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## Chapter 15: NGN Strategies for Capturing the Consumer Market

### Introduction

Consumer services can broadly be divided into two major areas: *content* services, where the customer is offered professionally produced material for entertainment, information or education; and *communication* services, where the customer is offered the ability to create a two- or multi-way information-bearing channel with other communicating entities (one or more persons, computer systems or some combination). This distinction is not at all absolute: TV programmes come with interactive features such as viewer voting, while Internet surfing is all about accessing content. However, in business terms the value chains, or value networks, are today largely distinct. And this chapter, as previous ones, is anchored by the concept of value networks.

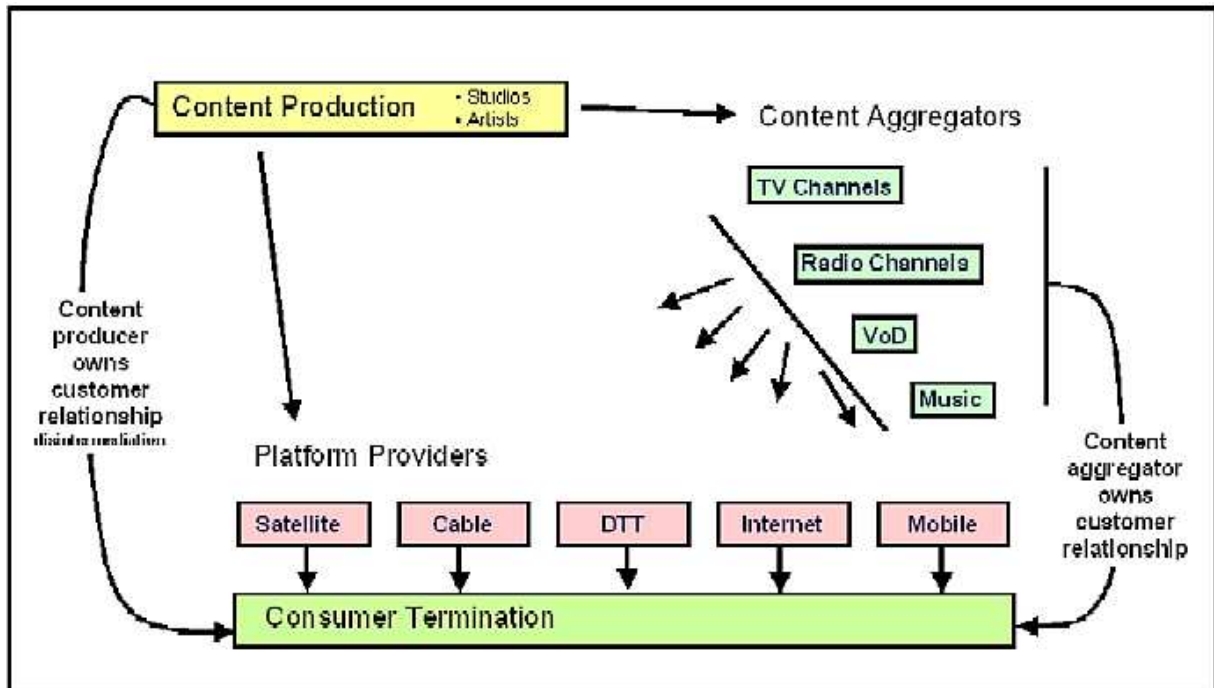
The Internet and the next-generation network supply a kind of ‘external shock’ to the existing value chains, both for content and communications services. We will start by considering the former. In this chapter ‘content’ means digital content such as digital TV and radio, film and music. Where I mention TV, both the broadcast of linear channels and video-on-demand (VoD) I will usually mean the possibility of radio channels as well. The relevant technologies were discussed in some detail in chapter 3; here we look at the business structure of the market and the strategies of the various players. After discussing content services, we will take a look at the business strategies for players in the *communications* services sector of the consumer market.

### Business strategies in the content services sector

The value net for content services is shown in figure 1. It comprises three main types of player: content producers, content aggregators, and platform providers. We will take a look at each in turn.

