's success is built, in part, by leveraging on the brand, distribution channel, a solid customer base and an offer which includes content, platforms and infrastructure. To succeed, according to Virgin Mobile, MVNOs need to execute the following:

1. Target customers that most carriers ignore like low-credit, prepaid customers that Virgin Mobile and Tracfone in US focus on;
2. Launch a differentiated product;
3. Build cheap platforms like simple phones;
4. Focus on crazy retail like selling big national retail chains from day one;
5. Acquire customer cheaply; and
6. Focus on the right metrics: Revenue per megabyte or per minute.

Case Study: Virgin Mobile, US

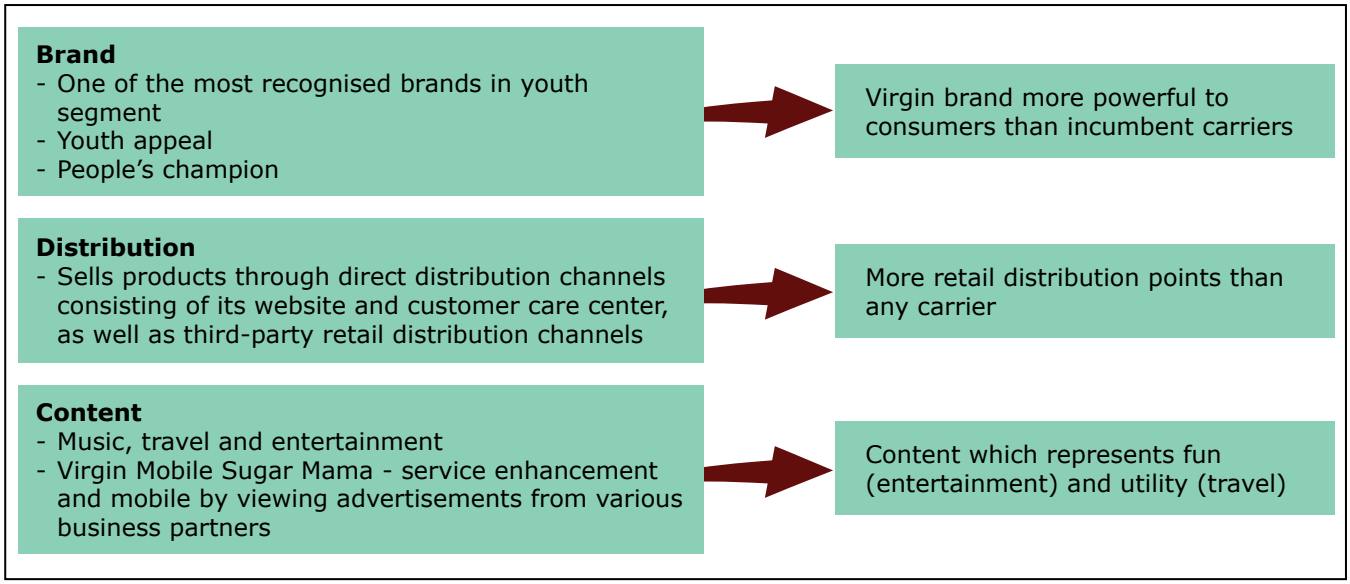
Virgin Mobile, US jointly owned by Sprint Nextel and Virgin Mobile Holdings, PLC was launched in 2002. By 2007, the company owned 5.1 million customers which is about 10% of Sprint's customers. Virgin's strong branding, Virgin Mobile utilised the parent company's existing products and services such as travel, music and banking to represent its content.

Developments of Virgin Mobile

Month/Year	Market Events
July 2002	Virgin Mobile US launched
November 2003	One million customers making it the fastest US wireless operator to hit this mark
March 2004	A top 10 US wireless provider
January 2006 to December 2006	2006 Adjusted EBITDA of USD47.9 million
August 2006	J.D. Power and Associates highest prepaid customer satisfaction
December 2006	Exceeds USD1 billion in annual revenues
August 2007	Second year running, J.D. Power and Associates highest prepaid customer satisfaction
October 2007	Virgin Mobile listed in NYSE as "VM"
December 2007	5.1 million customers
January 2007 – December 2007	Financial Year 2007 Adjusted EBITDA of USD95 – USD100 million

Note: EBITDA is Earning Before Interest, Taxes, Depreciation and Amortisation
Source: Adapted from "Technology, Telcom and Internet Conference 2008" by Virgin Mobile, February 2008

Virgin's Strategic Assets Include a Strong Brand, Channel and Relevant Content.



Source: "MVNO Opportunities for Software and Information Companies", www.siia.net, March 2002

Virgin Mobile MVNO

MVNO Business Model	
Network	- Sprint contrast to 2027 - Near-owner economics with limited capex - Access to current/future technologies - Nationwide
Infrastructure	- MVNO-heavy approach - Own the customer experience - Real-time billing/pricing/promotions
Brand	- World class youth oriented brand - Leverage over USD350 million in global annual spend - Lower customer acquisition costs - Brand licence to 2027
Value Proposition	- 49% of new customers are over the age of 34 - 63% are employed - 88% pay for some or all of their services - Customer race/ethnicity mirrors US population, except Hispanics
Sustainable Competitive Advantage	- Leading provider in high-growth, no-contract market • Broad National Appeal - Resilient MVNO business model • Low fixed cost structure • Ability to compete in varying price/economics environment • Strong cash flow management - Track record of consumer-driven innovation - Strong Virgin brand equity - Primier national retail distribution - Highest customer satisfaction in the prepaid industry

Source: Adapted from "Technology, Telcom and Internet Conference 2008" by Virgin Mobile, February 2008

Factors to Avoid

By the looks of the numbers of MVNOs coming into the worldwide market, there has not been a slow down in the developments and progress of MVNO industry overall. Nevertheless, there are factors to avoid for MVNOs. Our findings identified that a basic lack of customer base reduces the success of MVNO to stay competitive in a market.

Finding the right MNO partnership can also make or break an MVNO company. Virgin Mobile considers the following to be badly conceived factors[12]:

1. MVNOs target customers that carriers themselves are finding it hard to get;
2. Launch of a not-very-distinctive product proposition that focuses on all the same things that carriers themselves are offering;
3. Builds expensive new product platforms with loads of capex and opex;
4. Ignores basic retailing such as big media launching with no or little store availability;
5. Acquires customer expensively; and
6. Gets distracted by the "high" ARPU that people will spend a vast amount of money with your service.

[12] *"Amol Sarva: How to Make an MVNO Work" by Sillicon Alley Insider, October 2007*

Interestingly, amply funded or well-branded startups like Mobile ESPN, Disney Mobile and Amp'd have not sustained business for more than 3 years. Each has incurred some of the above factors. A summary of more factors to avoid is in Appendix 1.

Overall, the changing landscape of the telecommunication industry poses challenges to operators, especially later start-ups in the MVNO industry. Some realities in today's market are as follows[13]:

1. As competition in the wireless industry intensifies and market gets more saturated, innovation for product differentiation may become scarce;

2. Subscriber acquisition can be already high, fuelled by cheaper available handsets in market other that those MVNO can provide;

3. Strong brand competition no longer guarantees success. However, affinity by a group of customer base to a particular brand does exist. Monetising brands may not be as simple as it looks, for example the MVNOs, Mobile ESPN and Disney Mobile; and

4. The youth market is generally lacking purchasing power and premium content approach is elusive. To them paying for content is unnecessary when the same content is obtainable at no additional cost from other channels like broadband or television.

While successful MVNOs like Virgin Mobile or Tesco Mobile are able to sustain their businesses for a long period in the industry, replicating their business model may be elusive for others due to many differences such as timing of launch, appetite of consumers or contextual challenges.

Overall, there are no shortcuts to success. Rather ,there is much required excellent ground work, solid planning, and ample access to capital, good communication skills as well as a strong management team that is sensitive to market and consumer behaviour changes and is nimble minded enough to be proactive or reactive accordingly.

GLOBAL AND REGIONAL PERSPECTIVE OF MVNO INDUSTRY

Global Current and Expected Growth

Of late, the numbers of MVNOs are growing steadily worldwide especially with more assignments of third generation mobile licences. Many operators have articulated keen interest to enter this market, led by countries like Netherlands, Belgium, Germany, UK, Sweden and US.

Number of MVNOs

In 2005, there were approximately 200 planned or operational MVNOs worldwide[14]. By June 2006, Blycroft Publishing estimated 230 active MVNOs[15]. According to consultancy firm Takashi Mobile, by early 2007 there were approximately 360 planned or operational MVNOs worldwide.

