

# From industry norms on full costing to ecologies – on pricing principles in telecom

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## Principles for pricing

Once upon a time, Swedish manufacturing enterprises reached an agreement on how to calculate full cost so that differences in price depended on efficiency differences, not on different computational principles (Sveriges industriförbund, 1937, Unified principles). Full costing as a basis for price determination then held its ground for a long period, even though marginal costing was viewed as an alternative in special circumstances. When I studied views on costing in the international pharmaceutical company Astra's division Wet production, some 20 years ago, there was considerable disagreement on whether it could be appropriate to use marginal cost in certain cases, or if full costing should always be the basis for pricing (Westelius & Westelius, 1990). Perhaps, costing could be adjusted in the direction of ABC costing, with its ambition to find causal bases for cost distribution, rather than an ossified costing model of schematic cost attribution. This ambition was inspired by the then popular "Relevance lost" (Johnson & Kaplan, 1987), or simply by the Swedish tradition of viewing causal cost distribution, rather than schematic cost attribution, as the ideal (Johansson and Samuelson, 1988).

By then, marketing people had already started out as missionaries for customer value, not costing, as the basis for pricing. To a profit-maximising seller, it may seem like a beautiful theory. To a consumer activist, the idea may seem revolting if it implies that the entire consumer surplus should be appropriated by the seller. But in practice, the market situation and the competition is what guides pricing. There are cases that resemble the perfect competition of economics textbooks – no material differences exist between the competitors' products, and the competitors put price pressure on each other until no more than "normal" risk-adjusted interest on capital employed can be achieved. If there is a customer surplus, it stays firmly with the customers – "leaving money on the table", as marketing people regrettably term this. Provided that there is such a thing as a meaningful full cost, and that the competitors compute it in similar ways, an equilibrium could be established.

## The time is out of joint

In pricing of today's often increasingly IT-based products, these principles no longer work. Almost all the cost is of an investment character. R&D – the production of copies is achieved at no or very low direct cost. Nothing counterbalances the sales person's wish to lower the price yet a little to land the deal – not unlike the Astra salesman's wish to sell off a consignment on the Middle East spot market without being bothered by cost attribution to cover R&D or production facilities. If the customer maintains that there is no costly item production and that the development cost is "sunk", and the salesperson agrees, there is

nothing more than the competitors' prices that can stop the price erosion towards zero. And if the competitors' salespeople argue in the same manner, the nose-diving price spiral gains momentum. For example, international sea cables have an estimated life expectancy of 15 years and could take up to six years to move from idea to operational installation. But price per unit of North Atlantic transfer has fallen to half a per mille since 1997 (Telegeography, 2011). Under such circumstances, it is difficult to establish meaningful life-cycle costs and to base pricing on them.

Must this be the state of affairs? Is it reasonable that a party that produces some kind of useful goods or service that is in demand should find it difficult to survive because of problems of attaining a long-term viable price? The question is difficult to answer, but it does move the focus from full costing as the natural basis for pricing to some kind of agreement between the parties of what a reasonable compensation for each one's contributions should be, and towards the question of whether long-term cooperation, where also the counterpart's survival, not just the profitability of the isolated deal, is of importance. The question of fairness can be sharpened even further, if a party somewhere in the value system manages to reach splendid profitability, while others are worried about survival. The situation can resemble the internal debate of whether the salesperson, who "pulls in" the money to the enterprise, should have a considerably higher salary than the production worker or the developer who are farther from the source of income. Or what the individual at the organisational summit, who can lean on a comparison between his or her own salary and the aggregated income of the company, should receive as compensation in relation to the grassroots, who only have the income flows in their organisational proximity to leverage their claims.

In the project PICT, Pricing of ICT, we have as a first step developed a taxonomy of pricing parameters that, in addition to the price level, can be of interest in constructing a deal. In our taxonomy, we focus on five: the scope of the offering, from single product attributes to entire product systems; the buyer's temporal rights, from single occasion to eternity; price formula, from price variable by volume or attributes to fixed price for the entire offering; the pricing mechanism, from price list, via negotiation and auction to exogenously determined price; and the pricing information base, from cost, via market prices to customer value (Westelius et al., 2010). By attempting to direct attention at such parameters, the singular focus on price level can perhaps be broken and a richer pricing concept form the basis for differentiating the offering. But pricing is not just conducted in an isolated negotiation between a seller and a buyer. It takes place in a context that is increasingly often termed "ecology" – a value system consisting of many parties, and where no single party controls all the others. In this essay, I describe telecom ecologies (such as the iPhone, the Skype and the Google ones) to see how different actors collaborate and how compensation moves – or could move and be distributed – within the ecology.