#### *Content Producers*

Content Producers create programmes, films, books, music tracks and performances with the intent that consumers should find their work valuable, and should pay to experience it. The problems they face are to acquire an audience at all, to deliver their product to that audience and to secure payment. There are so many potential providers of content in a busy and inattentive world, that all of these things can be very difficult. Content producers usually need help from downstream in the value net. However, things are



**Figure 1. Value network for content services**

dynamic. If a content producer can acquire a reputation, a devoted (read 'locked-in') audience and a low-cost distribution and payment mechanism, then the said performer might be able to appropriate most of the value from his or her work. Internet bands, at least in the early stages of their career, are a contemporary example. This worries other parties to the value chain who fear 'disintermediation'.

### ***Content Aggregators***

Samuel Johnson famously said "No man but a blockhead ever wrote except for money." However, the author frequently finds that he or she needs help to monetise their excellent literary content. The purpose of content aggregation is to better secure revenue streams, either from consumers through subscriptions or pay-per-item, or from advertisers drawn by the aggregated audience, or frequently from both. In order to achieve this, the content aggregator provides a number of value-adding functions. The first is filtering and consolidation: by topic, by relevance and by quality [1].

Filtering and consolidation in today's TV industry is carried out by programme schedulers, who use their understanding of the target audience of a particular channel to schedule a sequence of programmes which are aimed to hold their attention. This is as true for general entertainment channels as the more specialised channels covering areas such as news, sports, history, arts or technology. Note that a single channel is itself an aggregator, but companies which function in this space seek to address wider audiences by

further aggregating a number of channels, either in-house produced, bought-in or a combination of the two. The BBC and Sky in the UK are well-known examples.

The music recording industry aggregates music tracks within artists/genres as CDs, or increasingly as a themed inventory in online stores. Publishers offer technical books, novels, magazines and newspapers and struggle to figure the Internet angle for content dissemination. The film industry's price-discriminating distribution sequence of theatres and cinemas, hotels and airlines, DVD, pay and subscription TV and finally free-to-air TV, and their concerns with an Internet distribution model are also well-known.

By a careful use of their editorial, scheduling and quality-assessment skills, the content aggregator can create a consolidated experience for the customer which has stability and predictability. This can create the basis of an enduring relationship which can be monetised - the basis of brand identity and brand power.

A second function of the content aggregator is a reduction in transaction costs, the standard role of the middleman. The content provider does not have to deal with a myriad of platform providers (or they with him), or try to secure payment from an unbounded number of consumers. Likewise the consumers are not faced with the impossible choice of finding and establishing relationships with a dynamically shifting population of content providers: the task is sub-contracted. These are the forces which shore up the role of aggregator and resist disintermediation.

### ***Internet Search Engines as automated content aggregators?***

But perhaps in the new world of the Internet, search engines can aggregate dynamically with less cost and overhead than existing people-intensive companies? Could Google be a content aggregator? A search engine has to solve the same set of problems as existing aggregators do, namely

- identify the relevant population of content providers
- rank them by topic, relevance and quality
- present them to an audience and permit selection
- ensure content delivery
- organise payment.

In principle technical solutions exist to each of these problems. The issue is more how good these solutions are from the point of view of the customer experience. How would you rate Google News - automatically put together - against an online newspaper?

The relevant population of content providers is anyone publishing material to the Internet. This is not just as-yet-undiscovered bands. With conditional access systems enforcing digital rights management, digital material can be safely distributed over the Internet as we have seen with music download sites.

Regulation is increasingly forcing owners of digital content to publish, for a fee, over the Internet. It seems that as more high-quality items finds themselves on the Internet, search engines should be able to locate them, and it is in the interests of the content publishers that they should do so.

Existing aggregators identify and rank 'talent' by using specialist 'talent scouts' - everyone has heard of the music industry's 'A&R men'. Amazon's search engine ranks books both by sales and by customer reviews, both examples of user quality-assessment. Google ranks through a complex weighted page-link algorithm as a proxy for quality. Recommender systems matching your personal buying history with the buying patterns of similar customers have had some success. It would be unwise to bet that a search engine couldn't create a personalised menu of highly-valued content, whether TV, music or textual material (a personal newspaper).