[13] *"The Retske Report: New Strategy for Winning, Surrender", www.prepaid-press.com, May 2006*
[14] *"Mobile Virtual Network Operators (MVNOs) (Special Reference to Regulatory Environments)" insert-research paper submitted to the University of Manchester, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1087262*
[15] *http://www.mvno.eu*

As of 2006, the spread of numbers in MVNO relationships total 345 in wholesale relationships, 189 MVNO and 156 ESPs. Note that these are only our totals based on the selected countries cited in the table below to obtain a flavour of the MVNO market scenario worldwide:

Number of MVNOs in Selected Countries*

Country	Wholesale Relationships**	MVNOs***	ESPs****
Australia	29	1	28
Austria	3	1	2
Belgium	29	3	26
Canada	6	6	0
Denmark	14	4	10
Estonia	3	2	1
Finland	10	5	5
France	13	9	4
Germany	32	13	19
Hong Kong	6	0	6
Ireland	4	3	1
Latvia	1	0	1
Liechtenstein	1	1	0
Lithuania	2	2	0
Luxemborg	1	1	0
Malaysia	**2**	**2**	**0**
The Netherlands	36	6	30
New Zealand	1	1	0
Norway	13	12	1
Philippines	1	1	0
Poland	5	3	2
Portugal	3	3	0
Russia	2	2	0
Singapore	1	1	0
Slovenia	2	1	1
South Africa	1	1	0
Spain	4-5	3-4	1
Sweden	23	20	3
Switzerland	5	3	2
Taiwan	2	2	0
Ukraine	2	2	0
United Kingdom	27	24	3
United States	60	50	10
TOTAL	**345**	**189**	**156**

** All figures as of January 2006*
*** Wholesale Relationships - Service providers that purchase wholesale mobile minutes from a network operators and resell to end-users*
**** MVNOs - Mobile Service Providers having their own switching infrastructure*
***** ESP – "Enchanced" Mobile Service providers having more branded customer interfaces*
Source: "Incentives to License Virtual Mobile Network Operators (MVNOs)", http://web.si.umich.ed; www.takashimobile.com/mvno.html

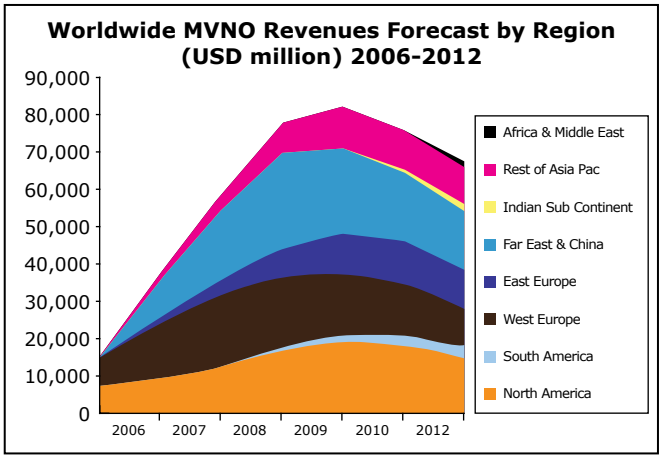
Number of MVNO Subscriptions

While MVNO business models face claims of difficulty in sustainability, studies by Informa Telecoms & Media reveal the overall global performance of MVNOs to have improved with an increase of 23% for a total MVNO subscription at the end of 2007 compared with the end of 2006. These improvements come as the Western Europe MVNO market stabilised with many of those MVNOs launched during the latter part of 2005 and 2006 maturing and experiencing sustainability over 2007[16].

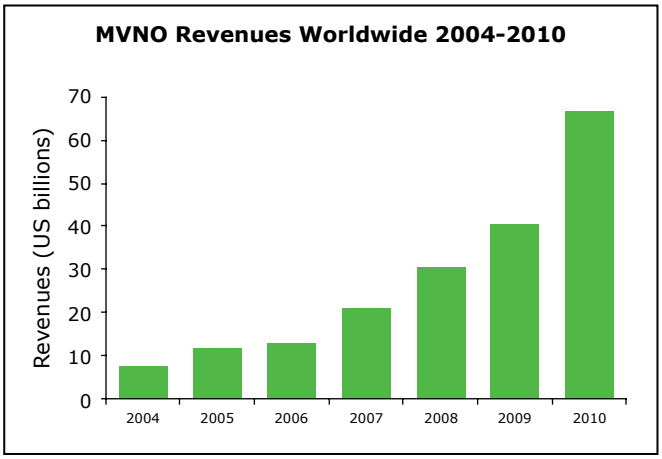
Additionally, subscriptions to MVNO services will reach 150 million worldwide by 2013 with 58% coming from outside Western Europe. This will represent 3% of the total global mobile subscriptions according to new research from Informa Telecoms & Media. Juniper Research forecasted subscribers to MVNOs at around 93 million in 2006 globally to 352 million by 2012. New consumers are expected to continue to be hungry for low-cost voice services (USD42 billion by 2012) but they are also increasingly looking for mobile entertainment, such as music and games.

MVNO Revenues

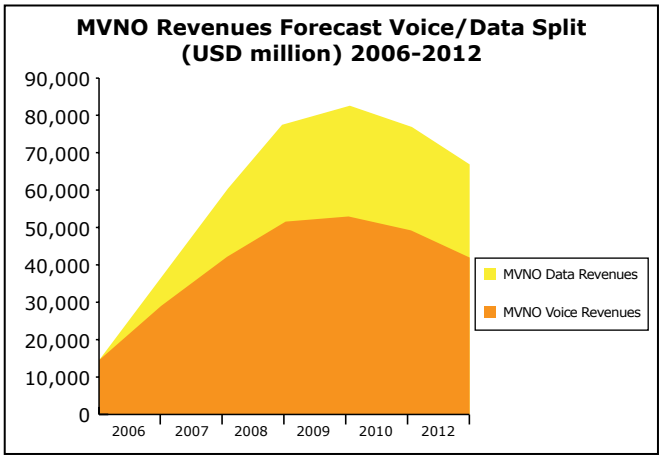
Worldwide MVNO revenue on the other hand, is expected to post steady growth. IN-Stat forecasted revenue for MVNO worldwide at nearly USD40 billion in 2009 and more than USD60 billion by the year 2010. On a similar note, Juniper Research predicted revenues for MVNOs to increase from USD15.4 billion in 2006 to USD67.4 billion by 2012. Of this, USD42 billion (62.3%) will be from voice services, with the remainder being accounted for by mobile data services, mainly music and games.



Source: Juniper Research Limited



Source: IN-Stat



Source: Juniper Research Limited

Summary of Forecasts

MVNO Service Subcription Forecast		
Source		**2013**
Informa Telecoms & Media		150 million global subscribers
	2006	**2012**
Juniper Research	93 million global subscribers	352 million global subscribers
		2012
Pyramid Research		150 million subscribers

[16] *"Global and Regional MVNO Market Development" by Informa Telecoms & Media, July 2008*

Summary of Forecasts (continued)

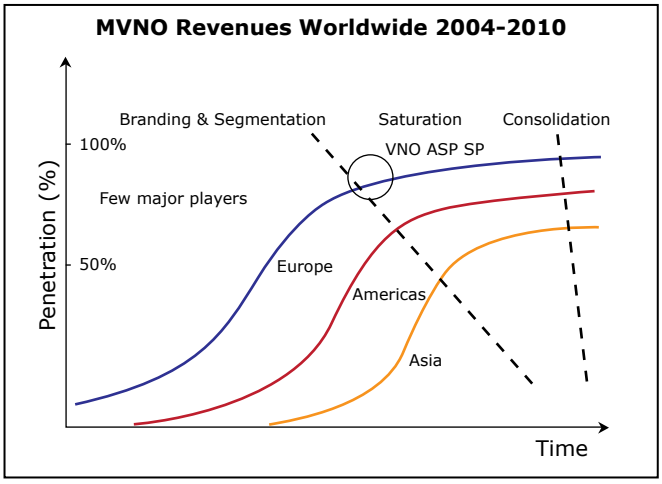
MVNO Revenue Forecast		
Source	**2009**	**2010**
IN-Stat	USD40 billion	USD60 billion
	2006	**2012**
Juniper Research	USD15.4 billion	USD67.4 billion
		2012
Pyramid Research		USD30 billion

In conclusion, most analysts expect MVNOs subscriptions and revenues to be on uptrend in the coming years, albeit in varying degrees of growth in various markets.

Global Market Readiness for MVNOs

The mobile telecommunication industry is buoyed by the relatively fast changing developments and even paradigm shifts. Trends that indicate the likelihood of market readiness for MVNOs, thereby propelling or prompting MVNOs businesses are as follows:

a. Mobile markets are getting saturated.
   Over the past 20 years, the mobile markets are reaching or have reached saturation or maturity, especially in voice services, mostly in developed countries. Thus, these are poised for data services take-up such as MVNOs which can sustain customer loyalty and reduce churn or to increase differentiation;
b. The mobile telecommunication industry is moving towards 3G. 3G provides opportunities for existing MVNOs to increase their data revenues;
c. Convergence emerging in cross industry products and services in the wireless space;
d. Declining ARPU;
e. Increasing subscriber acquisition cost; and
f. The need for segmentation increases opportunities.



