Business Models for Secure Service Offerings by ISPs

Version of 10 November 2016

1. Background

On 1-2 December, I'm participating in a meeting in Frankfurt of a German consortium of universities and IT providers called AN.ON-Next. Their project is looking at what's needed to enable ISPs to offer secure services. A bit more about the project is here:

- a one-page outline, incl. discussion questions
  http://www.rogerclarke.com/EC/NetwkPETs-160919.pdf
- a couple of slides identifying the project
  http://www.rogerclarke.com/EC/ANON-next.2016-08-05.pdf
- Übersicht und Details der 6 Arbeitspakete (nur auf deutsch vorhanden)
  http://www.anon-next.de

The question the consortium has asked me to focus on is business models. The foreground question is of course 'how can secure service offerings earn at least enough revenue to cover the ISPs' costs'? But strategic and market-share issues are involved as well.

2. The Business of IAPs and ISPs

An Internet Access Provider (IAP) offers customers connection to the Internet (IP-address, traffic-passing), and ancillary services, such as domain-name registration and management.

An Internet Services Provider (ISP) offers customers a variety of services, such as hosting of web-sites, email, mailing list services, databases, applications, backup and recovery, and web-site design. There are a great many variants in specialisations, and in the clusters of services that any particular ISP offers, and the patterns change over time. An ISP may or may not also act as an IAP.

3. Secure Service Offerings by IAPs and ISPs

A vast array of threats exist, and neither Internet architecture nor Internet infrastructure were designed with security in mind. All IAPs and all ISPs need to implement a considerable set of safeguards, to protect themselves, and to provide a basic level of protection for their customers.

However, despite two decades of talking about 'cyber-security', and despite the emergence of process standards in the risk assessment area (ISO 31000 and 27000 series), no framework has emerged that establishes a baseline or declares technical standards that need to be applied. Examples of approaches that could be built on include iCode (2010), CSRIC (2011), Clarke (2013a), NIST (2013), ASD (2014), Clarke (2015), Cisco (2016) and ASD (2016).

Many of the safeguards used to protect the interests of the IAP / ISP are concerned with traffic analysis and filtering. Some of these safeguards protect their customers as well. For example, blocking inbound malware and malcontent (in particular, spam emails) is of direct benefit it to them. On the other hand, the detection of streams of spam and DoS packets outbound from customers' networks may be of less interest to them, because the harm caused is not to the customer but to third parties.

The operation of these safeguards is largely invisible to user organisations, and hence they are seldom able to be used as selling-points for the IAP's or ISP's services. One exception to this, however, is protections against Distributed Denial of Service (DDoS) attacks. Denial of service has become much more frequent, and customers are conscious of it. The focus of this discussion is on aspects that are more visible to user organisations. Examples of such secure services are the following:

- proxy-servers, especially anonymous proxies
- traffic mixers, including ToR routers
- VPN / anonymisation services in the IP-layer rather than at applications level
- mechanisms to support pseudonymity and inter-session unlinkability
- server-side-driven user-side-encryption, e.g. by means of scripts delivered from servers

Categories of service expressly within-scope for the AN.ON-Next project are as follows:

- measures to achieve anonymisation of users, and unlinkability of users' successive transactions and session, in particular through multiple IPv6 addresses and extended NAT concepts. (This is a safeguard against third parties, not against the IAP / ISP)
- improved protections by means of overlay-networks
- facilities installed on user premises, which intermediate seamlessly between the user's devices and the IAP. This delivers end-to-end encryption, pseudonymity and unlinkability of sessions. It involves minimal need for user expertise or conscious user actions, and does so in a manner compatible with mainstream user working environments

  A service of this kind is already marketed by consortium member Comidio under the name TrutzBox. See https://comidio.de/produkt/trutzbox-paket-mit-service-ohne-wlan/

4. Business Strategy Factors

Business Models need to be seen within the context of business strategy. This section identifies several aspects of strategic theory that have relevance to businesses generally, including IAPs and ISPs. All aspects included in this section are of long standing (see Clarke 1994), and no attempt has been made to track fashions within business schools. In addition, no attempt has been made to identify specific theory targeted at telcos, carriage service providers / backbone operators, IAPs or ISPs.

Porter's conventional **competitive forces model** (Figure 1) show the players involved in any market. It identifies not only pressures arising from 'direct competitors', which supply much the same goods and/or services, but also the impact of substitute goods and services that may satisfy the same need, and the scope for new entrants to disrupt the existing balance. Added to that suppliers may utilise their control over factors of production, or their sheer size, to manipulate costs-prices or terms to their own advantage. Similarly, customers may have monopsony power, and may utilise it. Appendix 1 provides checklists of key factors in each of those areas.

The standard Porter model fails to recognise **regulators as a competitive factor**. This is particularly problematical in some sectors, including telecommunications. IAPs and ISPs are subject to a great deal of essential regulation (e.g. in relation to spectrum, and 'last mile' cabling), and are commonly, for various reasons, subjected to intervention in many other areas as well (e.g. connected-device specifications, consumer rights, anti-competitive behaviours, and procedures for responding to communications from national security and law enforcement agencies).

When considering strategic factors, it is useful to model the business enterprise as a series of value-adding activities that are complemented by a set of supporting activities. The specifics internal to **the enterprise value-chain** (Figure 2) are of course industry-specific.

In recent decades, a great deal of focus has been an alliances, strategic partnerships and the supply chain of which any particular business enterprise forms a part. The enterprise value-chain can therefore be usefully modelled as being an element within **an industry value-chain** (Figure 3).

At the simplest level, a corporation may comprise a single business enterprise within a single such industry value-chain. Alternatively, it may be seen as an element within multiple industry value-chains; and it may also be what was previously referred to as 'vertically integrated', but which in the currently conventional depiction is instead horizontal, i.e. the corporation may include two or more business units or subsidiaries that are usefully distinguished as separate elements along the same industry value-chain.