Once a search engine has identified and ranked a collection of possible content of interest, the result has to be presented to the user for final selection. There is a trade-off between the size of the selection problem you present to the consumer, and the sophistication and excellence of the filtering procedure which pre-selects what the customer would have selected anyway. Examples today include the Electronic Programme Guides (EPGs) seen with multi-channel TV, listing guides in newspapers and specialist magazine, the screen of results returned by a search engine, and the themed catalogues seen on music download sites. Most Internet-hosted content distribution sites already contain an embedded search engine.

None of these existing formats should be seen as restrictive of the future. If there are consumers who simply want a personalised linear TV schedule for the evening, it will not be beyond the abilities of the search engine's programmers to design a system to put that together, if the primary content is out there at affordable prices in the first place. Skilled schedulers may believe that their jobs cannot be automated out of existence, but history does not appear to be on their side. A possible source of friction standing in Google et al.'s way is probably exclusive rights restrictions, which makes some of the highest value

content unavailable except through the rights holder's branded channel. However, from the rights holder's point of view, a search engine is just another channel to market, so why not allow it to index your material: if an end-user then chooses it, it's additional revenue. The equilibrium probably makes a great deal of high-value content available to search engines.

Home consumption of Internet content can be done today from a PC via a Broadband connection, and from a TV set via a Broadband Set-Top Box (STB). With the arrival of higher-speed DSL or fibre links into the home, and a generation of usable media centres, IPTV and VoD from the Internet will be just another way to get TV and radio.

And finally content payment. This is far from being a trivial issue. No consumer is going to actively manage tens of micro-payments for an evening's viewing. And if prices for different content-items are all over the place, then selecting a satisfactory programme schedule within a fixed budget for the evening is another complex optimisation process which may or may not be able to be automated away. Content aggregators like Sky, the BBC and other mainstream broadcasters solve the problem today by intelligent, experience-based scheduling for the mass audience, which reliably delivers the number of viewers, and which commensurately rewards both advertisers and content providers whilst charging viewers a competitive and predictable fee. The search engine solution, with its radical customisation of the schedule down to individual preferences, naturally finds pricing and billing more difficult, while promising increased satisfaction. Of course, family viewing is either shredded or the subject of complex negotiations in this model, another example of where you might have too much freedom?

### **Platform Providers**

Originally there was only terrestrial transmission of TV and radio, and with a fixed and limited amount of spectrum, the result was channel scarcity. The spectrum generated revenue as long as it was used, so content aggregation into linear channels was an efficient response. The transmission bottleneck led to vertically-integrated companies which produced content, aggregated and scheduled it, and then broadcast it.

Cable and satellite platforms massively increased the number of channels but the basic nature of content distribution - one-to-many - still meant that customers could not be individually targeted. The industry was still about the competition between broadcasters for aggregate shares of the mass market and the revenues which were tied to audience share.

The Internet, with its point-to-point architecture, completely removes the limitation on number of channels ([1] *ibid*). In theory, every single user could have their own personal channel. At this level of granularity, the very concept of channel, as a pre-packed linear ensemble of programmes, loses its force. Since any content is in principle accessible at any time to any person, the architecture is *random* rather than *serial* access. The most general service provided is video-on-demand. Linear channels *may* be offered for commercial reasons, but they are not mandated by the technology, and some people may elect not to consume their entertainment that way at all.

The often heard argument that capacity does not exist on the Internet to provide unbounded choice is not compelling. A standard definition TV programme needs 3-4 Mbps if you include metadata such as EPG updates as well. One wavelength on a fibre could easily carry 10 Gbps which would support 2,500 TV channels. It is not very hard to pipe one wavelength around a national optical network.

For VoD, the right architecture is local caching. One Terabyte disk arrays are just about consumer items - at time of writing, around \$700. Robust carrier storage would be more expensive, but a server farm of one hundred of these could store around 20,000 TV programmes of 2 hours each. Seems a reasonable choice. In fact the ideal architecture is to have a lot of programme storage on the customer's own premises equipment based on their preference profiles, refreshed by background updates from larger cache server farms at the local network Point of Presence, with a centralised network archive server of last resort.

Finally, with 3G cellular and TV transmission networks (eventually to be joined by pervasive WiFi and WiMAX networks), and the current generation of multimedia handsets, it is now possible to receive TV on mobile devices as well. Mobile networks are not the Internet - the radio access network, which is shared, two-way and expensive, is not efficiently used for scheduled, non-personalised channels, even with MBMS (Multimedia Broadcast Multicast Service - the multicast service on 3G mobile networks). It is better to broadcast mobile linear TV on an overlay wireless network, and reserve the scarce capacity of the two-way radio access network for video-on-demand.