Source: Adapted from "Mobile Virtual Network Operators and Enablers in Challenging Market Environment – Market Assessment and Study" by Logan Orviss International Deutchland GmbH

Regional MVNOs Trends

The marketplace saw the appearance of many leading MVNOs with various MVNOs business models especially in brand-led, niche-focused MVNOs. Most successful MVNOs have shown the mobile industry how to capitalise on niche markets and exploit the "long tail". While most leading MVNOs are located in the UK, Europe and the US, there is an increasing number of MVNOs emerging in Asia.

MVNO Fast Facts*

- **Countries with the most MVNOs: Netherlands (43)**, Belgium (38), Germany (31) and France (22)
- **Most active Host Network Operators (HNOs): KPN in Netherlands (35)**, Base in Belgium (31) and E-Plus in Germany (11)
- **Most active MNO Groups acting as HNO: T-Mobile (19 MVNOs in 3 countries)** and Orange (15 MVNOs in 5 Countries)
- **Country with the highest MVNO market share: Netherlands with 3.05 million customers** served by MVNOs in 1Q 2007
- **Largest MVNOs by number of subscribers: Debitel (roughly 13 million in Germany alone)** and Virgin Mobile (roughly 6 million in the UK alone)
- **Fastest growing new MVNOs: Tesco Mobile in the UK** (500,000 customers during first 12 months, +1.5 million today), M6 in France (400,000 customers in first 12 months, +1.0 million today), Virgin Mobile in France (300,000 customers in first 10 months), NRJ Mobile in France (300,000 customers in 12 months, +400,000 today)

** from FRiENDi mobile MVNO market research of 18 countries in Western Europe, with a total of 399 million people*
Source: FRiENDi Mobile, 27 August 2007

United Kingdom

In terms of subscribers, UK has one of the largest markets for mobile services in Europe. In 2007, there are 73.4 million total mobile subscribers in UK and it is expected to grow to 76.7 million in 2010[17]. Whereas the wireless penetration in the UK market has surpassed 100% since 2003, and reached a penetration rate of 117% by mid-2007[18], it is expected to reach 121.6% in 2010[19].

Due to the high mobile penetration rate, the number of MVNOs in the UK has increased rapidly. It has one of the biggest MVNO markets in the world by volume of customers, with more than 6 million MVNO customers by the end of 2004[20]. UK's and Europe's first MVNO was Virgin Mobile, which was launched in 1999.

By mid-2005, there were seven major MVNOs in the market, out of an estimated 53 MVNOs across Europe as a whole. Of the UK operators, Virgin has been the most notably successful[21], followed by Tesco Mobile, the second largest MVNO in UK. Among the more notable UK MVNOs are noted in the table:

UK MVNOs

MVNO (Service Plan)	Launch Year	Hosting MNO	Target Segments	MVNO Classification	Objective	Differentiating Factors
Virgin Mobile (Prepaid)	1999	T-Mobile	Youth and young adults	Discount MVNO	• Creates value and profitability in cell phone service industry. • Targets market ages 15 – 29 years. • To serve the youth market in a way they have never been served before.	• No contracts. • No hidden fees. • History of brand extension.
Tesco Mobile (Prepaid)	2003	O2	Loyal and price conscious customers	Discount MVNO	• Leverage its competitive advantage of distribution and strong brand association by having branded pre-paid phones on sale in stores and through tesco.com.	• Offers customers value, simplicity and choice, along with supermarket style offers and the chance to earn Clubcard points when buying handsets and call time.

[17] *http://www.reuters.com/article/pressRelease/idUS110953+25-Jan-2008+BW20080125*
[18] *"Mobile Virtual Network Operators (MVNOs) in Israel – Economic Assessment and Policy Recommendation", www.moc.gov.il, August 2007*
[19] *http://www.reuters.com/article/pressRelease/idUS110953+25-Jan-2008+BW20080125*
[20] *"The Future of MVNOs in the 3G Era" by Analysys, 2005*
[21] *"The Communications Market" by Ofcom, February 2006*

UK MVNOs (continued)

MVNO (Service Plan)	Launch Year	Hosting MNO	Target Segments	MVNO Classification	Objective	Differentiating Factors
BT Mobile (Prepaid)	2004	Vodafone	Corporate market and high usage residential customers	Lifestyle MVNO	• Providing fixed mobile convergence utilising its MVNO capabilities.	• Services include a mobile Virtual Private Network service, Business Circle and Conference on Demand, as well as new tariffs to give large and small businesses greater freedom to structure prices according to their needs.
Blyk (Prepaid)	2007	Orange	16 years old to 24 years old	Ad-funded MVNO	• Built a service around what young people want and need – free communication, ease of use and relevant messages from brands and allows advertisers to reach young people using the only channel that they carry with them everywhere.	• Ads, promotions and marketing messages in exchange for free calls/voice minutes and text messages.
Lebara Mobile (Prepaid)	2007	Vodafone	UK immigrants and migrant workers	Ethnic MVNO	• A competitive way for permanently based immigrants in the UK, and migrant visitors and workers to the UK, to use their mobiles to call overseas.	• Support customers by own language customer service before and after the purchase.
Ikea Mobile (Prepaid)	2008	T-Mobile	Members of Ikea Family Loyalty programme	Discount MVNO	• Pre-paid services that will be available to Ikea Family Loyalty programme members and all Ikea staff.	• One low price for UK calls. • One low price for texts. Free SIM card. • No contract. • No monthly contract. • No minimum spend.

Source: Adapted from various websites

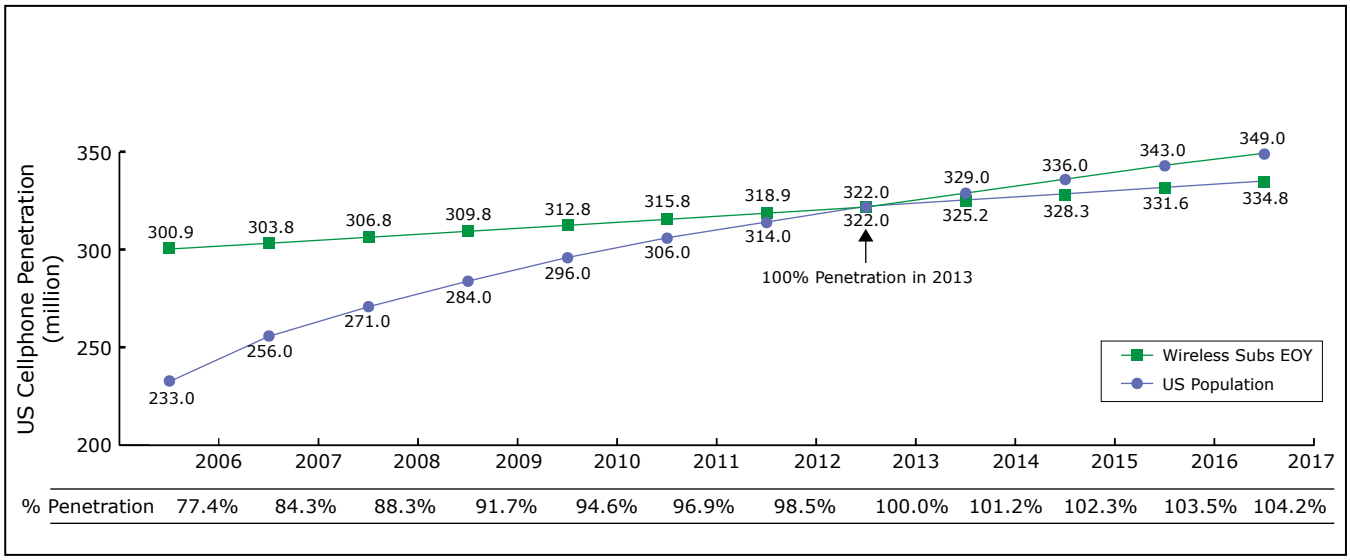
However, even though there has been sound success in Europe, there was an abundance of MVNO low cost discounters which are putting downward pressure on prices. On a similar note, UK is experiencing this trend where many of the MVNOs also are low discounters.

United States

In 2004 and 2005, traditional market segments are approaching maturity, as mobile penetration grows to high levels. Already, the US wireless market saw a number of MNO consolidations, for example, Cingular Wireless merger with AT&T Wireless, and Sprint's merger with Nextel. This has resulted in four national MNOs, Verizon Wireless, Cingular Wireless, Sprint Nextel and T-Mobile[22].

In terms of subscriber growth, analysis company, SNL Kagan projected mobile penetration in the US to surpass 100% by 2013. Forecast is for the total US wireless service revenue to increase at a 5% CAGR from 2007 to 2017, from USD155 billion this year to USD253.6 billion in 2017.

