White paper

rethinking
the traditional telco
the need for independent brands and pipes

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Foreword

In the past few years Atos Consulting has developed an extensive vision on the direction of the Telecommunications market (Telco). Our latest view is that traditional telcos will have to focus on being either a Brand or a Pipe.

The rapid developments that continue to occur in the Telecom sector require us to check regularly on the progress of these scenarios. For example, towards which scenario is the market heading? And what does that mean for Telcos' business models? In 2010 we explored together with Ericsson the four most likely scenarios for the future of the Telecom market (white paper Business Models in Time).

For our 2011 analysis, we interviewed at the end of 2011 board members and directors of eight leading international Telcos and combined the results with our own research and knowledge. This led us to the conclusion that the 'Brands and Pipes' scenario (with a "sniff" of User's Choice) is the most likely outcome. The Brands and Pipes scenario describes a world in which Brands are operated separately from the Pipes. Brands will buy their infrastructure needs from specialized infrastructure companies and Pipes will specialize in infrastructure and servitization. If this scenario comes true, it will be the end of the traditional Telco that integrates its Brands and Pipes.

In this white paper the introduction outlines the four scenarios described in the previous white paper Business Models in Time. Chapter 2 outlines the developments that are leading the sector towards the Brands and Pipes scenario. In Chapter 3 we argue that this requires the traditional Telco to specialize . We then show how companies can prepare for this scenario and what the key requirements are to be successful as either a Brand or a Pipe.

We hope that this white paper will help Telcos in forming their vision of the future and in defining the tactical moves to prepare for the Brands and Pipes scenario.

We wish you a pleasant and inspirational read!

Contents

Summary

Follow up research from Atos Consulting around the Ericsson/Atos Consulting 2010 research project 'Business Models in Time' has shown that the most viable scenario for the Telecom industry is 'Brands and Pipes' with a sniff of User's Choice. The traditional integrated Telco will disappear.

Three key trends play a major role in the emergence of this scenario. First, current consumer behavior requires massive investments to provide the bandwidth that is necessary to give the consumers their personalized content anytime and anywhere. Next, government policies towards LTE frequencies, roaming tariffs and net neutrality are making future cash flows rather uncertain. Finally, there are the new entrants with their enormous customer pull, deep pockets and accompanying ability to put more emphasis on long-term market share than on the short-time bottom line. These new entrants can capture a huge segment of the value creation market at the expense of the traditional Telco. These three trends combined leads to an investment squeeze.

The way out of this squeeze is via the Brand and Pipes model. As a result, the traditional Telco will need to let go of the outdated way of looking at their business as an integrated player. Flexibility is now the name of the game and that demands focused organizations. The choice is to focus on either becoming a Brand (delivering integrated services) or a Pipe (delivering the network and value added services). In each of these two options there is a variety of other choices to be made.

Moving towards becoming a Brand or a Pipe is a three step process. First traditional Telcos need to position the Brand and the Pipe 'at arms' length' in their organization. This enables them to already prepare for entering into partnerships with third party Brand and Pipes. Then the operations themselves will need to be split: everything that is shared is redistributed to one side and built up on the other side. The last step is 100% divestment of either the Brand or the Pipe.

The beginning for new, viable Brand and Pipe companies

To make independent Brands and Pipes successful, we propose several tactical moves for each of them. For Brands these include becoming a guide for customers through the rather complex multi-layered Telecom environment. By guiding, coaching and supporting them they will win their loyalty. Secondly, they should be Pipe independent and look for several Pipe suppliers, each with different cost/service ratios that best meet their specific customer's needs. Third, they should look for partners to limit the risk exposure and to share the out-of-pocket expenses related to R&D.

The Pipe too should look for partners to limit risk and share costs. It should also find Brands to partner with to develop new winning technologies. Secondly, they should make optimal use of technology across the lifecycle by engaging different brands as customers in different phases of the technology lifecycle. Brands that service Laggards and are low cost can be profitable customers when technologies are nearly obsolete, whereas innovative partners can help to kick start profitable technology implementation early on in the lifecycle. A last, very promising tactic for Pipes is to invest in servitization. Buffering full-service packages to the Brands, e.g. in the area of billing, will allow them to enter a high margin business.