### **The Impact of the Internet**

As we discussed previously, the conventional broadcast technology base for TV content distribution (satellite, cable, terrestrial) has three salient characteristics.

- It is one-way (with at best a non-integrated and low-capacity PSTN back-channel)
- It is one-to-many (which means individual customers cannot be addressed, only aggregates)

- it is spectrum limited (which means there is a distribution bottleneck restricting supply).

A fourth characteristic is also cited - that existing platforms are geographically limited, while the Internet is global in coverage and without boundaries. Geographical limitations are the basis of a whole content resale industry through syndication. For example, Warner Bros. sold new episodes of 'Friends' to NBC for about \$4 million an episode. They also sold reruns of the same episodes to hundreds of US local stations for another \$4 million per episode. Such geographically-based resale apparently generated more than \$1 billion in syndication fees for the studio. If anyone in the world could watch 'Friends' over the Internet, then this whole syndication edifice would come crashing down. But the technological hurdles to geographical localisation on the Internet have been much exaggerated. A combination of IP address monitoring and user authentication via credit card (which can serve to check the user's address) can allow the Service Provider to restrict access perfectly well within geographical boundaries in accordance with the rights they have acquired. There will always be the possibilities of fraud at the margins, but the business model *can* be made robust.

The three characteristics of current platforms itemised above have shaped the industry. With only one-way, one-to-many platforms, programmes have to be linearised into channels. This mandates the role of the content aggregator, who assembled and owned channels, as we have seen. With spectrum scarcity, only a restricted number of channels could be broadcast, and consequently per-channel viewing figures could be relatively high. This attracted advertising finance and underpinned a business model where power accrued to the aggregator.

Broadcasting consequently evolved into the standard market structure described in chapter 6, that of the 'rule of 3'. In North America, there are generalist stations such as ABC, NBC, CBS which were the traditional major players, and then a host of niche channels. Fox has had recent success as a 'new generalist', perhaps a pointer to changing times.

In the UK there were historically five main free-to-air channels: BBC-1, BBC-2, ITV, Channel 4 and Channel 5. Historically BBC-1 and ITV were the generalist 'mass' channels, with the remaining three more niche. The UK situation is dominated by the licence-fee funded BBC, however.

The recent rise to prominence of satellite companies such as Sky and DirecTV, and cable companies such as NTL in the UK, Comcast, Time Warner and Cox in the US. has fragmented the market somewhat, with many new channels, but has not dented the power of the content aggregators. The cable companies are

geographic monopolies in the regions they serve, and compete with terrestrial free-to-air channels through premium content. The satellite providers also tend to be geographical monopolies - even a *duopoly* can cut returns significantly, satellite TV being a scale business.