[22] *"Mobile Virtual Network Operators: Blessing or Curse? An Economic Evaluation of the MVNO Relationship with Mobile Network Operators" by NERA, 2006*



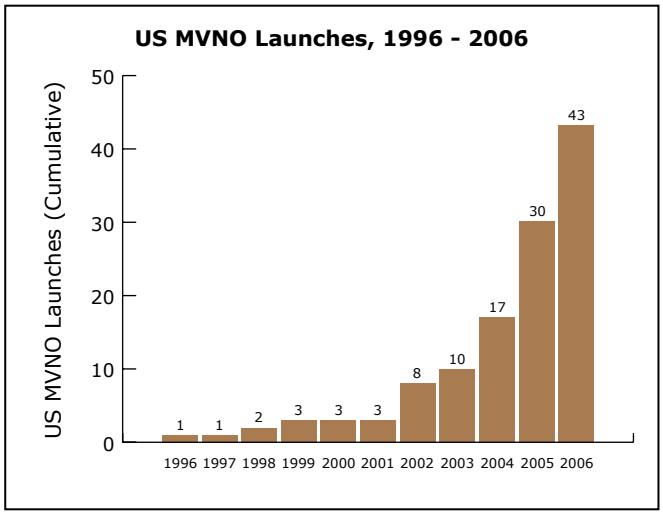
Source: SNL Kagan, a division of SNL Financial LC estimates

Not known to many, the MVNOs or cellular resellers as they are known, have been around in the US for as long as there has been cellular service. Many of the carriers that exist were resellers but the rigid wholesale pricing structure offered by carriers has prevented the MVNOs from offering innovative pricing and product differentiation.

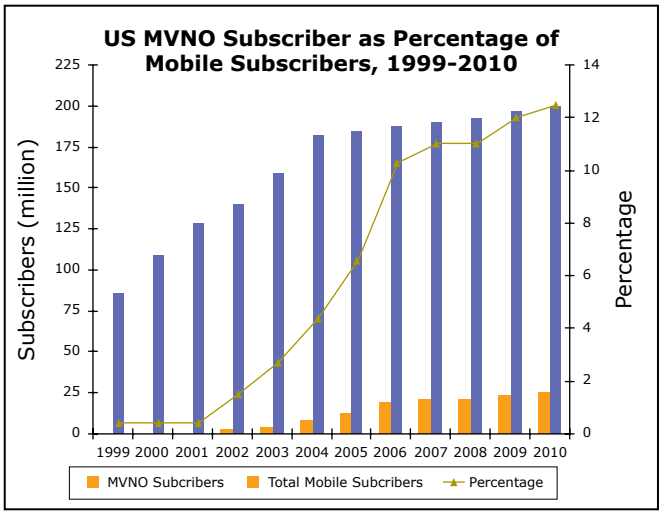
In the mid 90s, the then emerging carriers such as Sprint PCS and Cingular Wireless citing more open attitude towards reseller channels started to work collaboratively with resellers. Initially, most mobile operators in the US lacked enthusiasm for prepaid wireless, when compared to their core and very lucrative postpaid, contract business. In contrast, prepaid generated less ARPU and faced higher churn rates. However, with increased competition and more saturated marketplace, MNOs had to relook the wireless prepaid opportunity to reap this historically underserved market segment.

Over the years, with reasonable success of Tracfone, Virgin Mobile and Boost Mobile, the number of MVNOs in the US has grown rapidly. In 1999, there were less than 500,000 in the US, representing less than 1% of the mobile market. By 2010, the number of MVNO subscribers is expected to grow to 25 million.

In 2005, the total MVNO revenue was USD4.6 billion and by 2010, NERA projects MVNO revenues to be USD29.6 billion. By 2006, there are approximately 40 MVNOs operating in the country, after the first US MVNO, Tracfone was launched in 1996. Tracfone itself has since grown to approximately 10 million customers and nearly USD200 million EBITDA in 2007. A selection of US MVNOs is shown in the table below on "US MVNOs":



Source: Nera Research



Source: Nera Research

US MVNOs

MVNO (Service Plan)	Launch Year	Hosting MNO	Target Segments	MVNO Classification	Objective	Differentiating Factors
Tracfone (Prepaid)	1996	Verizone Wireless, Cingular, AT&T Wireless and Alltel	Lower income, lower-volume customers, senior citizens, casual cell phone users, parents, safety users.	Discount MVNO	• To make cell phone service available to everyone without the need for a contract or a high credit rating.	• Offers services under two brands: TracFone and Net10. • Offers prepaid services on both CDMA and GSM networks. • Does not use contracts nor does it conduct credit checks.
Virgin Mobile USA (Prepaid)	2002	Sprint Nextel	Youth market	Discount MVNO	• To make prepaid service something cool and socially acceptable.	• Offers Pay-as-you-go and monthly plans with no contract required. • Strong focus on music, ringtone deals and specialist youth handsets.
Boost Mobile (Prepaid)	2002	Sprint Nextel	Youth market (14 years old to 34 years old), urban demographic, Hispanic market	Lifestyle MVNO	• Developing and distributing wireless communications products for the youth market.	• Offers both CDMA and iDEN phones. • Offers Push-to-Talk (PTT) service or walkie-talkie style communications through Motorola phones only. • Monthly users can choose from three plans, each with unlimited calling. Plans with unlimited messaging and Internet are available as well.
Qwest Wireless -Postpaid	2003	Verizon Wireless since 2008 (previously Sprint Nextel)	Residential and business customer	Discount MVNO	n.a.	• Offering postpaid wireless services to residential and business customers as part of a quadruple play.
Movida (Prepaid)	2005 -ceased operation	Sprint PCS	Hispanic market	Ethnic MVNO	• Providing pay-as-you-go voice and data access with an emphasis on international and Spanish-language content and service.	• Services are delivered primarily in Spanish.

US MVNOs (continued)

MVNO (Service Plan)	Launch Year	Hosting MNO	Target Segments	MVNO Classification	Objective	Differentiating Factors
Disney Mobile -Prepaid	2006 -ceased operation	Sprint	Families with kids	Lifestyle MVNO	n.a.	• Offers entertainment-focused Disney-themed content. Child- and parent-focused services such as Family Monitor, to help parents control the family's wireless spending. Family Alert, for sending priority messages to the entire family at the same time. Call Control, to enable parents to control the days and times that children's phones can be used and Family Locator, a Location-Based Service (LBS) that uses GPS to enable a parent to pinpoint on a map the location of a child's phone.

n.a.: not available
Source: Adapted from various website

Asia

Although the majority of countries in Asia pride themselves as having one of the fastest developments in the mobile and telecommunication networks, the market for MVNOs is still at nascent stage. MVNOs development is not as visible as their European counter parts where MVNOs there have been gaining a lot of traction over the past years.

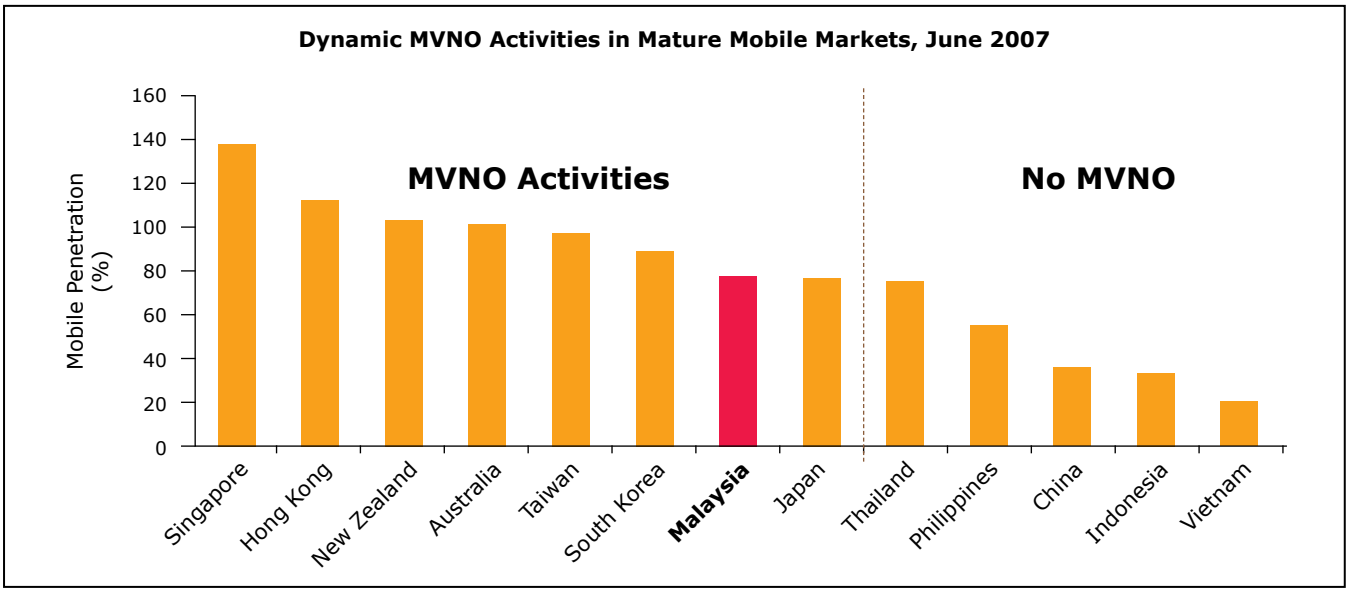
According to a report by Yankee Group, MVNO penetration is less than 1% of the total subscribers in Asia Pacific by the end of 2006. The slow penetration is attributable to amongst others, regulatory policies which previously have not been very open and supportive for network access. Other challenges include high penetration levels, low prices and difficulty in competing on Value Added Services (VAS) as prepaid users usually do not consume VAS as much as postpaid users.