## Ecologies

According to Encyclopaedia Britannica, the word *ecology* was coined by the German zoologist Ernst Haeckel (1834-1919). Based on the Greek words *οἶκος*, (meaning both a place to live and the interacting assembly of those living there, the household) and *λογία*, (study of), he wanted ecology to denote the relation of the animal both to its organic and inorganic environment (Encyclopædia Britannica, 2011). In line with those intentions, ecology has today come to denote the study of organisms and populations and their relations and interactions with each other and the environment. Relations and interactions in an ecology do not have a clear, common direction and are not controlled by an overarching intent or

purposefulness. This is why I here prefer the concept ecology, both to more linear ones, such as value chain or Porter’s value system (connected value chains), and to more non-linear definitions of value systems, value networks or value constellations (e.g. Normann & Ramirez, 1993) as they tend to build on ideas of an overarching intentionality or goal-directedness. Ecologies can contain chains, but are not restricted to chains. Certainly, networks can be pure descriptions of relationships without maintaining that the networks are designed or maintained by some mastermind, but to avoid confusion stemming from how such terms have been used previously I choose the (now increasingly popular) *ecologies* due to its pronounced non-intentionality. Furthermore, I use the ecology concept in a system-theoretical tradition, where a system is an analytical concept denoting what the analyst chooses to focus on rather than some pre-existing, fixed entity that the analyst discovers.

## A generic telecom ecology

Figure 1 shows a schematic ecology description.