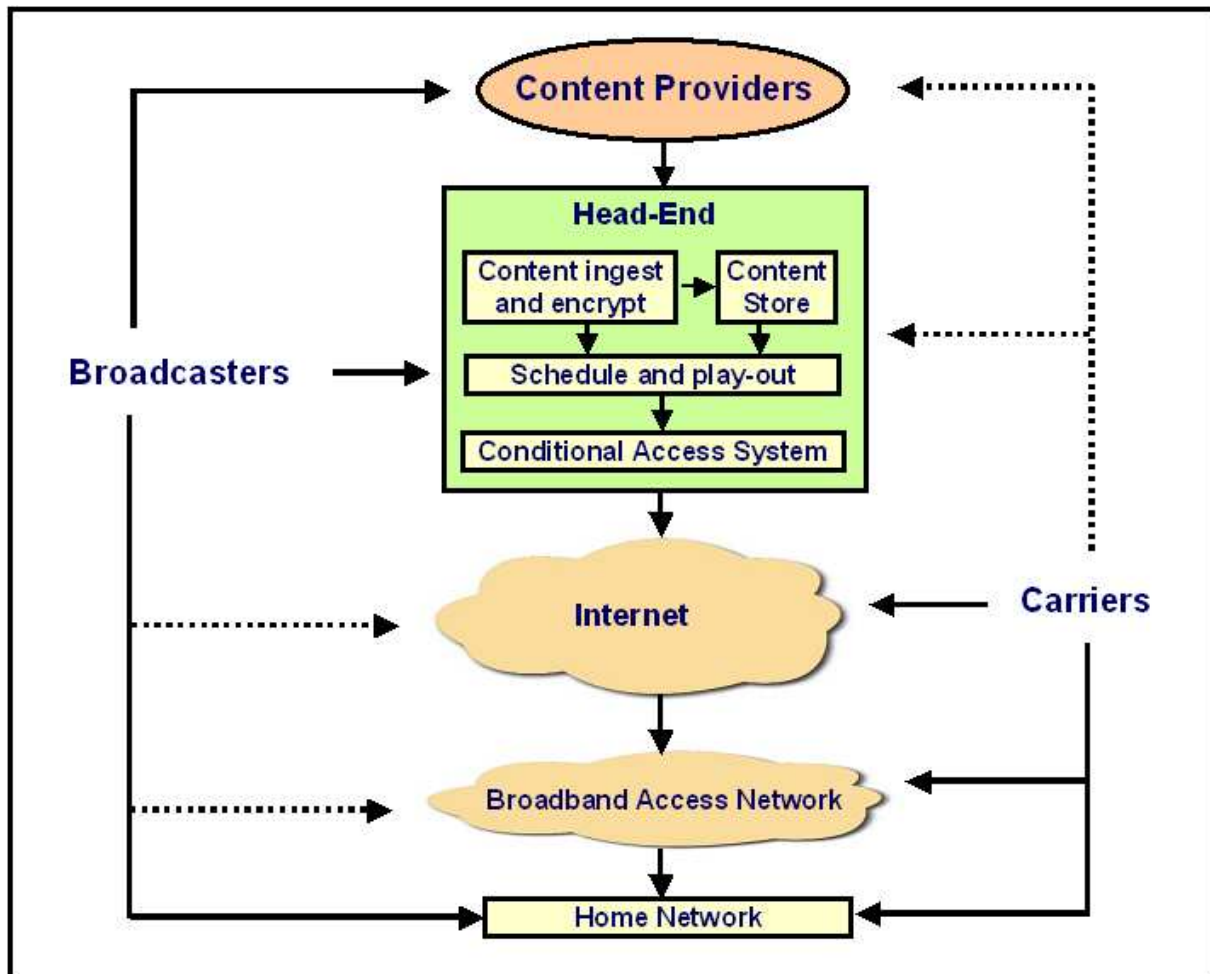
So today, a consumer typically has a choice of signing up with one cable company, with one satellite company, or with a terrestrial broadcast platform. How will the new Internet and mobile platforms change this?

### **The Race to the Middle**

In value-net terms, the pre-Internet value net was firmly under the control of the content aggregators. They owned the channels, they were the branded companies, they viewed their distribution platform as a utility, and they billed the customer/advertiser. With the arrival of a TV-capable Internet, new players arrived, the carriers, who were not necessarily resigned to a subordinate role in carrying bits for the major broadcasters. We are currently seeing, therefore, a race to the middle to establish control of the most valuable territory in the new value network. (figure 2).

In this diagram, the solid arrows show the points of departure. On the left-hand side, the broadcasters produce or acquire content, and ingest it in their head-ends. In some cases the channels are then encrypted if they are part of a premium package or have any restrictions on usage rights. The broadcasters also produce schedules for their own channel programming designed to maximise audience share. The distribution is over dedicated terrestrial radio, satellite or cable networks, usually operated by an independent company, and on which the broadcaster has bought capacity (not shown in the diagram). In the case of satellite, cable and digital terrestrial transmission, a set-top box and possibly a viewing card is required which authenticates the user, confirms billing status and helps decrypts the signal. The user cannot normally access the distribution platform without such a device. Customers accessing purely free-to-air channels may be able to get by without the viewing card and point-of-use billing mechanisms.

The starting situation for the carriers is completely complementary, as shown by the solid arrows on the right hand side of the diagram. In the general case the carrier owns the IP transmission network and the broadband access network, and provides or supports a broadband modem or router as the gateway device for the home network. The utility of the broadband connection to the customer is the access it gives to all the services available over the public Internet, very few of which are provided by the carrier itself. So for the carrier, this is a 'pipes' business, one where only utility rates of return can be expected in a competitive or strongly regulated market.