The failed attempts by Virgin Mobile in Singapore after nine months of operation due to high wholesale pricing and Shell in Hong Kong due to lack of customer base are good examples. However, these examples have not damper investors' anticipation in venturing into the MVNO market. Investors in Asia are still hopeful in drawing inspiration from highly successful MVNOs in Europe.

With a growing large share of mobile terrain, an overall average of 33% of mobile penetration[23] and expected penetration rate just over 50% by 2010[24], the proliferation of MVNO is expected to mature in Asian market in the near future. Ernst and Young reported there being renewed interest in MVNO, particularly in the two most highly penetrated markets of Singapore and Taiwan since 2006. To date, Hong Kong has the highest MVNO-penetrated market in Asia with 720,000 customers, representing 7.5% Hong Kong market penetration[25]. By 2007, the trend has spread across other Asian markets like South, Korea, Japan, Thailand and Malaysia as well.

Experiences drawn from other countries indicate that MVNOs thrive in more mature and liberalised markets as opposed to emerging markets, especially those with restrictive regulatory regime. Hence, there are different opportunities to stimulate competition via MVNO entry in countries across Asia due to market maturity and regulatory stance taken. When markets are more mature (higher market penetration), MVNOs are seen more pertinent.

[23] *"Asia Calling – Taking on the Rising MVNO Wave in Asia, Global Telecommunication Centre" by Ernst and Young, 2007*
[24] *"Asia Phone Penetration to Reach 50% by 2010" by Cellular News, http://www.cellular-news.com/story/17162.php*
[25] *"Asia Calling – Taking on the Rising MVNO Wave in Asia, Global Telecommunication Centre" by Ernst and Young, 2007*



Source: "Asia Calling, Taking on the Rising MVNO Wave in Asia" by Ernst & Young, 2008

Examples of some of Asia MVNOs are as per the table below:

Asia MVNOs

MVNO (Service Plan)	Launch Year	Hosting MNO	Target Segments	MVNO Classification	Objective	Differentiating Factors
Australia	Crazy John	2007	Vodafone Australia	Blue-collar worker	• Providing quality customer service and offering the best possible prices.	• Comprehensive and largest range of mobile phones and plans in Australia.
	SlimTel	2005	Vodafone Australia	Ethnic market	• Connecting global ethnic communities, without the excessive costs. • Providing ethnic-oriented MVNO offering low international calls.	• Offering Islamic content delivery such as prayer timetables.
Taiwan	Arcoa	2006	Far EasTone	n.a.	n.a.	n.a.
	President Chain Store Corp (7-Eleven)	2007	Far EasTone	n.a.	n.a.	n.a.
	Family Mart	2007	Far EasTone	n.a.	n.a.	n.a.
Thailand	Samart i-Mobile	2007	Telekom Malaysia	n.a.	n.a.	n.a.
Hong Kong	PLDT '1528 Smart'	2004	The Philippines Long Distance Telephone Company	Ethnic/ affinity group – overseas Filipino workers	• Providing Filipinos in Hong Kong with access to the same Smart mobile services and content they can use in the Philippines.	• The world's first text-based money remittance service, Bible verses, 24-hour customer service from fellow Filipinos, make long-distance calls to the Philippines and text messages for around 50% less than they would otherwise pay on a local Hong Kong network.

Asia MVNOs (continued)

MVNO (Service Plan)	Launch Year	Hosting MNO	Target Segments	MVNO Classification	Objective	Differentiating Factors
Korea	Korea Financial Telecom & Clearings Institute	2007	SK Telecom	n.a.	• Aims at stable mobile banking service to protect customers' data as directly administered by the operating banks.	n.a.
Japan	EMobile	2008	NTT DoCoMo	n.a.	• Providing "high-speed data communications by building mobile broadband services supported by the latest "HSDPA" (High-Speed Downlink Packet Access) and IP network technologies.	• No monthly subscription fee. Instead, customers will pay a per half-minute price for all calls, or a one-off payment per month for unlimited calls. • To offer services and handsets fully usable in the mobile environment, similar to the current PC environment at home or office.
	IIJ Mobile	2008	NTT DOCOMO (3G FOMA network)	Corporate business customers	• Providing comprehensive solutions (including one-stop corporate network construction and operation that includes mobile data communications) for businesses employing mobile broadband.	• High-speed nationwide mobile environment. • International roaming. • Unique MVNO fee plan. • Fixed-rate plan, Packet share plan, and Connection share plan. • Secure, stable mobile communications environment.
New Zealand	M2 Telecoms	2007	Vodafone NZ	Small and medium sized corporate users	n.a.	• Subcribers can receive a "phone and fly" rebate of up to 15 cents in the dollar on their telco bills, which they can spend on travel products offered through a sister company.
	Telstra Clear	2007	Telecom NZ (CDMA)	Small and medium enterprise business customers	n.a.	n.a.
	Black + White	2008 (not launched)	Vodafone NZ	Customers who do not want to be tied up with long term contracts	n.a.	n.a.

n.a.: not available
Source: Adapted from various websites

REGULATORY CONSIDERATIONS IN MVNOs

The views of regulators towards MVNOs differ across various jurisdictions, where opinions have been both for and against MVNO regulations. Nevertheless, regulators in many countries are considering to what extent the regulatory intervention, including access price and conditions, is necessary, if indeed there is such development.

Here we document some examples for and against regulatory interventions from various jurisdictions:

Supporters of Regulatory Intervention

According to a report by ITU News[26], those in favour of regulation argue the following:

1. Mobile network operators control the available radio spectrum, which is a bottleneck facility that is an entry barrier for new mobile network operators. Hence, mobile network operators are less likely to provide MVNO access unless it is a regulatory requirement;

2. Regulation of the mobile market is said to be failing, which is another reason why MVNO regulation maybe a good idea; and

3. Mobile operators have very high profit margins of 25%, in some cases significantly over costs. Current regulation, as interpreted by some national regulatory authorities, already provides the power to enforce an access obligation on existing operators.

Opponents of Regulatory Intervention

Further to the report, ITU News[27] has suggested that those who are opposed to MVNO regulatory intervention argue on the following basis:

1. Benefits of MVNOs are as yet unproven, and that there is inadequate evidence that market failure has occurred;

2. The mobile market is competitive by nature and therefore does not require regulation;

3. There is no industry consensus that MVNO access is necessary; and

4. There is a bleak possibility that MVNOs could even discourage investment in mobile networks (both 2G and 3G). Anti-regulatory intervention stances also argue that regulatory measures such as indirect access or 3G networks will improve the competitive situation.

Levels of Regulatory Intervention

The levels of regulator intervention vary among countries depending on how open it is to network access. Intervention varies from – strong market intervention to creating a more favourable entry settings. The four basic regulatory tools to facilitate entry are:

Decreasing Levels of Regulatory Intervention

Regulatory Tools	Heavy-handed interference	Signalling regulation	Enabling	Purely commercial negotiation
Definition	Mandated MVNO access with direct intervention and establishment of a strict regulatory framework.	Suggesting operators voluntarily open their networks and negotiate wholesale agreements with potential MVNOs.	Introducing enabling factors that would facilitate the entry of MVNOs without directly regulating them (lowering switching and entry barriers.	No regulatory intervention and base on market forces that enable both parties to arrive at commercially sensible deals.
Approaches	• Highly interventionist • Fastest and clearest approach • Can be justified on basis of market failure or "bottle necks" • Normally requires a Reference Access Offer (RAO)/Reference Interconnection Offer (RIO)	• Less interventionist • Commercial negotiation • Left to the market players • Can be through a co-regulatory approach • Requires credible threat from regulator	• Very minimal interventionist • Only introduce overall frameworks required to ensure a stable environment for decisions and to support MVNO entry by reducing barriers	• Non interventionist • Supports Win-Win ethos • Risk is: no commercial deals with no further competition • May be subject to gaming and abuse by MNO

Source: Adapted from "MVNO Access and Interconnection: Regulatory Models and Key Agreement Terms", by FRiENDi Mobile, 2007

[26] *ITU News No. 8/2001, http://www.itu.int/itunews/issue/pdf/2001/08.pdf*
[27] *ITU News No. 8/2001, http://www.itu.int/itunews/issue/pdf/2001/08.pdf*

MVNO Regulatory Regime Worldwide

Different countries approach different regulatory regime to encourage MVNOs entry into the market. This ranges from ensuring open network access like in Hong Kong to strict prohibition as in Italy. Often an open and supportive regulation is the most important to enable MVNO to thrive in a market.