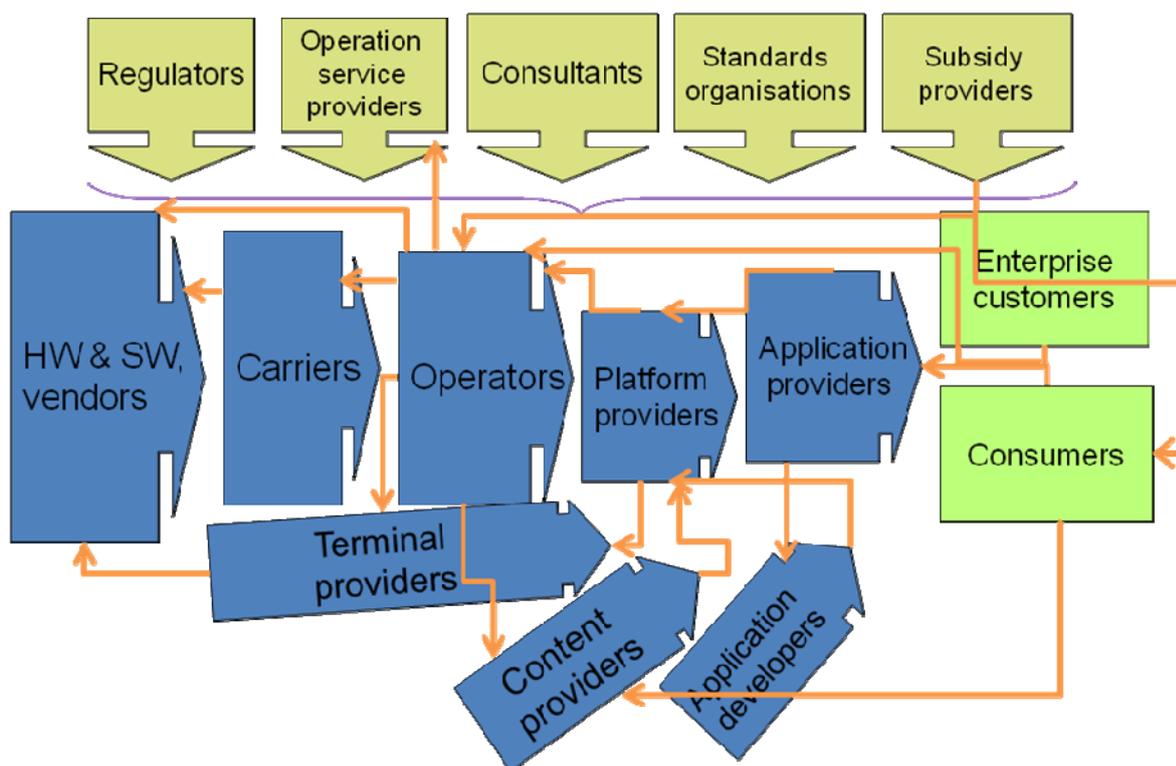


Figure 1 A generic telecom ecology

### *The ecology actors*

The blue arrows depict actors who form parts of a product and service flow from a specific end customer perspective. In order for an end customer to receive telecom services, hardware and software forming the basic telecom networks (telephony, the Internet, etc) is needed, as are carriers who operate parts of the networks and operators who have end customer contracts and lease or operate networks reaching those customers. Today, it is also common that there are applications resident in the end user terminals (handset, PC, etc), rather than in the telecom net. Such applications can be supplied by application sellers (e.g. Apple’s iStore, Android market and Nokia’s Ovi store) who are not part of the operators and who act as resellers to independent application developers, who in turn often use development platforms

that are not necessarily provided by operators (e.g. iOS SDK, Android SDK and facebook). Developers and manufacturers of telephones and other end user terminals serve as terminal providers (e.g. Nokia, Samsung, HTC and Apple) and often reach end users via operators or independent middlemen. Content suppliers, finally, contribute with material that end users may want to access via the telecom networks. Examples include entertainment companies, television networks, game companies, weather services and news agencies.

In addition to such value system participants, further actors may participate directly in the delivery process, such as *operation service providers* (one of the yellow arrows at the top of the figure) who operate networks on commission, and other *consultants* who can aid in development, planning, valuation, market analyses or simply as extra capacity workforce. Some actors attempt to control other actors, for example national and supranational *regulators* and inspection agencies, and *standards organisations*.

### ***The ecology cash flows***

If we look at cash flows in the ecology, focusing on the payments that make delivery to end customers possible (the orange arrows in Figure 1) the majority originates from the end customers (*enterprise customers* and *consumers*), but some also stems from subsidy providers. These subsidy providers can be state, private or non-profit actors who want to enable potential end customers who lack sufficient ability to pay to also be able to use telecom services, or ensure that areas that operators deem commercially unattractive are provided with coverage. The results from a pricing perspective differ substantially depending on the type of subsidy. There are subsidy or aid projects that are so small, in relation to the market they operate on, that the subsidy providers become price takers and pay the current market price. There are aid projects where the operators decide to contribute by offering special rates or deliver services pro bono. And there are subsidy programs, like broadband coverage in sparsely populated rural areas in the USA, where the government has set service quality standards and prices based on some type of full costing for conventional, terrestrial networks, turning it into segments of marginal interest to terrestrial operators, while for example innovative satellite telecom companies, with a different type of cost structure, come to view it as a high-margin niche (Dankberg, 2011-01-17).

The customers' payments go to operators, but also to some (perhaps even increasing) extent to application vendors and content providers. For example, streaming video (video on demand and IP TV) increased sharply last year, has exceeded file sharing in traffic volume and is estimated to form more than 40% of traffic volume in a few years (Cisco 2010). Pricing is strongly market-based. Price levels at each market or market segment are largely determined by the one who sets the lowest prices. However, prices between markets can vary drastically, with differences of an order of magnitude or more. And since many operators are international, with some stronger and some weaker market positions and with ambitions to grow, it is not unusual for those entering a market to set a low price that the incumbents then need to match. The purpose of setting a low price can both be to buy market share, and to hit at the profitability of the incumbents. At industry conferences (e.g. Digiworld Summit, ITS and PTC, international conferences with a strong participation of representatives of telecom companies of different kinds) concern is voiced regarding how network operators (*carriers* and *operators*) will be able to cope with the investments needed to satisfy ever increasing traffic volumes while rates fall, sometimes drastically. In response to such concerns, it has now become common that the popular fixed price contracts, that became popular a couple of

years ago, are replaced by contracts with some kind of cap: either a price variable by volume above a certain volume, or a capacity limitation if a certain volume is exceeded.