We believe that the traditional Telcos with Brands and Pipes under one roof will cease to exist. However, by following the tactics we have outlined in this white paper, their successes can be transformed into thriving new businesses. In this way, the end of the traditional Telco, also marks the beginning for new, viable Brand and Pipe companies.

1. Introduction

The change Telco players are currently experiencing, is comparable to the radical change they experienced at the end of the last century when mobile telephony came onto the market. Currently, the rise of the mobile internet is the main driver of change. In a previous white paper, developed together with Ericsson, we defined four scenarios that describe possible future scenarios for the Telecom sector (for some relevant definitions see Box 1).

These were intended to help Telcos find their way in the new competitive and technological landscape. The four scenarios are shown in Figure 1.

Scenario 1 predicts the split between Brands and Pipes. Here companies will increasingly focus on either one of those and the traditional Telco, being both service provider (Brand) and network operator (Pipe), will disappear.

Scenario 2 is the User's Choice scenario where clients demand user friendly and seamless services. Operators and service providers strive to give clients exactly that.

Scenario 3 is the Green Shift which emphasizes sustainability. Here Telcos will increasingly implement technologies that save energy, reduce CO2 emissions and reduce pollution.

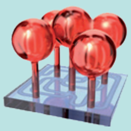
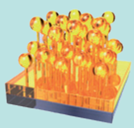
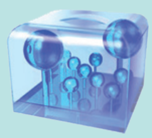
Scenario 4 is "All-Inclusive" and describes a situation in which total package offerings including communication, broadcasting and content are presented to customers, to work on any device. It predicts that, in the end, a few large, integrated players will dominate the Telco landscape.

These scenarios were defined in 2010. However, since then the market is clearly moving in the direction of the Brands and Pipes scenario with a slight touch of User's Choice. In the next chapter we will elaborate on the developments that are directing the Telecom industry towards this outcome.

Box 1 Telco-related definitions

- The **Telecommunication market** refers to all the parties involved in the demand and/or supply of any type of Telecom related offering and their transactions.
- The **Telecommunication (Telecom) sector** refers to all the professional suppliers and buyers of any type of Telecom related offering.
- A **Telecom-related offering** is any product, service or infrastructure that provides access to networks and/or facilitates the electronic transmission of voice and data in the broadest sense of the word, including the voice and data being transmitted.
- A **Telecommunication (Telco) company** is a company with activities in the Telecommunication sector. If a Telecommunication company also has activities in (an)other sector(s), it is only a Telecommunications company insofar as its activities are executed in the Telecommunications sector.

Figure 1: Four scenarios for the Telecom industry

	 **Brand & Pipes**	 **User's Choice**	 **Green shift**	 **All-inclusive**
User perspective	Users want branded "life style" service packages (based on trust, loyalty)	Active users want choice among an abundance of services (open market)	Users demand utility and sustainability solutions	Users will get bundled offerings (convenient but locked-in)
Industry perspective	Large consolidated service providers separated from pure access & transport networks	Fragmented service providers on top of a service support layer "network operatiing system"	Consolidated service providers on top of a (regulated & standardized) service support layer	Vertically integrated providers of everything from content to transport & access
Context	Global economy, high economic growth	Global economy, high economic growth, strong renewal of business models	Government regulation, regionalized economies, lower economic growth	Regionalized economies (US, Asia), lower economic growth
Business model	With two business models (brands and pipes) the market is an extrapolation of the current 2010 relationships, with a clear separation of network and brand	The facilitating network operator and service innovator business models result in high innovation supported by facilitating networks	The green aspects of the scenario can be found in all aspects of the business model, from customers to infrastructure, costs and revenue	Unlike the other business models balance between the different aspects of the model is less necessary

2. What and whom do we see moving in the market place?

Three key trends in the Telco industry are currently driving the sector towards the Brands and Pipes scenario:

- **Consumer behavior** is leading to a growing need for bandwidth
- **Government policies** are creating uncertainty as to future cash flows
- **New entrants** are bringing downward pressure on prices and margins.