The following table shows the different regulatory approach towards MVNO entry in various countries:

MVNO Regulatory Regime

Regulatory Position	Country	Regulatory Regime
Force MVNOs to Share Network	Hong Kong	Has a MVNO-related regulation which was implemented in 2001. The regulation limited to 3G network, requires 3G licences to open up 30% of their network capacity to unaffiliated MVNOs and is part of the licensing conditions for 3G spectrum.
	Norway	Regulator imposed an obligation on MNOs to provide access to MVNOs in 2003.
	South Korea	Its Ministry of Information has indicated a strong will to open the MVNO market. The National Assembly is set to revise the Telecom Act to force network operators with over 50% market share to open their networks to resellers.
Facilitate Launch of MVNOs	United States	FCC has repeatedly found the mobile market to be effectively competitive. No interference in the MVNO-MNO relationship. MNO and MVNOs are nevertheless regulated. All wireless carriers including MVNOs must register with the state concerned before providing service, must to regulators and have universal service and customer complaint obligations.
	United Kingdom	No MVNO related OFCOM-specific regulatory requirements beyond those in the published General Conditions of Entitlement to open networks to MVNO entirely voluntarily.
	France	EC struck down the French regulator's proposed MVNO-related regulation. No MVNO-related regulation. ARCEP[28] acts as a watchdog and has promised to reassess the market.
	Denmark	One of the first European countries to implement wholesale access regulation and to support and promote the MVNO concept with a mandatory wholesale access rule. Under EC's new regulatory framework[29], this rule was withdrawn. Currently, there are no MVNO-related regulatory measures in place.
	Finland	The Finish regulator (FICORA) has traditionally encouraged MNOs to enter into wholesale agreements with MVNOs, but has refrained from actually intervening. All MVNO agreements in Finland have been the result of commercial negotiations.
	Japan	The government has set new guidelines to mandate mobile operators to open their network to MVNOs. Operators cannot reject a request from an MVNO without justifiable reasons.
	Taiwan	Taiwan amended regulations to open the MVNO markets in 2003 where players can obtain Type II telecommunications licence to start service.
Indifferent to MVNOs	Ireland	There is currently no MVNO-related regulation and MNOs may host MVNOs at their own discretion.
	Canada	The Canadian Radio-Television and Telecom Commission (CRTC) has refrained from regulating the MNO-MVNO relationship.
Discourage Development of MVNOs Prohibit MVNOs	Argentina	Large number of MNO licences granted to make market unattractive to MVNOs. Stringent rollout obligations to MNOs make MVNOs entry difficult.
	Italy	The regulator has determined that network operators do not have to open their networks to MVNOs in request. The Italian regulator Agcom has decreed that the network operators should be afforded a level of protection to develop their 3G business, in a decision that was upheld by the EU in December 2005. The Italian government decided to delay MVNO legislation until at least 2010, so to give incumbents time to recover UMTS costs and establish themselves in the mobile data market.

Source: "Mobile Virtual Network Operators (MVNOs) in Israel – Economic Assessment and Policy Recommendation" by NERA Economic Consulting, August 2007; "Asia Calling – Taking on the Rising MVNO Wave in Asia" by Ernst and Young, 2007; "The Communications Market Interim report" by Ofcom February 2006; "Mobile Virtual Network Operators: Can They Succeed in a Competitive Carrier Market?" by The Yankee Group, 2000; "Mobile Virtual Network Operators (MVNOs) (Special Reference to Regulatory Environments)", research paper submitted to the University of Manchester, http://11papers.ssrn.com/sol3/papers.cfm?abstract_id=1087262

[28] *Autorité de Régulation des Communications électroniques et des Postes (ARCEP)*

[29] *For a summary of EC's New Regulatory Framework, please see International Telecommunications Union "The New European Union Regulatory Framework for Electronic Communications: Convergence and Regulation", http://www.itu.int/ITU-D/conferences/wtdc/2002/doc/info-docs/024E.doc, 23 March 2002 and for further readings on EU Regulatory Actions in EU, please refer to "Mobile Virtual Network Operators: Blessing or Curse? An Economic Evaluation of the MVNO Relationship with Mobile Network Operators" NERA, 2006*

ENABLEMENT PARTNER - THE MOBILE VIRTUAL NETWORK ENABLER (MVNE)

With the successful entries of MVNOs, the need for a special focus enabler to efficiently support the operational tasks of the MVNO especially in a market with a large number of MVNOs is becoming a necessity. As a result, this has generated a new sub-segment, or an added element in the value chain, to the MVNO industry. Known as the Mobile Virtual Network Enabler (MVNE), this entity emerges to address and fill the gap.

Though the degree of maturity of the MVNE industry is still at a nascent stage, it has created an opportunity for MVNEs to partner with the MVNOs and act as an interface between a Reseller or Enhanced Service Providers and a host MNO. Hence, through a smart partnership, a MVNE can be a good complement to the MVNO's core business.

Recognising this, MVNEs role is to provide back-office support in terms of processes and systems that make a MVNO run; allowing MVNOs to outsource telecom intensive activities (e.g., logistics, provisioning, billing, real-time charging, collections, recharge, and customer care), systems implementation and hosting. At times, a MVNE may also provide technical architecture and enter into wholesale agreement with a host MNO to enable mobile service provision on behalf of the MVNO.

Choosing an end-to-end solution by MVNE will enable the MVNOs to go to market more quickly while focusing on its core competencies and at the same time, minimise the capital investments for the MVNOs or MNOs or even both the operators concerned. According to Telecompaper, some examples of MVNEs that are currently in operation are Ztar Mobil in the US, Spinbox in Finland, Norway and Sweden, Transatel for the European market, ComTel Corporation and Virtel Group in Australia and Aspider Solutions in Sweden, Netherlands and Croatia.

Just like for MVNOs, to understand the MVNEs operational perspective and core business requires in depth study as MVNEs are actually a market by itself. However, presently not many studies have been done partly because of the current nascent state of the MVNE.

MVNOs IN MALAYSIA

Trends in Malaysia

Like many other countries, Malaysia has similar trends in embracing MVNO models as part of the mobile industry. The arrival of MVNOs in Malaysia represents an exciting window of opportunity for other operators, especially those who are from non-telecommunications industry to penetrate a high growth market and at the same time renew this market growth from a different perspective.

Four operators, Merchantrade Asia Sdn Bhd, REDtone International Bhd, TuneTalk Sdn Bhd and XOX.com Sdn Bhd have MVNO licence awarded by the Malaysian Communications and Multimedia Malaysia (SKMM). While some MVNO operators like Merchantrade Asia and REDtone have launched their services, Tune Talk and XOX.com have yet to rollout their services.

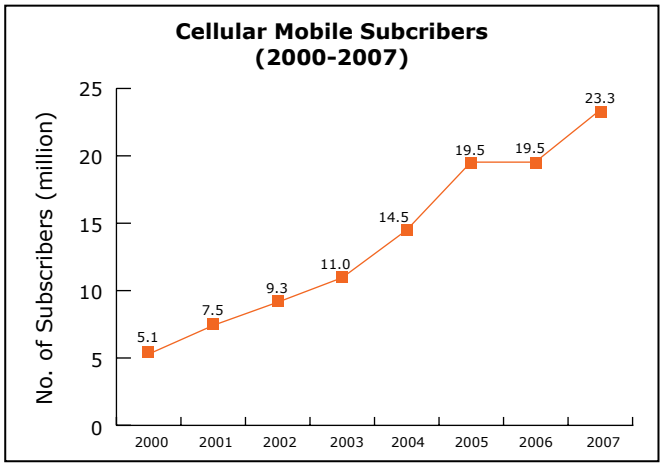
Malaysia MVNOs

MVNO	Launch Year	Host MNO	Target Market	Description	Service Provided
Merchantrade (Prepaid)	2007	Celcom	Foreign migrant workers in Malaysia	To provide foreign workers segment in Malaysia with mobile and remittance services.	SMS, Multimedia Messaging Service (MMS), General Packet Radio Service (GPRS) and mobile content.
REDtone Mobile (Postpaid)	2008	Celcom	Enterprise customer	One stop supplier and Service Provider of total telco solutions catering to corporate, SMI, SME and SOHO communities in Malaysia.	SMS, MMS,GPRS and 3G technology.
Tune Talk	Pending launch	Celcom	Mass market	Low cost Pan Asean MVNO.	Prepaid voice and SMS
XOX.com (Prepaid and Postpaid)	Pending launch (November 2008)	Celcom	Young Chinese market	Offering customers full-fledged services competitive with those from a mobile network operator.	Purchases through mobile devices, top-up facilities, content and services offering a social networking element. Also in its suite of services is a feature that allows consumers to seamlessly access mobile web services through the web and on their mobile devices.