The application development and supply is segmented by the terminals' operating system. To some extent this is also true for content. For consumer markets, standard prices have become adopted – for example a dollar or a euro per unit. These prices are obviously not based on product costing, since costing where the majority of costs are development costs are entirely dependent on the estimated sales volume – something that is extremely hard to predict in such markets. Neither are they customer-value-based, since it is unreasonable to assume that the majority of all the applications or all the content would have the same value to the customers. It appears more reasonable to see this pricing as a guess at the ability and willingness to pay at a mass market. A dollar or a euro is a price that an average customer could be willing to pay without getting upset if it turns out at the time of use that the experienced value is less than the price paid.

Pricing of content is also affected by the abundant availability of free material via the Internet (within or outside the law). Pricing may here on the one hand depend on the prospective customers' perceptions of the consequences of breaking the law, and on the other hand of their sense of justice: foremost their wish to award authors a fair compensation for their creations. Thus, neither in pricing of content does traditional product costing form a meaningful part.

In order to deliver telecom services, operators need to purchase capacity from telecom service wholesalers and / or network equipment from hardware and software providers. Both these types of suppliers have increasingly standardised offerings on deregulated and increasingly competitive markets and are experiencing strong price pressure. Price-setting power therefore lies with the buyer, but prices can vary widely between markets. On the network equipment side the price pressure is increased because a strong player (Chinese Huawei) has a financially very strong owner (the Chinese government) and, according to a widespread view in the industry, other goals than traditional Western profit seeking. Some operators may also choose to buy services from players who can manage the network for them. Here, too, there is price pressure from the Chinese player, but each equipment supplier has a fairly strong position when it comes to operating their own equipment.

Terminal developers and manufacturers (Nokia, Samsung, Apple, HTC, SonyEricsson, etc) interact with the platform providers (sometimes within the same group, sometimes beyond) and with operators and, possibly, application developers and application providers. Depending on the market, operators are buyers of the phones and other terminals that they bundle in post-paid contracts with fixed monthly fee components, or end customers buy the terminals directly from producers (or via phone or computer retailers). This segment deals with distinctive consumer products developed from a target-costing view, where the expected volume of sales is obviously an important factor, but the prices are largely determined by the type of phone - smart phone, advanced mobile phone, simple mobile phone - and are relatively constant between product generations, even though the price of a given model falls rapidly as new models become more attractive.

Pricing, and the conditions for pricing, can also be affected by other players. For example, governments tend to have the ambition to break monopoly-like situations by regulation – phone number migration, network owners' right to choose whose traffic will be allowed on

the network, roaming charges, etc. In cases such as phone number migration, regulation has led to increased competition and operators vying for one another's customers, trying to buy them over. In the case of roaming charges, which is an important and lucrative source of revenue for many companies, the price cap has rather become a cartel price level that no one undercuts - why charge less than the permissible level? But regulators mainly affect operators and to some extent telecom wholesalers. Telecom equipment suppliers may however be affected by policy decisions - such as when India for national security reasons do not want Chinese equipment and Chinese telecom networks, providing the non-Chinese suppliers with a reduced price pressure on that market.

Consultants such as research and analysis firms can affect pricing by developing comparative statistics and forecasting future developments. This both reduces information monopolies and aligns and drives expectations.

The natural course of pricing in a system like the telecom world is that the competitive landscape will have a decisive influence. In an increasingly integrated world, which requires standardisation, the scope for differentiation is diminishing. Certainly, there are occasional statements such as "there is nothing wrong with being a pure bitpipe provider as long as one can make a good profit on it." But most actors seem to agree that it is difficult to obtain good profitability in such activities. The trends above tend to move the markets toward the economists' perfect competition, while the technological development and the negligible cost of reproduction compared to investment costs make it very difficult to form a relevant – or joint – picture of "real" costs. Therefore, more and more players think along the lines of how to create more differentiated offerings through upstream or downstream integration – in-house or as partnerships. I now turn to those thoughts.

### **Aspirations to get closer to end-user revenues**

At the Telecom Conference PTC11 in Honolulu in January 2011, a number of voices were raised for the value of seeing beyond "your" step in a value chain or value system. For example, a Sri Lankan telecom operator head (Sidhu, 2011-01-17) noted that mobility has become essential in today's society, but that an operator cannot live on basic telecom connectivity and voice traffic. The trick is to offer experiences, something that companies like his DialogAxiata do not have in their original business plan. The challenge for operators is to manage expectations of the experience delivery, and to get customers to appreciate it as a paid service. Quality of Service (QoS), Service Level Agreements (SLA), exclusive content and end-user experiences through the network, this is what operators will need to learn to handle. Part of this is to become good at delivering things quickly, for example through partner organisations rather than by building everything yourself. An Indian Vodafone manager claimed that also telecom wholesalers need to become involved in content delivery, since, for example, different contents can have different quality requirements for IP packet transport (Jhamb, 2011-01-17). If all parties understand and contribute to the final delivery, the proceeds may also be shared between all parties.