Figure 1: The Competitive Forces Model
From Porter (1980)

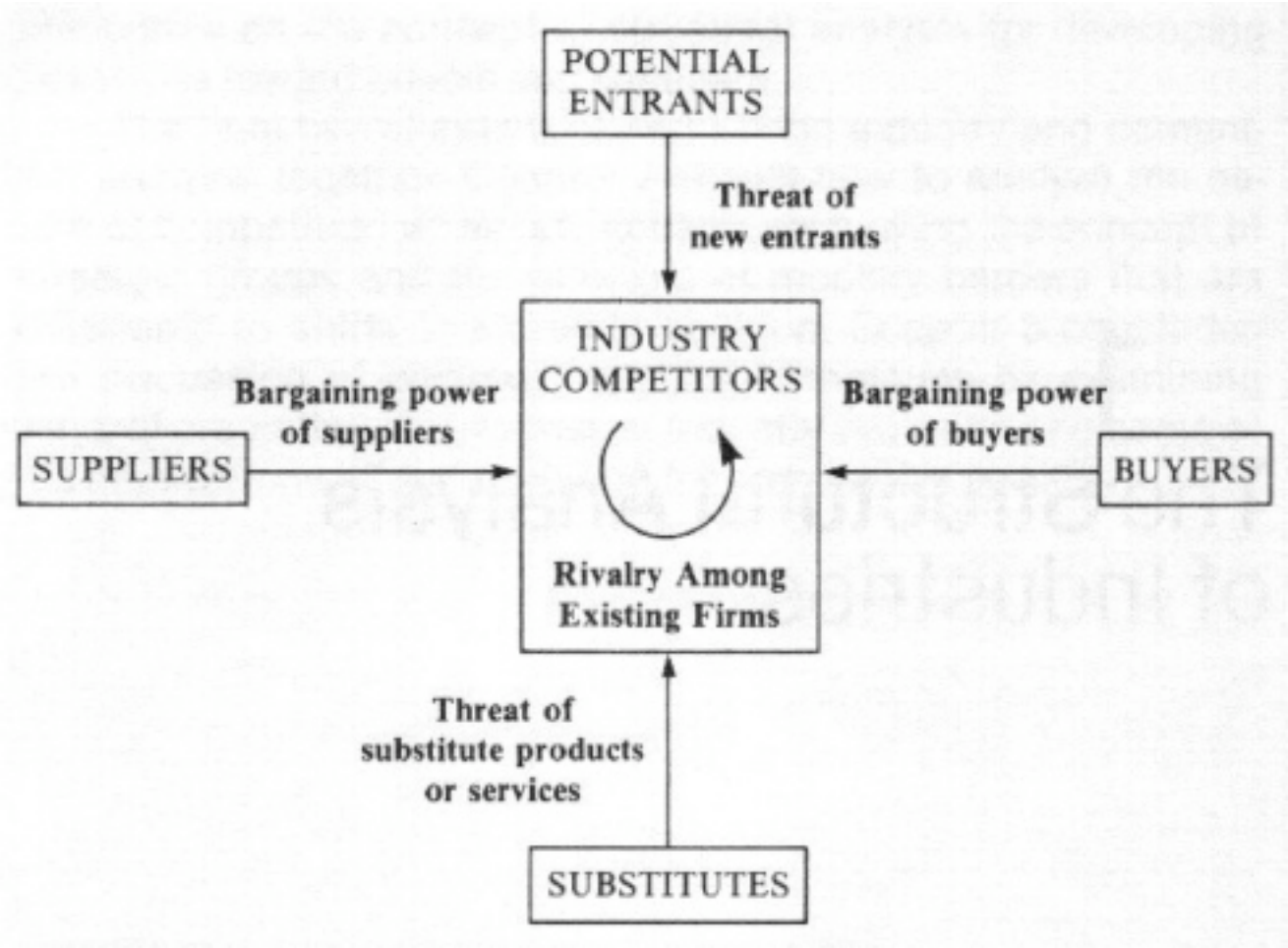


Figure 2: The Enterprise Value Chain
From Porter (1985)