We will next describe how these trends combined force Telcos to focus on being either a Brand or a Pipe.

2.1 Consumer behavior

Consumer behavior is changing based on a desire to experience utter freedom at low cost.

Consumers today are much quicker than they used to be at changing their minds and acting decisively, switch devices, providers, subscriptions, etc., whenever they see fit. Moreover, Telcos contribute to this 'product/service hopping' behavior by continually introducing an ever-growing number of products and services with comparable functionalities for social media, business, surfing on the internet, TV, video streaming or gaming.

> Consumers want content fine tuned to their specific needs and for it to be delivered independent of time, place and device

We are now seeing significant changes in consumer behavior related to social media. The opportunities afforded by social media are now ubiquitous and greater than ever. It is now possible for customers to keep in touch with old friends, make new ones, find travel buddies and colleagues and engage with their communities whenever they want and wherever they are. We expect that social media will become the basic form of communication for generations to come. Furthermore, this 'new way of working' helps and encourages employees to work more from their homes, further contributing to this development.

Improved customer experience is another important factor. Consumers value clarity about what they can expect from products and services. A prime example of a company that excels in providing this clarity is IKEA. Customers of IKEA are fully aware of, not only the kind of products on offer, but also the layout and the facilities they can expect at the store, the service that is offered and the fact that they have to assemble their purchase themselves. And, after all this, if they still want to return a product or get that extra bolt or nut, the service is swift and free!

Telecom companies find it hard to mirror that transparency although some major steps have been made in the last years. For example, prepaid customers used to pay for the duration of the call which was rounded up per minute. Now customers pay per second. Roaming tariffs are transparent and communicated the minute a consumer enters a roaming zone.

Another change in consumer behavior is the growth in online shopping, both in the number of consumers and in the number of purchases per consumer. One of our interviewees expects that in the Netherlands, 70% of the population will shop online in 2015. These numbers are likely to continue to increase strongly the coming years. Furthermore, offline shopping is now often preceded by 'info gathering' online. Here consumers first get interested in and compare products and prices via the web, then come to a decision while they are online before finally making the actual purchase 'offline' in a shop.

Over the last three to four years we have seen a growing need for personalized content. Consumers want content fine-tuned to their specific needs and for it to be delivered independent of time, place, and device. In fact, before 2016 the majority of video and television consumption is likely to be 'on demand'. An important and related aspect here is that the video and television possibilities are also available on smartphones and tablets. The opposite occurs as well: more and more apps for smart phones and tablets can be downloaded to television sets.

Within the growing need for personalized content, the generation and distribution of local content by local consumers is a notable development. However, large players in the market can often find difficulties in spotting and adapting to these local developments as it requires a completely different way of approaching and dealing with consumers. A good example of a company that anticipates the needs of the local community and their needs is Jumbo, a Dutch food retailer. Their recent anti-cyclical growth in market share is largely related to their focus on the different needs of consumers in different regions. For example, they encourage their customers to upload photos of their local football heroes to the local stores' website. The store then produces photo books that can hold all the photos of the local football team and stickers with those photos. And all available for free, if of course, the consumer first bought x amount worth' of food. It is also clear that such highly localized content is valued by customers.

All these changes in consumer behavior have led to an enormous uptake in the necessary investments in mobile and fixed bandwidth.

2.2 Government policies

National and supra-national government bodies can affect the average Telco's day in both positive and negative ways. Here we have to note that, in general, government regulation tends to cause certain issues for most operators.