The need and the ability to differentiate offerings based on quality of service was underscored by a Singaporean telecom wholesale manager, among many others (Montefiore, 2011-01-17). Different customers have different needs for quick connection between end points (latency) and traffic volumes (Gb/s). Therefore, it should be possible to offer different versions at different prices. This is a customer value argument. Today it is mainly applied to customers with extreme requirements for point-to-point speed and availability (stock markets and

financial actors, in particular) who are willing to pay premiums on x10 or even x100 compared with standard connections. If product differentiation could spread to mass markets, I find it likely that competition in the sale to the retail level will lead to a situation where customers' willingness to pay decreases rapidly as the competing providers undercut each other in terms of price / performance, and then you are back in a world where neither product costing nor customer value determine prices.

## Exploring ecologies - three examples

One way to think along other lines is to achieve a greater integration between the actors, rather than restricting the interaction to simple and transparent transactions between two parties at a time in a standardized and well-defined market. Some successful examples of integration of this type are Apple's iPhone initiative, Skype and Google. These will now be described using the generic ecology actor and cashflow map as a framework.

### The iPhone ecology

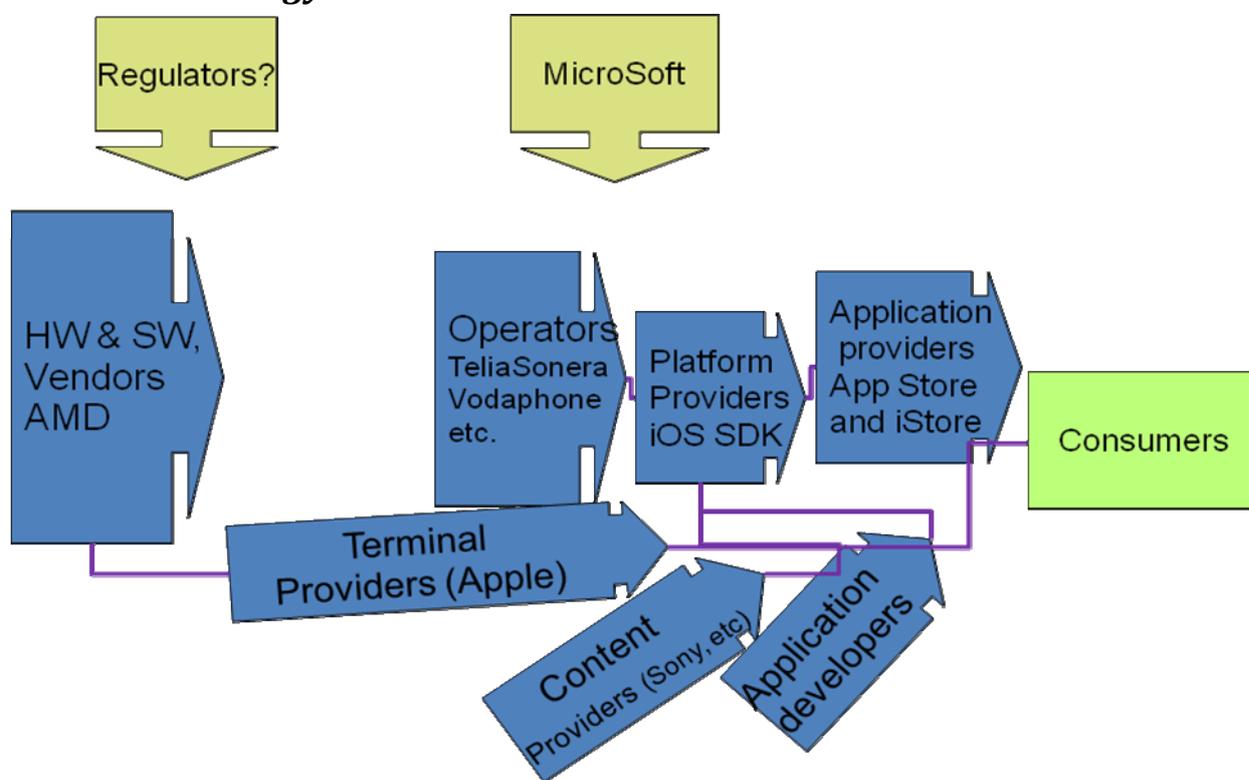


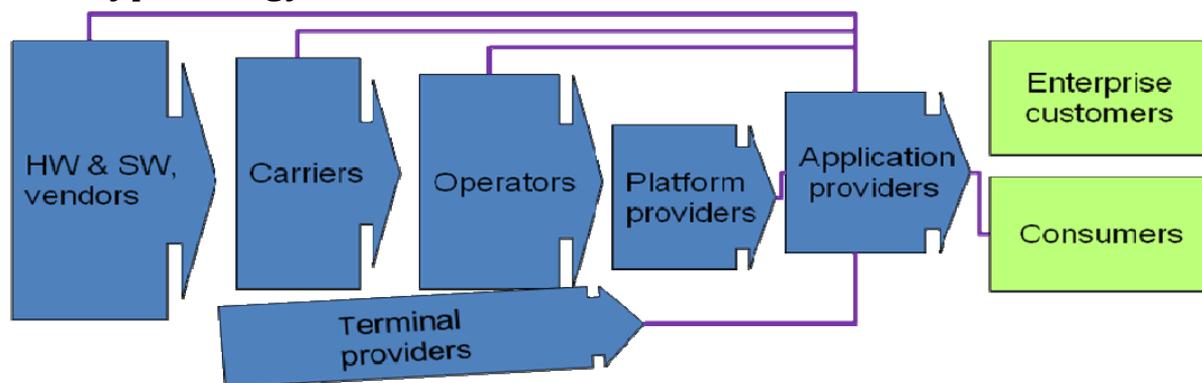
Figure 2 The iPhone ecology

In the iPhone Network, Apple is a major player, offering terminals (iPhone, iPad, but also Macs), a marketplace for applications (App Store) and for content (iStore), a platform for application development (IOS SDK) and content delivery (iTunes and the file format AAC) and has strategic alliances with hardware manufacturers (ARM Ltd. of processors), operators (TeliaSonera, Vodafone, etc.) for mobile broadband contracts for the terminals, and content providers (both the major brands Sony, Universal, Warner and EMI, where the relationships at times have been very strained, and smaller, independent (indies)). This is already more than most competitors, but in addition, Apple has a relationship with tens of thousands of independent application developers who can sell their products (when their quality is approved by Apple) via App Store at pre-specified sales commissions to Apple. And, most