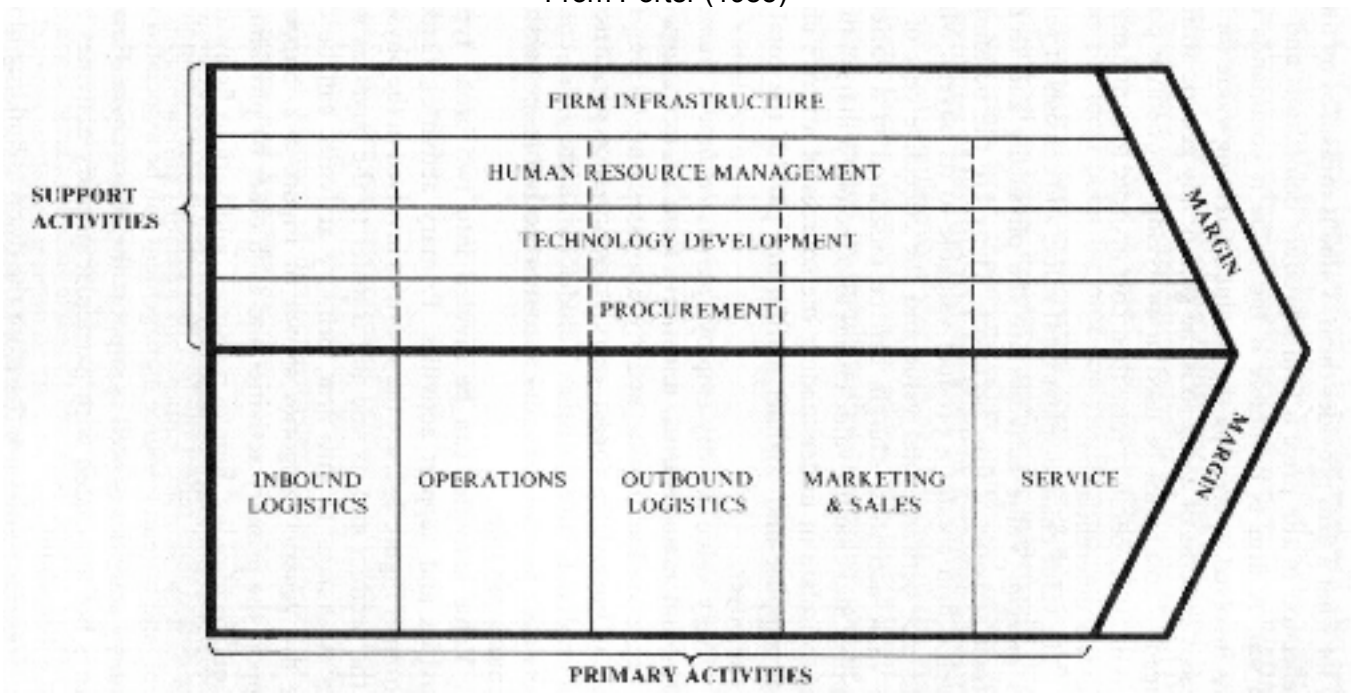
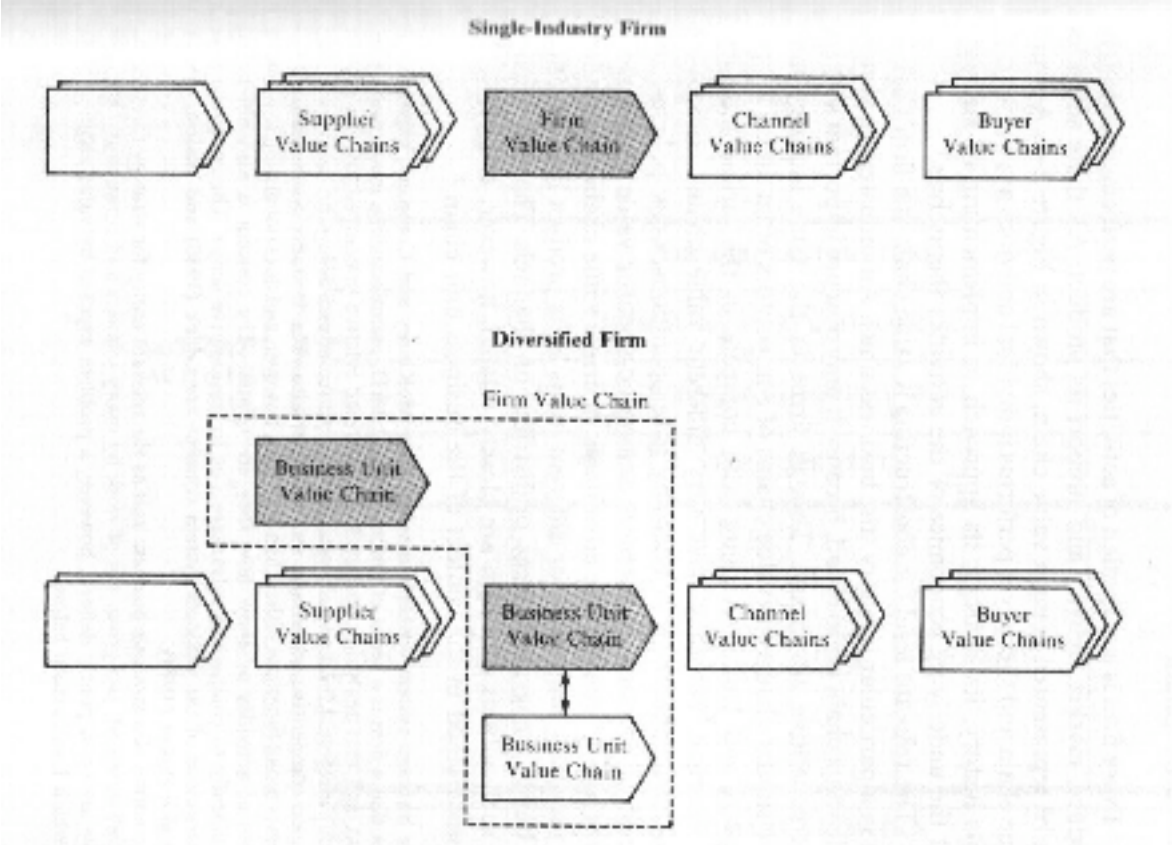
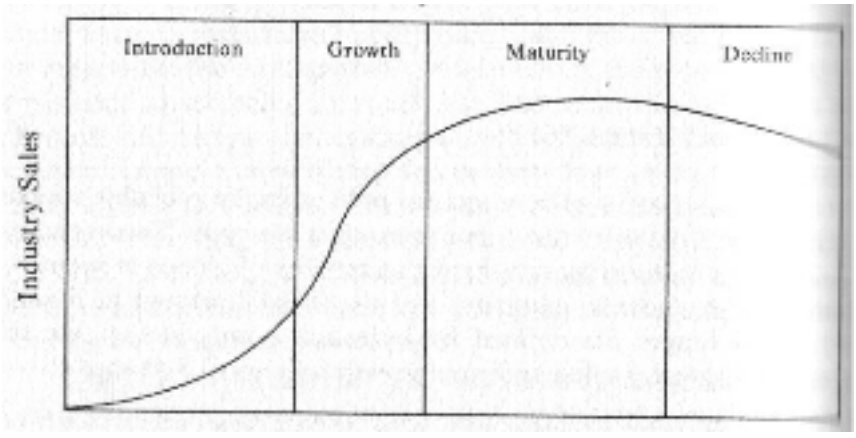


Figure 3: The Industry Value-Chain
From Porter (1985)