Government regulations can affect the average Telco bottom line performance in both positive and negative ways

The first is via the distribution of the frequencies required for mobile communications. Just before the burst of the Internet bubble, national governments generated a substantial income for themselves by auctioning off UMTS frequencies to over-eager Telcos. Now although both parties have learned from that rather painful experience, the LTE frequencies are yet to be distributed. This may lead to another issue as it will create the possibility for governments to directly influence the number of active players in the mobile Telco market.

For example, while over the last few years the market has dictated the partnerships between smaller players and the acquisition of smaller players by large ones, governments in some European countries now seem intent on using the distribution of LTE frequencies to create new players.

Secondly, the European Commission is putting pressure on roaming tariffs. Roaming tariffs were a significant source of income for Telcos but the recent demand to lower them has cut into the Telcos' income streams.

Finally, there is the concept of net neutrality. Some national regulators are playing with the idea of imposing net neutrality on the Telcos. This means that Telcos can no longer offer different internet access speeds to different customers. It is a bit like forcing Volkswagen to only offer Lamborghinis or Bugattis to its customers, including to those who have only just said goodbye to their Volkswagen van from the 1970's and are looking for a decent Golf to replace it. The result will be that it will push Telcos to only offer their most elaborate and expensive offering to all their customers, limiting their ability to distinguish themselves in the market place.

These policies, if continued, will lead to considerable uncertainty about future revenues and this will force Telcos to rethink their business models.

2.3 New entrants

A number of new parties have entered the Telco market. They are fast, sometimes unpredictable, surprisingly cheap and extremely competitive. Over The Top (OTT) players have rapidly gained market share. Apple and Google and to a lesser degree Samsung and HTC form the spearhead of these players. The popularity of their devices and services is such that they do not have to pay attention to the traditional Telcos' demands. And through their success, they have bitten off quite a big chunk of the earnings of traditional Telcos.

Lower in the supply chain are two remarkable companies from China, ZTE and Huawei. These players have enormous customer bases 'back home' and have huge war chests which they use to compete with existing players in the Operations Support Systems (OSS) and Business Support Systems (BSS) environment. For now, it seems that for these companies, their bottom line performance is of less interest than their long-term market share and market knowledge. They seem to be determined to use their deep pockets to establish a strong position in the Telco market.

The negative consequences of these new entrants on the prices and margins of the traditional Telco's is self-evident.

2.4 Conclusion

In this chapter we have elaborated on three key trends in the Telco market. We have shown that consumer behavior, government policies and new entrants are leading to an ever-increasing hunger for bandwidth, uncertainty as to future cash flows and growing pressure on prices and margins. The resulting investment squeeze therefore forces traditional Telco players to rethink their current model and focus on either being the best positioned Brand or the most effective Pipe.

The next chapter describes the choices that the traditional Telco faces and the steps it should take to reposition itself as either a Brand or a Pipe. It also discusses the sequence of steps that a traditional Telco should take to become a focused Brand or Pipe.

New parties have entered the market, they are fast, sometimes unpredictable, surprisingly cheap and extremely competitive

3. From integration to specialization

3.1 Brand or Pipe... or both?

Considering the key trends described in the previous Chapter, the following key question arises:

- Is there a competitive advantage to be had from specializing?

We believe that for traditional Telecommunications companies it is important to focus and make a choice and that the integrated model of the traditional Telco, owning both Brands and Pipes will become obsolete. Traditional Telcos will therefore have to determine exactly what type of player they want to be. They will need to consider: What is the distinctive strength in their company that can help them survive and win? For some Telcos the brand experience is a differentiator to win and keep customers, while for others it is a world class infrastructure that will make the difference. However, it is unlikely that a company can be world class in both.

Many integrated Telcos have had a similar experience - their technological legacy makes them less nimble than the OTT players in responding to changes in customer behavior. OTT players are knocking at the front door of consumers. Step by step they take over the direct communication between people with constantly improving communication technologies. At the same time, cable companies and new Chinese entrants are attacking their Pipe business. With deep pockets, long-term visions, and at lower costs, they can set up complete Telecom operators to compete with the traditional Telcos.