**Figure 2. Internet platform: the race to the middle**

Once it became technically possible to run TV content over the Internet and into people's homes via a broadband connection, the Broadcast and Internet value chains became glued together, as shown in the diagram, and the major players from both camps began to circle each other warily, trying to determine where the value really was, and whether they were in a position to colonise the high-value portions, and extract economic rents.

### **The Broadcaster View**

The Internet and mobile networks are both a new distribution platform for linear TV channels (IPTV) and the basis for a new network service, Video-on-Demand (VoD). Neither service is technically hard to realise. IPTV and VoD require re-engineered head-ends, a transmission and broadband access network and a re-engineered set-top box (STB).

The main issue facing broadcasters is whether to use the generic Internet as a platform, whether to resell a carrier's network offerings, and/or whether to forward integrate into the carrier space by acquiring and/or building their own IP networks.

It is likely that broadcasters will make their content available over the public Internet anyway - the incremental costs to do so are small, the revenue opportunities appear to be there via DRM. Regulation may, in any event, call for it. The additional benefits of forward integration into network ownership lie in the control over quality in these early days of the technology, and the ability to evade the kinds of 'hold-up' we discussed in chapter 13, whereby carriers can exploit their network dominance to extract monopoly rents from upstream content providers.

An unintended consequence of forward integration is that the broadcaster becomes an IP service provider, with a portfolio of communications and Internet access services. The broadcasters are inclined to write these off as marginal products as compared to their very profitable content-based services. In the longer term, they may be wrong about this (cf. [2] and below).

### **The Carrier View**

Most facilities-based carriers are today considering introducing IPTV and VoD services. They see these services as very profitable, and as substituting for their declining voice revenues. In terms of figure 2, they would like to backwards integrate into the areas shown by dotted lines on the right-hand side.

Architecturally, the next-generation network is of great help. The NGN network comes with QoS, call admission control and bandwidth management capabilities courtesy of the transport network and the IP Multimedia Subsystem. IMS additionally provides a session management and billing service which could easily be used to support a VOD service. Specifically IMS supports the following relevant functions.

- User authentication via the HSS.
- User service profile management via the HSS.
- Billing based on the user service profile.
- Bandwidth allocation via the Go interface between P-CSCF and the first service routing device (PE or GGSN).
- Session admission control (via many components, most notably the P-CSCF).
- VoD server functionality via IMS Application Servers.

On this basis, there is no question of the adequacy of IMS to manage and bill a VoD service. However, IMS does not today directly support the encryption and key management functions of a Conditional Access (CA) system. Unfortunately, existing CA systems are quite tightly coupled to user authentication and billing, so unless CA systems are re-engineered in a modular fashion to interwork with IMS, this appears to be a significant roadblock. But well-within the capabilities of a carrier to resolve.

The broadcasters, of course, already have systems which do many of the middleware functions which IMS abstracts and modularises. This makes IMS much less attractive to them. However, if broadcasters start to think more like carriers, and focus on the 'quadruple play' of (video)-telephony + data + IPTV/VoD + mobile, then the increased generality of IMS may well justify deployment in a few years time.