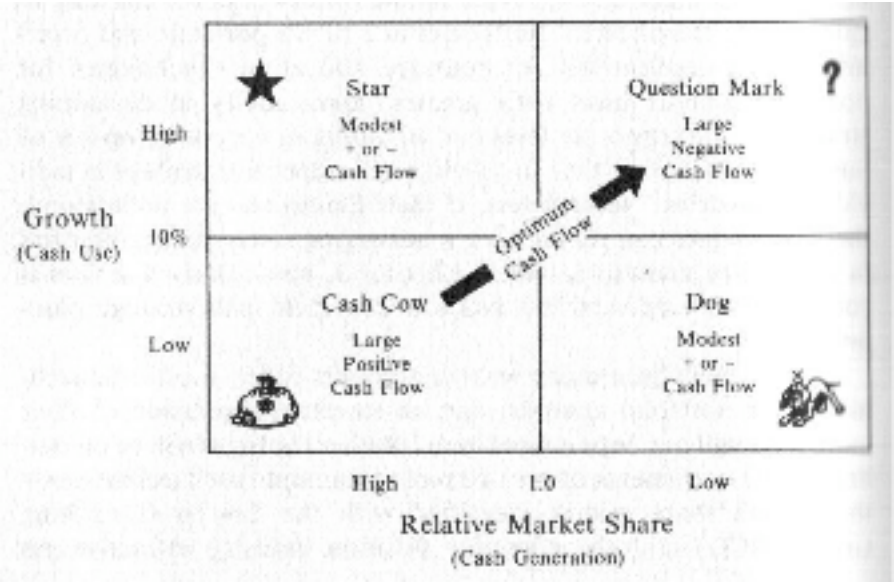
A further consideration is that every enterprise is subject to **a business life-cycle** (Figure 4).

Figure 4: Business Life-Cycle
From Porter (1980)



Long-lived corporations accordingly invest in **a portfolio of business lines (**Figure 5), to ensure that proceeds from mid-to-late-cycle business lines are available for investment in early-cycle lines.

Figure 5: Business Portfolio Model
From Porter (1980)



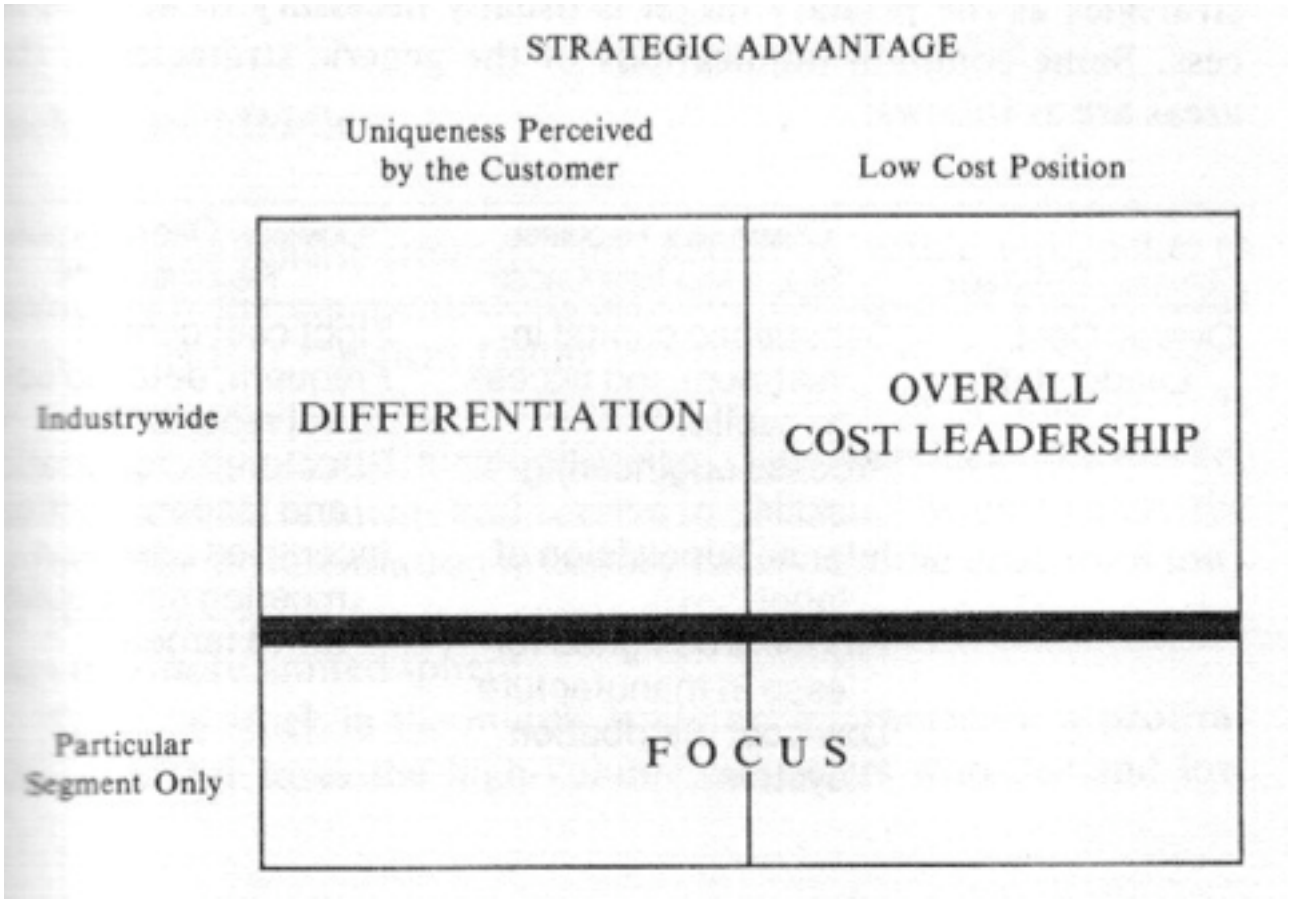
Corporations seek profits, in order to provide attractive returns to investors. Undertakings that require long-term investment in order to achieve returns require 'patient capital'. Industries that depend on large-scale and/or expensive infrastructure (archetypes: Boeing, Aerospatiale) need investors whose timeline for measuring **profitability** is long. Corporations with a medium-term time-horizon may focus on **market-share** in the short-to-medium-term, in order to achieve higher profitability later. Many industries, however, are subject to stock-market-induced stress associated with half-yearly or quarterly profit reporting. This has distorted capital markets in recent decades, and forced 'short-termism' on many corporations that need their investors to wait longer for returns.