To avoid getting squeezed by these two developments, the traditional Telco therefore has to split.

Advantages of a focus on Brands
Pure brands do not face the problems of a technological legacy. Neither do they face the costs of operating, maintaining and investing in an expensive infrastructure. Instead infrastructure access can be purchased from companies specializing in Pipes. In changing markets, brands can also quickly dispose of obsolete technologies and purchase services on new state-of-the-art technology platforms. This improves their ability to serve customers' fast changing needs.

The bottleneck in this flexibility is of course the speed of change that can be made in the IT landscape. A high degree of standardization is therefore of vital importance for brands to be effective. This standardization is exactly what new technology and cable companies are starting to provide.

Advantages of a focus on Pipes
Companies that choose to focus on the infrastructure and networks can open these investments to several brand-focused companies. Given the economies of scale in the industry, this is an attractive perspective. There is an additional advantage: the investments in Pipes can be used by more parties and thus have a longer lifecycle. In the early stages of the innovation lifecycle, the innovative brands are the key customers, while after that the volume players take over and ultimately the low-cost providers can become client of the network. Hence there is a much longer period in which specialized Pipe companies can earn back their investment. For consumers the additional advantage is that there will be less lock-in strategies in the market that aim to tie customers to obsolete technologies.

3.2 How to specialize

Specialization is a consecutive, three-step process. Below we briefly describe each of the three steps.

> The integrated model of the traditional telco, owning both Brands and Pipes will become obsolete

Step 1: Disentangling the governance
The first step is to position the Brand and Pipe, whilst still under one umbrella, at arms' length from the head office and govern them as two separate businesses. As well as having financial independence, the two units that are created will operate independently in process implementation, servicing of different customer groups and in the freedom to buy from, and collaborate with, third parties. They will also require their own separate targets that reflect the nature of their business.

As the "at arms' length agreement" will require both companies to operate as independently as possible while still acting under the same mother organization, there may be internal conflicts. For instance, the Pipe business may open up its network for competitors of the Brand business and the Brand business may buy services from a third party Pipe business. Therefore, the shorter this period lasts, the better. Another possible problem in this phase is building a new attractive image in the market. Customers may still perceive the company as one entity. Clear communication towards customers is therefore of the utmost importance in order to prepare the two businesses for the next step: operational disentanglement of the company.

Step 2: Disentangling the operations
The second step towards full disentanglement is separating the processes, people and technology. For a Pipe it is important that the technology is made accessible in such a way that as many Brands as possible can connect to the network and the services can be offered with different service level agreements (SLA's). By means of a 'plug and play' interface Brands should be easily connected to the Pipe. The separation will therefore yield the most concern between the Brand and Pipe in that area where both use the same elements of the IT landscape. Some parts of the landscape will be easy to assign to one or the other. The grey area in-between should be furnished as an interface between the two parties, but one that can immediately be made suitable for other parties.

Staff roles such as Finance, HR, Legal, Fiscal etc., need to be split and built up separately in their new roles. In our experience this is a split that does not cause pain from a governance or organizational background, but from a human perspective. Most people dislike giving up their power bases or seeing them diminished. Good change management and consistency in the execution of the strategy is therefore absolutely necessary.

An important decision before splitting the Brand from the Pipe concerns the product portfolio that the Brand and Pipe will offer. Figure 2 shows that Brands and Pipes have different options available to them concerning their choice of product portfolio. A Brand may offer additional services above simple telephony and data bundles, e.g. it may offer a back up service as well. It may also choose to deliver devices or not. The depth and breadth of the product and service portfolio is an important differentiator for Brands. Pipes may focus on offering access only, but they may also add services like fulfillment and billing. The latter may enable them to offer their services to non-Telco players as well, for example supermarkets that want to sell Telco services under their own brand name. These choices will also determine which part of the IT should go to the Brand or to the Pipe.

Step 3: Change of ownership
This step prepares the company for the final disentanglement into two separate companies. Once complete, two companies exist: the Brand and the Pipe company.