importantly, they have a relationship with consumers, both in terms of user communities and automated collaboration – deleting an app on your phone means that the assessment "one star" is sent to the App Store rating systems. The user community has both a positive charge – "the Apple world" – and takes advantage of customers' rejection of the giant Microsoft. In addition, up to now, Apple has had an advantage of not being market-dominant. If Microsoft had had an equally hard-integrated and locked solution, they would probably have had problems with competition-promoting authorities. Because of Apple's success, regulators are now likely to take an increasing interest in the Apple network and business model.

Payment-wise, it is Apple who charges the consumer for the sale of apps and content. They also sell some terminals to consumers, but to a large extent they sell through the operators, as part of operators' end-user traffic subscription offerings. The operators and other players "upstream" benefit from that an average iPhone has much more data traffic than conventional phones (30x) or previous smartphones (2.5 times). This increases demand for not only operators' but also wholesalers' and telecom equipment vendors' offerings. The collaboration with independent app developers is also to mutual benefit. Apple does not take a risk in terms of development costs and gain access to a huge and constantly further developed app portfolio. Customers can, through other customers' assessments, orient themselves in the app supply concerning quality (or popularity). Given the potentially huge market and the unit price structure (the same app price to all consumers) it is not reasonable to try to price according to each consumer's perceived value. Instead, there is a great incentive to try to reach a mass market. A price that is so low that many people try the product will, if the product is good, lead to popularity ratings that generate additional sales.