A further category of business enterprise is **'start-ups'**, which by definition do not yet have any 'Cash Cow' business-lines to draw on, and that are often, moreover, high-risk, innovative projects. They depend on 'venture capital' from investors who have an appetite for risk, and who adopt a portfolio approach to such projects.

There are various circumstances in which organisational strategy is concerned with aspects other than the organisation's competition with other organisations. One example is statutory corporations, which are likely to have strategic objectives that are not competitive in nature. Another example is not-for-profit organisations, for most of whom competitive aspects form a relatively minor part of their objectives, e.g. they may compete with other, similar organisations for donations, but to a much lesser extent for opportunities to spend the funds that they gain access to. The strategic outlook of government agencies, on the other hand, nominally places next-to-no emphasis on the organisation's competitive stance.

In the majority of corporate contexts, where 'strategic' is equivalent to 'competitive', the focus is on **sources of competitive advantage** (Figure 6). The key concepts are 'cost leadership' and 'differentiation', although there are variations in how these are approached, and there are multiple sources of each form of advantage.

Figure 6: Sources of Competitive Advantage
From Porter (1980)



Alternative representation, from Porter (1985)

Competitive Scope	Competitive Advantage: Lower Cost	Competitive Advantage: Differentiation
Broad Target	Cost Leadership	Differentiation
Narrow Target	Cost Focus	Focused Differentiation

Many bases exist for differentiation. They are usefully categorised into:

- product-related aspects (quality, features, options, style, packaging, sizes, services, warranties, returns)
- price-related aspects (tariff structure, discounts, allowances, payment period, credit terms)
- place-related aspects (channels, coverage, locations, inventory, transport)
- promotional aspects (branding, advertising, personal selling, sales promotion, publicity)

The term **'product differentiation'** refers to the extent to which buyers perceive products from alternative suppliers to be different (or, as expressed in economic theory, the degree to which buyers perceive imperfections in product substitutability). Differentiated products are commonly priced more highly, because the buyer perceives them to offer something special. If customer loyalty is achieved, perhaps to the point of establishing a partnership between seller and buyer, the buyer faces 'switching costs', because its internal processes have become adapted to the beneficial peculiarities of the particular factor of production, and use of an alternative would force internal changes. Hence product differentiation also serves as a defence against substitutes, and an entry barrier to new players. If a business can innovate within its area of product differentiation, it may be able to sustain its competitive advantage over long periods of time.

Another important consideration in a corporation's strategic positioning is its choice of **'competitive scope'**, i.e. the breadth of its target markets within its industry, including the range of product varieties it offers, the distribution channels it employs, the types of customers it targets, the geographic areas in which it sells, and the array of related industries in which it competes.

One further relevant approach to competitive advantage emerged during the dot.com era, c. 1995-2000. This might be summed up as **'dominance of a (possibly) emergent market'**, such that a substantial market-share is established early, and sustained as the size of the market grows, possibly very steeply. Vast numbers of start-up failures have been recorded.

There have been small numbers of successes using the 'dominance of an emerging market' approach to competitive advantage, some of them spectacular, such as Google's search engine, Facebook and DropBox. However, most of these are associated with the concept of **'second-mover advantage'.** With many innovations (such as search engines, social networking, and easy-to-use file-transfer services), it takes potential users some time to understand what it is, and why they would want one. When, finally, 'the time has come', the first-mover has generally burnt their available capital, and is saddled with a platform that has been serially modified and is no longer flexible enough to support the rapid feature-adjustment needed to address a fickle market. The first-mover is therefore highly vulnerable to being overrun by a well-funded new entrant that is nimble, and that can take advantage of the 20-20 hindsight that the first-mover's efforts have delivered.

A current vogue in strategic thinking is a focus on **'disruption'** of existing strategies, often by technology or by a new use of technology by a direct competitor or a new entrant, and sometimes by means of a business model different from the mainstream.

5. Business Models

The term 'business model' is capable of a variety of interpretations. A simple one is 'a story that explains how a business enterprise works'. At a slightly deeper level, it's 'a set of assumptions or hypotheses about the business' (Ovans 2015). A more analytical approach is to define it as the architecture of products, services, actors and information flows as perceived by a particular business enterprise.

Ideas about business models can be applied to any of:

- a single business line
- a cluster of business lines at various stages of the life-cycle which together make up a business enterprise, or a more or less independent division or subsidiary
- a conglomerate comprising multiple enterprises, divisions and/or subsidiairies

The building blocks needed to make up a comprehensive model encompass demand-side and supply-side factors, mediated by the value proposition that the organisation offers its customers, and supported by an appropriate revenue model and cost structure (Figures 7 and 8).