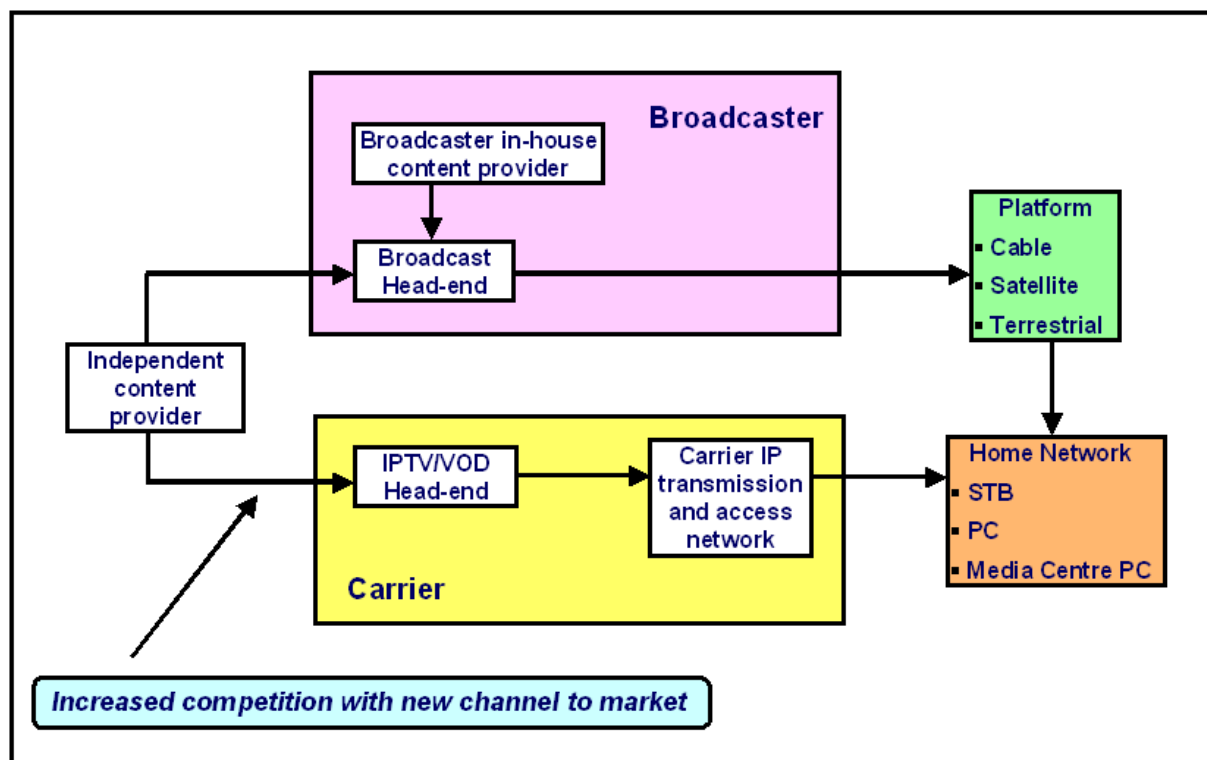
BT, for example, has proposed to offer content management and distribution services to a wide variety of content owners, and has floated the idea of a home device which is a hybrid 'Freeview box' (free-to-air digital terrestrial TV channels) plus a broadband connection for VoD. It has also deprecated suggestions that it might get into content aggregation itself, in competition with the BBC, Sky etc. At the very least, BT's initiative has the potential to disintermediate the existing content aggregators vis-à-vis content producers, and opens a competitive space for these and new entrant aggregators and portals to bring TV material to the mass market (figure 3 below).

So the carriers can support new content and media services over their new IP networks, and they can provide the infrastructure to adapt content onto them as well. They probably don't want to backwards integrate into either content production (buy a studio or production company) or content aggregation (buy or set-up channels), both of which require skills and culture at variance with those of carriers. All-in-all, this is not a bad strategy for the carriers to adopt.

We now turn our attention to consumer communications services.

### **Business strategies in the consumer communications services sector**

In 2001, Andrew Odlyzko wrote an interesting paper called 'Content is not King' [2]. This argued that despite appearances, content provided neither the margins nor the revenues of communication services, and that this pattern would be repeated on the Internet. He predicted that 3G mobile networks, widely touted as the key enabler for new content services, would instead see most utility as a lower-cost, higher-capacity platform for voice calls. He presented plenty of evidence that amongst both business and



**Figure 3. Carrier backward integration opens new opportunities**

residential users, there is a much greater demand for communication services than for content services and that this would continue to drive the revenue disparity.

As voice revenues apparently tend to zero, a skeptic might think Odlyzko has this all wrong, but many carrier strategists believe instead that he is absolutely right.

First of all, why are voice revenues tending to zero? The provision of voice calls is an extreme example of a service which has high fixed costs, which are infrequently incurred and which are sunk, and almost zero short-run marginal costs up to the capacity limitations of the network. In the circuit-switched world, regulation of the wholesale price and schemes such as Carrier Pre-Select have created a highly-competitive market which has bid down the cost of voice calls to levels perhaps lower than long-run incremental cost - insofar as this can be estimated.