### ***The Skype ecology***



**Figure 3 The Skype ecology**

The Skype case began with an application for computer-to-computer voice and video calls, with chat and file transfer options as a supplement. An important part of the application is that it is not limited to looking up the other users that exist, you can also see who is connected to the service at present. Skype use on the one hand hit the telephone operators' voice traffic, but on the other hand created data traffic in the networks and a demand for Internet access. The paid services Skype In and Skype Out – to make calls from regular phones to a Skype subscriber and vice versa – reinforce competition with phone operators as it makes a Skype account a "full" telephone subscription alternative, but simultaneously can be viewed as collaboration because the arrangement generates local calls at the conventional telephone end and requires Skype to buy capacity in traditional telephony nets that is then resold to Skype customers as paid services.

For international telephone traffic, which belongs to the more profitable services for operators, Skype has developed into a strong contender. According to Stephan Beckert, TeleGeography (2011-01-17) the volume of international Skype traffic is 42 billion minutes (in 2010) while the classical telephony volume is 15 billion minutes. Even if many Skype calls would never have taken place as paid calls in the telephony system, it is most reasonable to assume that Skype is a real competitor attracting some traffic away from telecom operators. In France, the telecom operators have launched contracts that include free international calls, which could be perceived as a countermeasure against the Skype expansion. Reportedly, half of the French subscribers had signed such contracts by early 2011. Pricing wise, free calling is obviously neither cost nor value-based, but is rather to be viewed as marketing activities to build customer base or defend market share that is expected to generate other revenue.

Over time, collaboration developed between Skype and some mobile developers – and operators with growth ambitions – which enabled Skype calls as data traffic from mobiles. Previously, opposition to Skype was strongest from mobile-phone operators, as Skype calls cannibalised profitable voice traffic. Resistance continues, but once an operator starts to collaborate with Skype in a market, it may become important for others to not deny the existing and potential customers the same opportunity, to prevent that dissatisfied customers change service provider.

In order to deliver good call quality – especially on video calls, which require the transfer of much larger amounts of data than phone calls – it became important for Skype to as quickly as possible transfer the call from the Internet (which is "best-effort" traffic) to the Ethernet connections, where transfer speed and packet delivery can be guaranteed, and to return the call onto the Internet as close as possible to the endpoint. The more of the call path that goes through the Internet, the greater the risk of disruption and poor quality of the call. The fast and easy solution for Skype is to rent capacity from wholesalers and operators, who then become customers and partners. And on routes where sufficient amounts of Skype traffic moves, as Skype grows, it becomes interesting for Skype to build their own transmission capacity, optimised for Skype traffic – and thus become a customer of network equipment suppliers and competitors to wholesalers and operators (Rosenberg, 2010-01-18 ). The business model is still to be dominant in IP-based voice communication with and without video by free software and services, and to receive revenues through paid services – which are priced based on market prices. A growing part of the business model is to be the voice and video platform for other service providers who purchase a license to use Skype's technology instead of developing their own solutions.

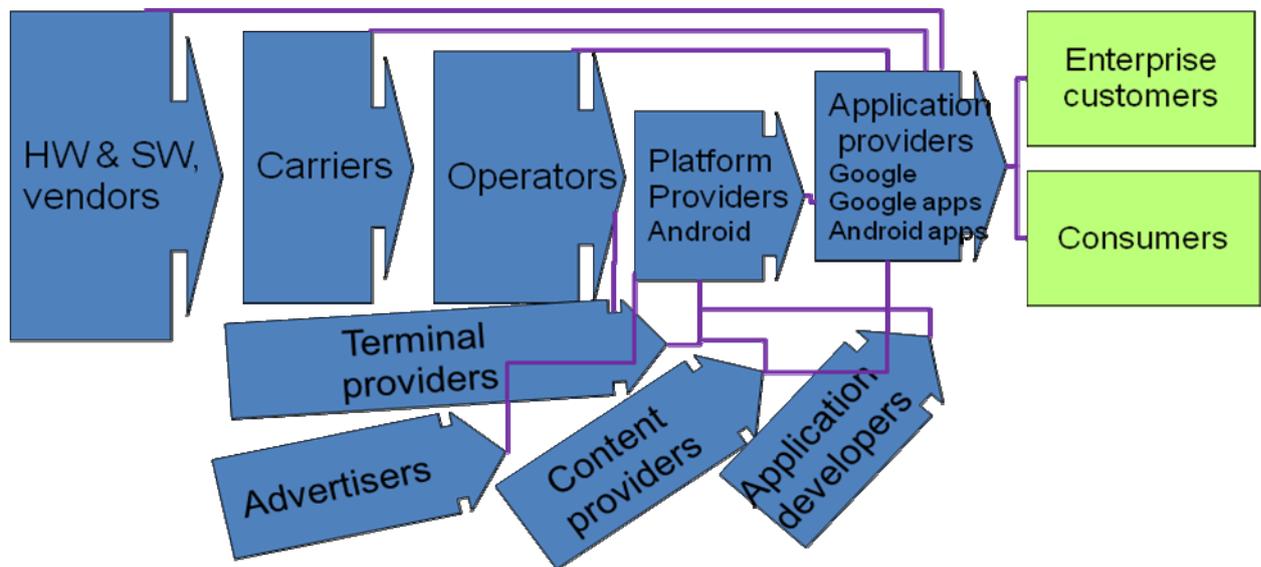
Google Voice, a unified voice communications solutions from Google, where users can dynamically specify which of their configured telephones that should handle the call, also handles Skype, but as long as Skype is not SIP compliant (a telephony standard), Google Voice is not be able to replace Skype In.