Figure 7: A Framework for a Business Model
From Fritscher & Pigneur (2009)

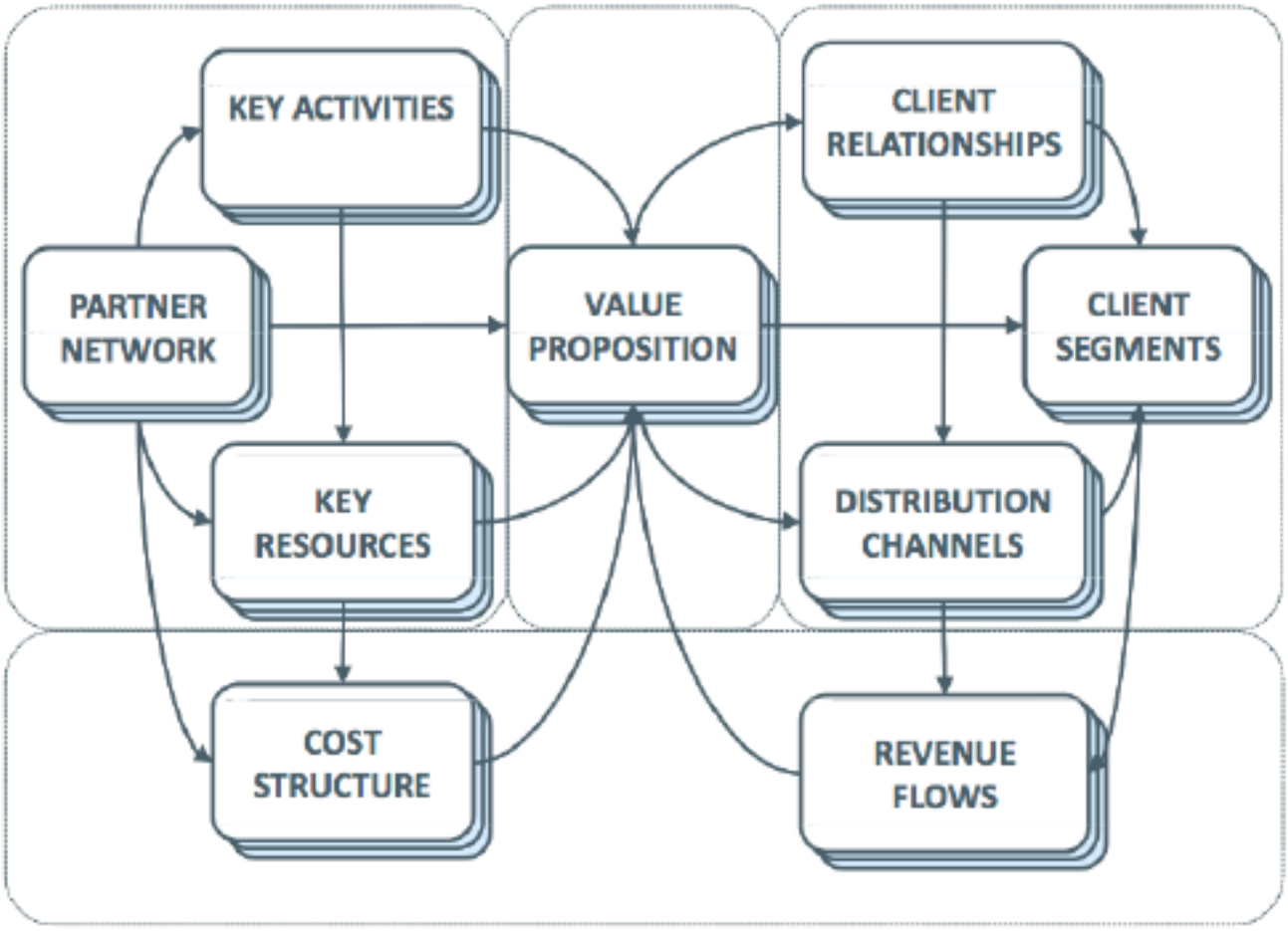


Figure 8: Building Blocks of a Business Model
From Osterwalder et al. (2005)

Pillar	Business Model Building Block	Description
Product	Value Proposition	Gives an overall view of a company's bundle of products and services.
Customer Interface	Target Customer	Describes the segments of customers a company wants to offer value to.
	Distribution Channel	Describes the various means of the company to get in touch with its customers.
	Relationship	Explains the kind of links a company establishes between itself and its different customer segments.
Infrastructure Management	Value Configuration	Describes the arrangement of activities and resources.
	Core Competency	Outlines the competencies necessary to execute the company's business model.
	Partner Network	Portrays the network of cooperative agreements with other companies necessary to efficiently offer and commercialize value.
Financial Aspects	Cost Structure	Sums up the monetary consequences of the means employed in the business model.
	Revenue Model	Describes the way a company makes money through a variety of revenue flows.

The 'Revenue Model' component is particularly important. A Revenue Model can be seen as an answer to the set of questions 'Who pays, for what, to whom, and why?' (Figure 9 – Clarke 2004, 2007).

Figure 9: Alternative Revenue Models
After Clarke (2004, 2007)

- **Who Pays?**
  - Customers:
    - Direct and Immediate Reciprocation (cash or barter)
    - Deferred Reciprocation (e.g. interest-free loan)
    - Conditional Deferred Reciprocation (e.g. goods on indent, royalties)
    - Indirect Reciprocation (i.e. the Customer does something for another party)
  - The Provider:
    - 'A Cost of Doing Business'
    - Services as per Mission Statement
    - Legal Obligation
    - Conditional Deferred Reciprocation (if the Customer never pays)
    - Cross-Subsidy from other lines of business, incl. loss-leaders, network-effect generators, portfolio approach
  - Third Parties
    - Advertisers
    - Sponsors
    - Subsidy / Patronage / Benefactors ('Fairy Godmothers')
- **For What?**
  - Goods and/or Services, productised, customised, or custom-built
  - Value-Add to Goods and/or Services
  - Complementary Goods and/or Services, incl. Installation, Infrastructure, Customisation, Education and Training, Consultancy, and 'The After-Market' (in particular, Supplies, Accessories, Upgrades, Enhancements, Extensions, Replacements)
  - Data to enable application of the Goods and/or Services (free handset, pay for data)
  - Expertise in applying Goods and/or Services
  - Assurance of Function, Quality and/or Security
- **To Whom?**
  - Directly to the Provider
  - Via sales channels, which may use a variety of intermediaries, e.g. retailer, franchisee, value-adder, bundler, aggregator of goods and/or services, payments aggregator
- **Why?**
  - Negative Reasons
    - Resource Control
    - Switching Costs (capture, lock-in)
    - Grief Avoidance (no lawsuits or guilty conscience)
  - Positive Reasons
    - Perceived Value (fitness to need, brand, 'the genuine article')
    - Cost Advantage (incl. savings of time and effort)
    - Quality Advantage (incl. accuracy, security, timeliness, completeness, complementary services)