Overall, this is mainly a question of ownership, for example, who will invest in the two companies? It is beyond the scope of this white paper to go into this area any deeper. However, we can say that we see major sources of positive cash flow for both the Brand and the Pipe as we will demonstrate in section 3.3 and 3.4.

3.3 Exploiting the Brand

This section highlights some strategic options for Brands. These options may also be combined but which choice to make depends very much on the specific company and the market it faces. However, the key to success is to choose and focus.

Focus on data
Is there a future for Brands only? What is the impact on their portfolio if everything is data? What is a really distinctive Brand? Table 1 compares what the old and new portfolio looks like. Brands need to build their business model taking into account the new portfolio. In the last year it became clear that data is surely the future. Calling and texting seems out of date as other social media applications such as WhatsApp and Facebook have gained popularity, not least because they are cheaper.

Figure 2: Portfolio choices for Brands and Pipes

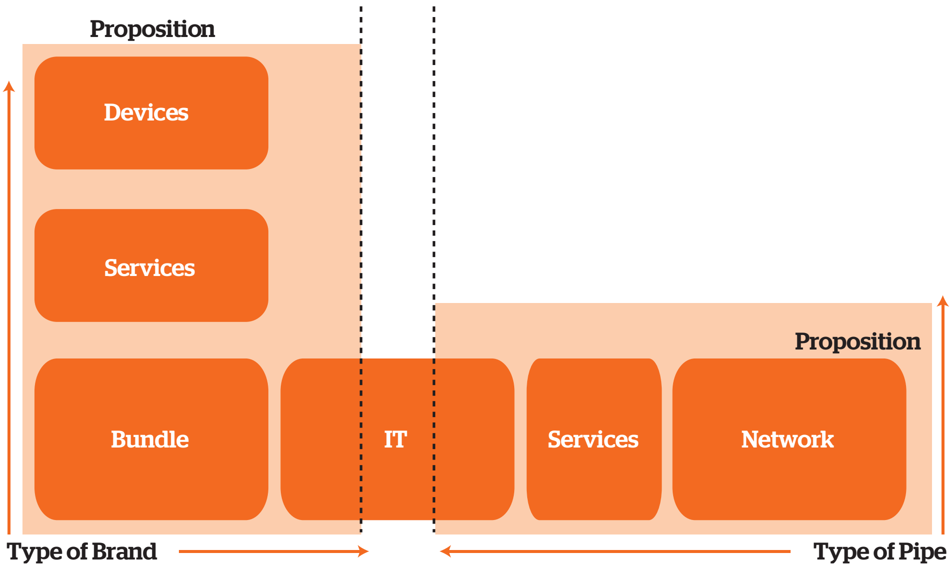


Table 1: Old and new portfolio of services

Old Portfolio	New Portfolio
Texting	WhatsApp
Speech	Skype
Unlimited data	Data bundles
Sale of phones	Bring your own device
Shops	Shops and online
Minimal service	Customized service
No content	Local and custom-made content

Exploit layered communication
An independent brand will be managed more on customer experience and brand perception, and less on cost levels. Directing all interactions between devices and services for customers, giving customers a clear overview despite the inherent complexity, relieving them from problems, facilitating independence: that is added value a customer wants to pay for. Furthermore, people have social layers in their lives: personal, family, friends, work. Each of these layers needs tailored information and tailored services. Google has understood this and its iGoogle is the first service that reflects this market need. It enables users to collect information on the Internet that is relevant to their needs on their own site and on all devices with browser access. The Brands born out of the traditional Telco may also offer these services and may even have a head start over OTT players because of their better customer knowledge.

Balance between costs and rates
A Brand can have customer groups that differ greatly in their use of the services. Based on that usage a Brand might therefore decide to partner with Pipe A for its Early Adaptors if Pipe A offers state-of-the-art technology and the most bandwidth. Alternatively, the Brand might join Pipe B to serve customers that like simple services for low prices, if Pipe B offers last century, relatively slow but most importantly very cheap infrastructure.