The second factor is VoIP. Putting Skype (discussed in chapter 9) to one side, there are a number of VoIP providers selling services which offer an almost perfect substitute for circuit-switched voice. The costs to the VoIP provider are soft-switches, media and signaling gateways, a PSTN break-out connection and an

Internet connection. The user often pays for the handset, and always pays for the broadband connection: the Internet itself is 'free' from the point of view of both the user and the VoIP supplier. On this dramatically lowered cost base it is possible to undercut even competitively-priced circuit-switched voice, and the VoIP supplier is paid for incoming calls by the PSTN carrier. A Skype-like service, of course, saves on the soft-switches and associated operational costs.

So why are carriers unreasonably optimistic? People like to communicate, and every time the technology advances to a threshold of usability, a new service opportunity beckons. SMS has to be at the margins of usability, but is nevertheless a huge business. Without trying to predict the details of 'new wave' communications services, it seems likely that a fully multi-media and pervasive transport network, overlaid with a sophisticated session management and charging mechanism, and combined with some new handset and terminal ideas, could launch a number of innovations.

For example, sometimes services languish for long periods because they are just not good enough, and then suddenly the technology improves and they take off. Mobile phones were clearly in that category, but looking ahead, I would guess that video-conferencing might develop in that direction too. As a frequent user a few years ago, I can testify that sound quality was frequently poor, the video cramped and inflexible, and the set-up and control interfaces opaque and barely usable. The recent popularity of HP's Halo system (<http://www.hp.com/halo>), which spares no expense to create a high-resolution sense of co-presence, seems to suggest we are only just about at the point of doing this right. If '*videoconferencing which just works*' follows the usual trend, then prices will come down and usage will explode over the next decade.

Even in voice services, there are opportunities for improved (CD) quality at enhanced price points. It's a mistake to look at voice only through the inflexible blinkers of circuit-switched telephony.

### **User-Generated Content**

A further area of interest is user-generated content. Photos and video are the paradigmatic examples. With digital cameras, camcorders and camera phones, what do people do? They take pictures and videos, select the best, and mail them to their friends or post them to specialised share-websites (youtube.com). There has been a relatively slow-take up of picture messaging on 3G phones, but this is probably due to a combination of early-adopter premium pricing, lack of usability and the current low take-up of 3G handsets. There is no reason why picture and video messaging shouldn't be huge once the usual tipping point has been reached.

User-generated content is in the overlap area between content and communication services. That overlap space is richer than some people imagine. It is tempting to think of music, photo and video share-sites as the exclusive preserve of enthusiastic amateurs. This is far from the truth. Even a cursory review of the more high-profile sites will show the prevalence of:

- new kinds of advertising, often rather ‘edgy’
- political and social commentary, clearly put together by funded interest groups
- promos, out-takes and other spin-offs from established media archives.

It’s clear that these sites are being used as a laboratory for many economic, social, corporate, religious and political groups across the world. The production values are often higher than those of the proverbial ‘student working in a garret’ and the content is more accessed, and gets higher ratings, than the totally amateur material. As always, such pluralism and diversity is to be welcomed, and we already see hints on future mechanisms of monetisation (intrinsically interesting short ads, for example).

## **Conclusions**

The consumer market is a market for both the consumption of professionally produced content and for communications services which allow people to communicate with each other.

In the former case, the impact of the next-generation network presents a new platform opportunity to existing broadcasters, one they are eager to exploit: it adds interactivity and is the basis for new services such as video-on-demand. The carriers own the next-generation network, of course. They can sell access to the broadcasters, and by implementing generic head-end functions, they can partially move into the content aggregator space and cut separate deals with content providers. Broadcasters also have the option to forwards-integrate by acquiring and investing in alt-net operators with suitable networks. They may then have to come to terms with what they have bought.

In the latter case, person-to-person communications, the future looks good. Doomsayers point to the death of voice revenues, and discount future services to zero. The truth is wholly different: people have always tried to use new technologies to communicate with each other, even when the platforms are difficult to use. Get the pricing, performance and usability right and usage explodes. We are still in the dark ages when it comes to the potential for technologies to enhance communications, so the future for carriers who can monetise this area is enormous.

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[2]. Odlyzko, A., Content is not king, *First Monday*, volume 6, number 2 (February 2001).

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