6. Business Strategy and Business Models for IAPs and ISPs

All aspects of the above business strategy and business model theories are at least potentially applicable in the telecommunications services fields. There is a great deal of **diversity in business-types**, however, including telcos, carriage service providers / backbone operators, IAPs and ISPs. Moreover, many variants in approach are possible within each business-type, and most business enterprises change their business model from time to time and/or migrate from one to another at various times during the organisation's life.

Additional considerations in the telecommunications industry are **the nature of the technologies used and the rate and directions of technological change**. On the one hand, appropriate business strategies and business models depend on attributes of the technologies being deployed. On

the other, the architecture, design, and design trade-offs depend on the business strategies and models that are to be used. The two therefore need to emerge in a parallel and interleaved manner.

For an IAP, key considerations include the extent to which the services are backbone, wholesale and/or retail, and whether they are wired and/or wireless, if wired based on fibre-topic and/or co-axial cable and/or twisted-pair cable, and if unwired based on mobile telephony, wifi variants and/or satellite.

For all categories of telecommunications business, it's vital for the organisation to be clear about the **customer segments** that are and are not being targetted. Many building blocks of the business model, and many aspects of the revenue model, depend heavily on that fundamental question.

Security is always undervalued by customers. Particularly at individual, micro-organisation and SME level, "most users have strong tendencies towards hedonism and away from considered, reflective and responsible attitudes towards the use of their devices. Security features intrude into users' enjoyment of their devices ... It is entirely rational for users to value convenience highly - because they experience it continually – and to value security very low – because they experience the impacts of insecurity only occasionally and are largely unaware of the security incidents that affect their devices, their transactions and their communication. Given that safeguards involve certain costs, but unseen and uncertain benefits, it is unsurprising that individuals and small organisations under-spend on security. For individual responsibility to become a significant factor in addressing the problem of inadequate IT security, a large number of conditions would need to be fulfilled ..." (Clarke 2015).

Secure services need to become a mainstream expectation, and that may well happen. But that's not currently the case. Until then, IAPs and ISPs must identify and **target those market segments that perceive value in security, or can be encouraged to do so**. Generally, these are likely to be individuals and organisations that not only are at significant risk, but also are aware of the risks and their potential consequences. Potential customers can be segmented according to such factors as sector (public, private, not-for-profit), industry, vulnerabilities (financial assets, financial transactions, sensitive data), regulatory requirements, and track-record of attacks, breaches and financial, reputational and other harm. A process for analysing data risks in the cloud is in Clarke (2013b). At the level of individual consumers, an analysis of categories of 'persons at risk' is in Clarke (2014).

For each of those selected user segments, it's strongly advisable to conduct **an analysis of needs, including risk assessment**. Suites of tools can then be designed to deliver the relevant features and/or existing suites of tools can be adapted in order to retro-fit those features. These ideas are discussed in the context of customer-side software in Clarke (2016). Those ideas are capable of being applied to secure service offerings by IAPs and ISPs.

In formulating the **value proposition**, it's vital to focus on the advantages to the customer, not the technical features. Relevant notions include the image of being a responsible service provider, and having no ability to perform functions on behalf of third parties, such as to intercept content, or to disclose anything more than basic traffic data. Notions such as anonymity and unlinkability should only be mentioned as part of the drill-down discussion. Technical aspects should be omitted, and published in white papers intended to be read by prospects' technical staff, not the decision-makers.

7. Implementation of a Business Model

The business strategy and business model need to be articulated into meaningful actions.

A marketing plan is needed, designed to communicate the value proposition to prospective customers in each of the targeted segments, and thereby prepare the ground for identifying key prospects and achieving sales to them. More specifically, a marketing plan needs to show how the following will be achieved in relation to the members of defined target-markets:

- awareness of the business and its offerings
- favourable impressions about them
- sufficient understanding about their fit to the organisation's and individual's needs
- interest in knowing more about the offerings

Effective **promotional channels** need to be found and exercised, so that the appropriate messages reach those prospects. Important among the available channels are the following:

- advertising – print, radio, television, billboard, direct mail, signs, displays, posters, mobile apps, motion pictures, web pages, banner ads, emails
- media coverage
- information on the corporate website and perhaps product websites
- social media
- direct marketing, e.g. through mobile messaging and email
- industry associations (functional groupings)
- chambers of commerce (regional groupings)
- industry conferences and exhibitions
- sponsorships

In order to utilise those channels, **promotional content** needs to prepared, in such forms as:

- printed brochures
- media release plan and draft media releases
- advertorials
- white papers
- training programs
- reference sites

The marketing plan needs to go well beyond advertising followed up by sales calls. It needs to embody an appreciation that secure networking services are an innovation, and that the diffusion of innovations involves the use of **the opinion leaders and change agents** that influence the behaviour of decision-makers in the relevant market segment. In consumer markets, this may involve civil society organisations, whereas organisations may take more notice of associations, regulators and acknowledged 'thought leaders' within the industry and in relevant consultancies and universities.

The revenue model for each segment needs to be developed in concert with the design of the services, and also needs to reflect the norms in the selected segments and along the selected sales channels. This may well result in different **tariff structures** in different contexts.