### ***The Google ecology***

Unlike Skype and iPhone, the Google ecology does not have its beginning in a connection with telephony, but has slowly developed it. The core of the Google ecology is the Google search engine, which rapidly outcompeted the existing alternatives to such an extent that in many languages, searching the web has become a verb taking its name from the company, like the English “to google”. The search engine creates interdependence between web content providers and Google. Google's main source of revenue is advertising (Google AdWords),

where Google offers an advanced form of content-sensitive advertising with dynamic pricing – the advertising client indicates its willingness to pay, and ad space is auctioned to the highest bidder for the specified search terms.

Part of becoming dominant in the search market (and advertising) is to also offer complementary products such as Software as a Service - Gmail, Google Apps (corresponds to resident Office packages), Google Translate, etcetera. Google reserves the right to analyze the content of communication and searches through the free versions, to thus obtain a better picture of what people are interested in and thereby further improve the search engine. For companies, it is possible to pay for the products instead and then both avoid ads and content analysis. Even though there is a growing effort to get paying organisational customers, the overwhelming majority of Google's revenues still come from advertising sales.



**Figure 4** The Google ecology

Since the entire Google offering is based on online services, the technical communication quality is important for the customer's use experience. The services need to be accessible and have short response times. Just as Skype has contracts with operators and wholesalers, as well as builds its own network capacity, Google has begun to do so (Gill, 2011-01-18). Optimisation of Google's network has two different components, with different requirements profiles. One is to move large amounts of data, but without the requirement for real-time performance. It is needed to, for example, place high-demand cached search material and search index at nodes near the major concentrations of users. The other is that customers' use should be as fast, safe and uninterrupted as possible. Of course, both Google and Skype try to meet the requirements of telecom performance as cost-effectively as possible, but in neither case is their pricing based on cost estimates. What they charge for is priced in relation to prevailing market prices or, in the case of Google's ad sales, an auction process that will be reasonably close to a customer-value-based pricing.

Over time, Google has come increasingly closer to the telephony sector, in step with how mobile platforms increasingly become everyday tools in society. Their development of the Android operating system; their introduction of "own" phones and HTC's continued investment; Sony Ericsson's and others' Android phones keep adding to the Google ecology, both directly through Google-customised terminals and because there is now a platform for

apps development of Google-compatible applications that attracts tens of thousands of developers to write hundreds of thousands of apps that have been downloaded millions of times. Less than one per cent of them reach a real mass market (more than 250,000 downloads) and two-fifths will definitely not (less than 50 downloads). 65% are free apps and 35% paid apps (Androlibs statistics page, visited 2011-01-21). This part of the ecology can be encouraged, but hardly controlled, by Google, and it is self-financing.

### ***Concluding remarks***

In conclusion, I think I can safely say that pricing in the telecom-ecology is not based on product costing but rather on market prices as determined by a complex interaction of factors – especially international strategic games between players. It also seems very unusual for pricing to be strictly based on customer value; the exception appears to be Google AdWords. Under these circumstances, the complex web of actors and their interdependencies becomes an important base for the pricing process, and considerations other than quantifiable costs or customer value govern the pricing. It is reasonable to assume that this result is based on the telecom world's more and more investment-heavy and low-reproduction-cost structure that makes classic product costing difficult to use, and strong competition on fairly standardised markets, that make customer-value-based pricing difficult. As the IT component is increasing in many sectors, this may be a trend occurring in many parts of today's society, not just in telecom.

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