Deliver value-added services
Another business model is to emphasize service delivery. This requires local presence and delivering services that truly add value. Vodafone offers an entire platform with apps that help clients with installing and using apps on their phones. For various groups of customers, such service propositions can be very attractive. Think of the average person over 65 as someone that would benefit most from a readymade working phone that suits their type of use. For example, with their favorite phone numbers already installed, an app with all timetables of the nearest bus stations in the area and the program of all the local concert halls. Local information is particularly valuable for this group. Therefore, the more a service provider is able to access and distribute local information, the more useful its services will be and the stronger its footprint in the market.

Play internationally
The opposite strategy of localization presents an interesting strategic option as well because scale has a number of advantages for Brands. Firstly, increased purchasing power will lower their costs when they source from a Pipe. Secondly, there are economies of scale in R&D. The higher the subscriber numbers, the lower the investment in R&D per customer becomes. Here it is not unusual for Chinese parties to test the latest technologies in markets with 50 million subscribers. The cost advantage is clear. Finally there are also marketing benefits. For instance marketing communications can be used internationally. For instance, Eva Mendez and the McLaren Formula 1 team are figureheads of Vodafone. Here a global footprint gives an opportunity to use worldwide celebrities as icons which appeal more to most people than local heroes. For these reasons internationalization is a good option to build and exploit brands. And, as brands can source local networks, the technological complexity and cost of rolling out a brand internationally will tend to be limited.

Strive for supplier independence
The above options all have one aspect in common - they require flexibility and independence from technology and network suppliers. Independence increases the flexibility brands have to adapt to changing customer demands. It enables them to switch technologies easily when new, value adding technologies become available. This is not only true for sourcing technology, but also services can be sourced in a similar way. If a company develops an interesting service, the Brand then faces the choice between developing a similar service or sourcing it. The latter will be faster and cheaper, but it can only be done when the platform the Brand uses is sufficiently flexible.

3.4 Exploiting the Pipe

Collaborate to co-create
As a standalone Pipe there is more freedom to experiment, innovate and collaborate with specialists in technology. Increasingly Telcos are creating consortia to develop new technologies faster and cheaper, while sharing the risk. One example that Telecom companies cooperate on is the development of LTE. But this form of collaboration to co-create innovations is not limited to the technology side of the business as brands may be involved as partners as well. Here the first steps for the Brands are interesting innovation partners that may be able to help develop new services that could lead the way to revenue generating opportunities for the Pipes.

Stretch the technology lifecycle
To fully profit from the investments made in technology and networks, Pipes should stretch the technology lifecycle as much as possible. This is a three phase process. First, with innovative brands they can bring new techniques to the market. When the first and early movers have adopted the new technology, the volume players will then implement the innovation and innovative brands may benefit from spreading costs over a larger volume. Finally, low cost providers that bring sharp propositions to the market on the basis of written off technologies are the end customer.

Exploit end of life infrastructure
Because Pipes have a focus on infrastructure, they can be more creative in exploiting and renewing technologies. For example, the end of the economic life of infrastructure in advanced economies may not be the end of the technical life. Infrastructure that can be moved may be reused in countries that are technologically less developed or less demanding.

Focus on plug and play
To be able to quickly add Brands to a Pipe, the identification and maintenance of standards is crucial. The easier it is to connect a Brand to a Pipe, the more attractive that Pipe will be. For the Pipes born out of traditional Telcos, this requires a high degree of process simplification since their current processes are overly complex. By standardizing and simplifying the operational costs will be reduced significantly.

Invest in servitization
Technology maybe the core of the Pipes' right to exist but there are plenty of additional opportunities for them to distinguish themselves from competitors. One example is Ericsson which increasingly delivers additional services such as maintenance and problem management. This trend of adding services to technology (servitization) relieves Brands from complexity. It enables them to focus on their core processes and thus is a valuable service to them for which they are willing to pay and so creating an additional source of income for the innovative Pipe.

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