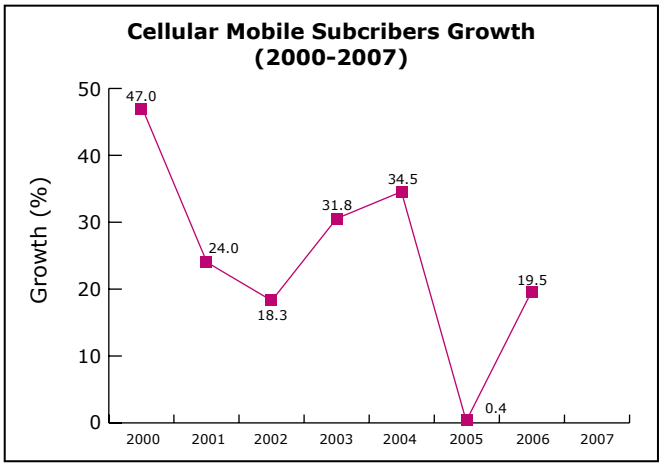
Source: Various websites and meetings with Malaysian MVNO operators

Malaysian Market Readiness for MVNO

Where is Malaysia currently positioned and what is the market readiness for MVNOs? Overall, Malaysia has more mobile prepaid subscribers compared to mobile post-paid subscribers. The ratio is 80:20 prepaid to post-paid subscribers out of the 23.3 million mobile subscribers in 2007[30]. That is, the total number of prepaid subscribers for 2007 stands at 19.4 million.

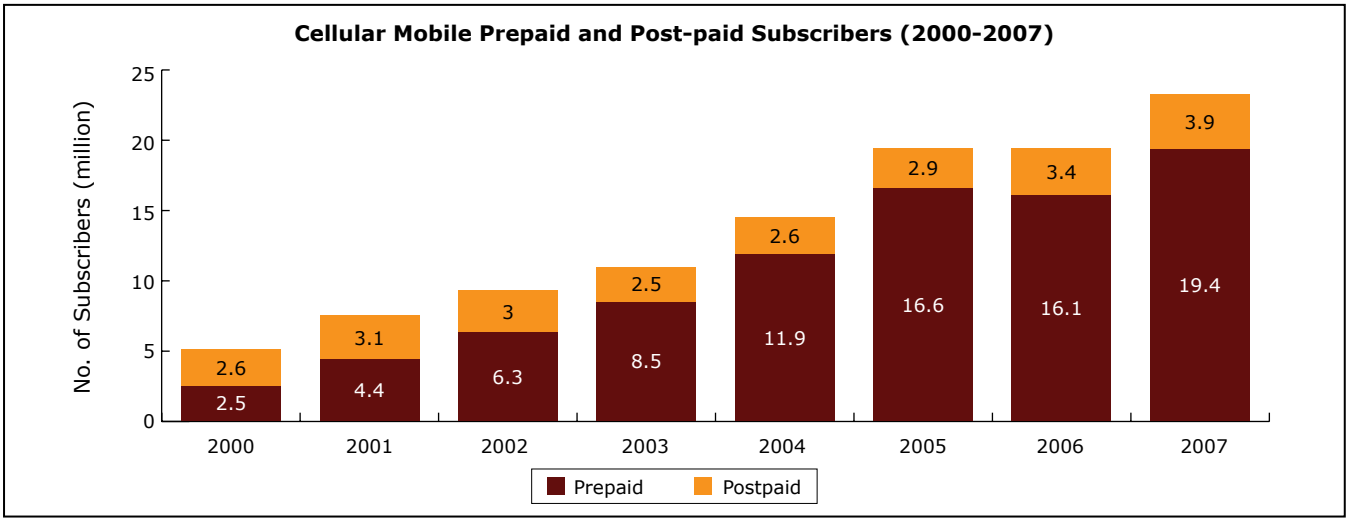


Source: "Industry Performance Report 2007" by SKMM, 2007



Source: "Industry Performance Report 2007" by SKMM, 2007

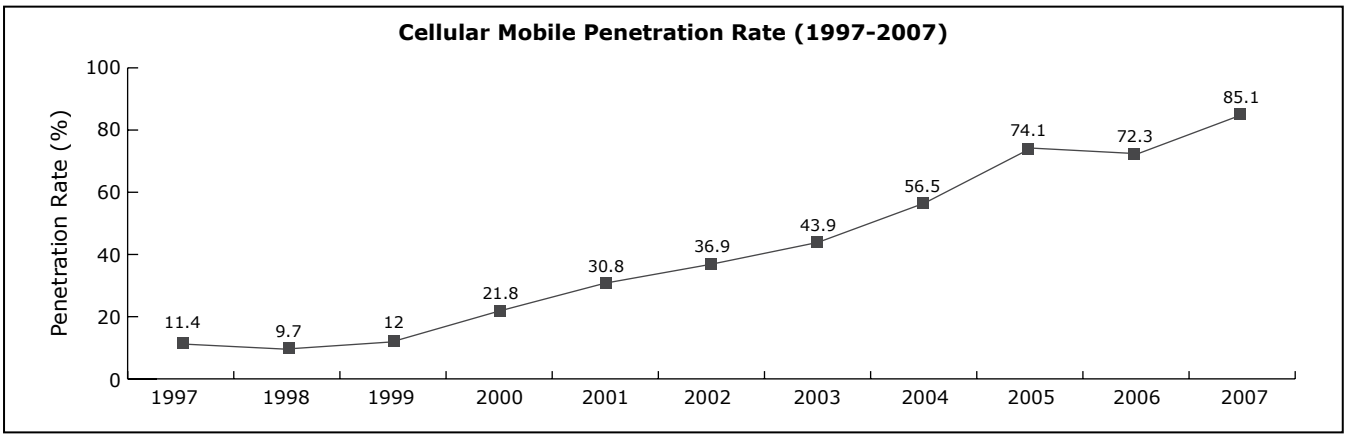
[30] *"Industry Performance Report 2007" by SKMM, 2007*



Source: "Industry Performance Report 2007" by SKMM, 2007

The high number of prepaid subscribers is encouraging for an MVNO market as most MVNOs offer prepaid services to their customers.

Prior experience has shown that MVNOs thrive in a more mature and dynamic market while they have much less impact in emerging markets. In 2007, the mobile market penetration rate stands at 85.1% which indicates emerging maturity of the sector.



Source: "Industry Performance Report 2007" by SKMM, 2007

When looking at Average Revenue Per User (ARPU), the greater prepaid subscriber mixes in second quarter 2007 and into third quarter 2007 have inevitably led to a flat blended ARPU in Malaysia[31]. Further to that, according to a Research and Markets report, the ARPU levels in Malaysia have stabilised[32]. Malaysia's mobile prepaid ARPU divide is as follows:

Malaysia's ARPU Divide (USD)

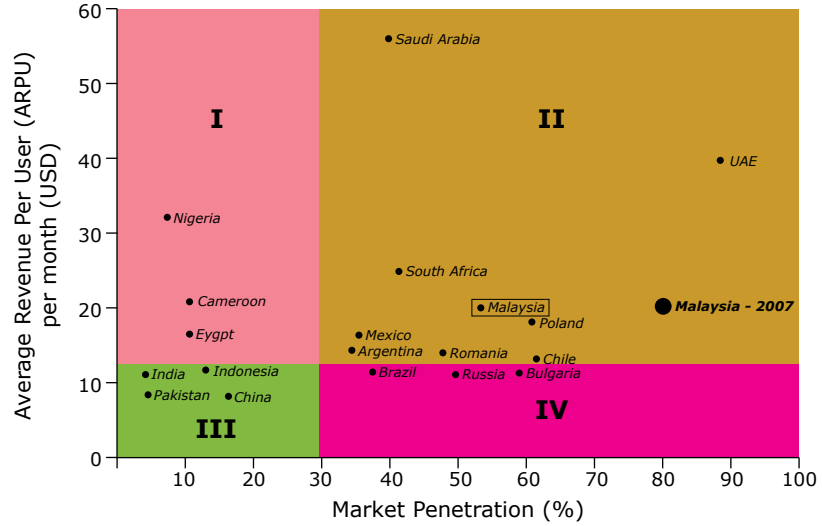
ARPU Prepaid	Mar-05	Jun-05	Sept-05	Dec-05	Mar-06	Jun-06	Sept-06	Dec-06	Mar-07	Jun-07	Sept-07	Dec-07
Celcom	14.0	13.1	13.1	12.5	10.8	10.3	10.8	12.8	15.1	15.1	15.1	14.8
Maxis	34.8	33.1	31.7	30.6	28.8	25.7	25.1	26.8	30.6	n.a.	n.a.	n.a.
DiGi	14.6	15.4	15.4	15.7	14.6	14.3	14.0	14.8	15.7	15.4	15.7	16.6

n.a.: not available
Note: Including five years industry forecast
Source: Business Monitor International Report third quarter 2008

[31] *"Dividing the 3G Mobile Market in Asia" by Business Monitor International, 2008*
[32] *http://www.researchandmarkets.com/research/901d64/3q08_malaysia_mobi, July 2008*

There appears market readiness in Malaysia for opportunities to stimulate the communications market further through differentiation of services in a highly competitive market through MVNOs. This matches the Asian MVNO market where presence or intended roll-outs are seen in the top mobile-penetrated regions[33].

MVNO Suitability in Emerging Markets



I Sweet spot: high ARPU, low penetration MVNOs pursue segments that existing players do not already have. MNOs will not open networks unless forces, but regulators may mandate opening. MNOs may complete for same segments as MVNOs. Markets in this category include Nigeria, Cameroon and Egypt.

II Mature market: high ARPU, high penetration Relatively slow organic growth and intense competition mean MNOs may host MVNO approaches are still possible. MNOs likely to have network capacity. Markets such as South Africa and Mexico fall into this category.

III Attractive but risky: low ARPU, low penetration High potential market volumes but low ARPU. MNOs need to be much more cost-effective; MNOs unlikely to open networks to MVNOs.

IV Unattractive: low ARPU, high penetration Addressable market already stretched. MNOs unlikely to open networks to MVNOs.

Source: "Industry Performance Report 2007" by SKMM, 2007

According to Pyramid Research, MVNO in emerging markets can be divided into four types, namely sweet spot, mature market, attractive but risky market and unattractive market as shown in the quadrants above. In 2006, Pyramid Research positioned Malaysia in quadrant II together with other countries such as Poland, South Africa and Mexico. In this quadrant, the market is at a maturing stage with high ARPU and high penetration. Meanwhile, subscription, penetration and ARPU figures from 2007, have allowed Malaysia to remain in quadrant II, a market which is suitable for development of MVNOs in the country.

Additionally, with a diversified demographic structure (potentials in different ethnic community as well as the foreign workers market) which creates windows of opportunity for segmented and niche MVNO market, competitive telecommunication industry landscape, and overall favourable regulatory environment will further provide a catalyst for the emergence of MVNOs in Malaysia.

MVNOs and the Malaysia Regulatory Environment

SKMM defined MVNO in a very broad term as broader definitions not only lower the barriers to market entry but also provide flexibility to potential MVNOs to establish business models according to their financial capability[34].

Unlike most other countries, the licensing framework under the Communications and Multimedia Act 1998 (CMA) was developed to accommodate business models such as MVNOs. The licensing requirements set out by SKMM for each business models are indicative only and the actual licensing requirements can only be ascertained by SKMM upon assessment of the applications *vis-à-vis* the CMA and the relevant subsidiary legislations on a case by case basis[35].

[33] *"Asia Calling – Taking on the rising MVNO wave in Asia" by Ernst and Young, 2007*
[34] *"Guidelines on Regulatory Framework for 3G Mobile Virtual Network Operators" by SKMM, February 2005*
[35] *"Guidelines on Regulatory Framework for 3G Mobile Virtual Network Operators" by SKMM, February 2005*

MVNO Differentiation by Licensing Categories

Licence	Full MVNO	Enhanced Service Provider	Enhanced Reseller	Reseller
Network Facilities Provider (NFP)	• Switching centre • Radio communications transmitters and links			
Network Service Provider (NSP)	• Bandwidth services • Cellular mobile services • Access application services	• Bandwidth services • Cellular mobile services • Access application services	• Bandwidth services • Cellular mobile services • Access application services	
Application Service Provider (ASP)	• Public cellular services	• Public cellular services	• Public cellular services	• Public cellular services

Source: "Guidelines on Regulatory Framework for 3G Mobile Virtual Network Operators" by SKMM, February 2005

At this stage, SKMM is directing ASPs to seek MVNOs ventures with current 3G licence holders. SKMM monitors, but will intervene if it is satisfied that such intervention is necessary to ensure a long term benefits to end users and growth in the industry[36].

CONCLUSION

The MVNO concept will continue to receive heightened level of interest over the next few years and is expected to provide more competition and innovation to the telecommunications market. It is noted that many of the incumbent operators have now accepted the existence of MVNOs which to some extent do provide opportunities to the MNOs themselves especially when they stand to benefit from tapping niche markets which they previously could not serve.

However, challenges still remain for new entrants to penetrate the telecommunication market as long as there are continuous changes in the telecommunication landscape. But by capitalising on market differentiation and segmenting the industry instead of competing on price, some MVNOs have proved to be resilient.

Approaches to regulatory intervention are observed to differ around the world, while most MVNOs thrive in unregulated market conditions where regulators take a monitoring position. There are clear indicators of various business models for MVNOs with differing degrees of relationships with MNOs, different wholesale strategies, and approaches to value proposition for the end-users. Though one model may be deemed successful for one MVNO, it may not work for another MVNO due to unique challenges in context and inherent issues arising in the business models.

The appropriate entry strategy – a strong partnership with an MVNO, a large customer base, the ability to acquire customers at a lower cost than the industry average and an experienced execution team – are the few key basics to a good head start. Overall, the outlook for the expansion of the MVNO industry looks promising with diverse opportunities especially for non-telecommunication providers.

[36] *"Guidelines on Regulatory Framework for 3G Mobile Virtual Network Operators" by SKMM, February 2005*

ACRONYMS

3G	Third Generation
ARPU	Average Revenue Per User
ASP (I)	Application Service Provider (Individual)
BSS	Business Support Systems
C&A	Certification and Accreditation
CAPEX	Capital Expenditure
CCRTC	Canadian Radio Television and Telecom Commission
CDMA	Code Division Multiple Access
CMA	Communications and Multimedia Act 1998
CRM	Customer Relationship Management
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
ESP	Enhanced Service Providers
FCC	Federal Communications Commission
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile
HLR	Home Location Register
HSDPA	High Speed Downlink Packet Access
IMS	IP Multimedia Systems
IN	Intelligent Network
KFTCI	Korea Financial Telecommunication and Clearing Institute
LBS	Location Based Service
MMS	Multimedia Messaging Service
MNO	Mobile Network Operator
MSC	Mobile Switching Centers
MVNE	Mobile Virtual Network Enabler
NDC	National Destination Code
NFP (I)	Network Facilities Provider (Individual)
NSP (I)	Network Service Provider (Individual)
OEM	Original Equipment Manufacturer
OFTA	Office of the Telecommunications Authority
OSS	Operational Support Systems
POS	Point Of Sale
PC	Personal Computer
PTT	Push-To-Talk
R&D	Research and Development
RAO	Reference Access Offer
RIO	Reference Interconnection Offer
SCP	Service Control Points
SIM	Subscriber Identity Module
SME	Small and Medium Enterprises
SMI	Small and Medium Industry
SMS	Short Message Service
SOHO	Small Office and Home Office
UMTS	Universal Mobile Telecommunications System
US	United States
UK	United Kingdom
VAS	Value Added Services
VLR	Visitor Location Register

APPENDIX

Factors to Avoid in MVNO Business Model

Failed MVNO	Start Up Date	Failed Date	Month/ Years	Wholesale pricing too high	Poor positioning in target market	Poor distribution channels	Poor marketing	Lack of Branding	Lack of unique applications	Lack of customer base	Too niche	Poor billing and collection system	Expensive service	Restrictive and costly terms of its MVNO agreements
USA														
Mobile ESPN	Nov 2005	Dec 2006	13 months				X	X		X	X			
Disney Mobile	June 2006	Dec 2007	18 months				X			X	X			
Amp'd	2005	2007	24 months		X	X	X			X	X		X	
Sonopia	1999	Mar 2008	9 years								X	X		
Helio		2008					X				X			
Movida	2005													X
Voce	Nov 2005	Feb 2008	27 months					X						
XE Mobile	2006	2007	12 months		X	X					X			
UK														
easyMobile	June 2005	Dec 2006	18 months											
SINGAPORE										X	X			
Virgin Mobile Singapore	Oct 2001	July 2002	9 months	X	X	X	X		X		X			
HONG KONG														
Shell Hong Kong											X			
AUSTRALIA														
One Tel	1995	June 2001	6 years										X	
NETHERLANDS														
Easy Mobile	Oct 2005	Mar 2006	5 months								X			

Source: Various website

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