Tariffs may be based on:

- Time-Period alone
- Traffic Volume alone
- Fee-for-Service alone
- Most commonly, combinations, perhaps also reflecting the Time-of-Day of traffic volumes

A common approach is to offer a modest number of alternative pricing plans, one or two with multiple aspects bundled together into a single price, plus one unbundled. This has the effect of drawing the prospect's focus towards the organisation's offerings rather than away to competitors' alternatives.

Pricing needs to be determined for each separately-purchased element and for each bundled package. There are two broad approaches to the determination of prices, both of which need to be applied. Cost-based approaches identify the variable costs of operating a service, and take into account the contribution margin needed in order to contribute to, or possibly fully cover, the organisation's overhead costs, plus a profit element. Demand-based approaches involve estimating, and testing, 'what the market will bear'. This necessarily involves comparisons with competitors' offerings. Consideration can be given to explicit or tacit special offers for 'anchor clients' / 'early adopters' / 'beta-testers', in order to establish a foothold in the market and reference clients. Appendix 2 provides some food for thought on psychological aspects of pricing.

The business strategy, business model, marketing plan and tariff together establish the basis for marketing and sales activities to be conducted, in order to communicate the opportunity and the value proposition to the targeted prospects, and bring in the business.

Discussion Topics

- Are the intended secure services to be offered by a new entrant, or by an organisation that already operates in the relevant marketspaces?
- What existing regulatory requirements can the offerings be designed to fulfil?
- What aspects of the current cost structure will be affected, and can the offerings be designed in such a manner that cost-savings can be made?
- Are any technological changes in train, or imminent, which may disrupt the market sufficiently to create opportunities for secure service offerings?
- To what extent have concerns about cybersecurity caused changes in the attitudes and practices of user corporations, government agencies and consumers?
- Which market segments are especially in need of secure services, which of those are already attuned to that need, what value propositions fit their needs, and what revenue models are appropriate to them?
- Have needs analyses already been performed, and have risk assessments already been performed, from the perspectives of each of the target segments?
- What characteristics do productised secure service offerings need to have, in order to attract the interest of potential customers?
- What characteristics do productised secure service offerings need to have, in order to attract the interest of IAPs and ISPs?
- What exemplars of successful secure service offerings exist, and what lessons can be learnt from those successes?
- What attempts at secure service offerings have failed, and what lessons can be learnt from those failures?
- What channels, opinion leaders and change agents are appropriate to each of the segments?
- What promotional channels, tariff structures and pricing are used by IAPs and ISPs who currently deliver relevant services into target markets?

References

ASD (2014) 'Strategies to Mitigate Targeted Cyber Intrusions' Australian Signals Directorate, February 2014, at http://www.asd.gov.au/infosec/top-mitigations/mitigations-2014-table.htm

ASD (2016) 'Information Security Manual' Australian Signals Directorate, May 2016, esp. 'ISM Controls', at http://www.asd.gov.au/publications/Information_Security_Manual_2016_Controls.pdf

Cisco (2016) 'Service Provider Security' White Paper, Cisco, February 2016, at http://www.cisco.com/c/en/us/about/security-center/service-provider-infrastructure-security.html

Clarke R. (1994) 'The Path of Development of Strategic Information Systems Theory' Xamax Consultancy Pty Ltd, July 1994, at http://www.rogerclarke.com/SOS/StratISTh.html

Clarke R. (2004) 'Open Source Software and Open Content as Models for eBusiness' Proc. 17th International eCommerce Conference, in Bled, Slovenia, 21-23 June 2004, PrePrint at http://www.rogerclarke.com/EC/Bled04.html

Clarke R. (2007) 'Business Models to Support Content Commons' SCRIPT-ed 4,1 (2007) 59-71 at http://www.law.ed.ac.uk/ahrc/script-ed/vol4-1/clarke.asp, PrePrint at http://www.rogerclarke.com/EC/BMSCC.html

Clarke R. (2013a) 'Information Security for Small and Medium-Sized Organisations' Xamax Consultancy Pty Ltd, 4 January 2013, at http://www.xamax.com.au/EC/ISInfo.pdf

Clarke R. (2013b) 'Data Risks in the Cloud' Journal of Theoretical and Applied Electronic Commerce Research (JTAER) 8, 3 (December 2013) 60-74, PrePrint at http://www.rogerclarke.com/II/DRC.html

Clarke R. (2014) 'Key Factors in the Limited Adoption of End-User PETs' Politics of Surveillance Workshop, University of Ottawa, May 2014, at http://www.rogerclarke.com/DV/UPETs-1405.html

Clarke R. (2015) 'The Prospects of Easier Security for SMEs and Consumers' Computer Law & Security Review 31, 4 (August 2015) 538-552, Appendix 2: Baseline Security Features, PrePrint at http://www.rogerclarke.com/EC/SSACS.html#App2

Clarke R. (2016) 'Can We Productise Secure eWorking Environments?' Workshop for 11th IFIP Summer School on Privacy and Identity Management, August 2016, Karlstad, Sweden, at http://www.rogerclarke.com/DV/SeWE16.html

CSRIC (2011) 'Internet Service Provider (ISP) network protection' Communications Security, Reliability and Interoperability Council, December 2011, at http://www.fcc.gov/pshs/docs/csric/CSRIC_WG8_FINAL_REPORT_ISP_NETWORK_PROTECTION_20101213.pdf

Fritscher B. & Pigneur Y. (2009) 'Supporting Business Model Modelling: A Compromise between Creativity and Constraints' in D. England et al. (Eds.): TAMODIA 2009, LNCS 5963, pp. 28–43, 2010

iCode (2010) 'iCode: Internet Service Providers Voluntary Code of Practice for Industry Self-Regulation in the Area of Cyber Security' Industry Code C650:2014, Communications Alliance Ltd , 2010, at http://www.commsalliance.com.au/__data/assets/pdf_file/0019/44632/C650_2014.pdf

Nagle T.T. & Holden R.K. (2002) 'The Strategy and Tactics of Pricing: A Guide to Profitable Decision Making' Prentice Hall, 2002

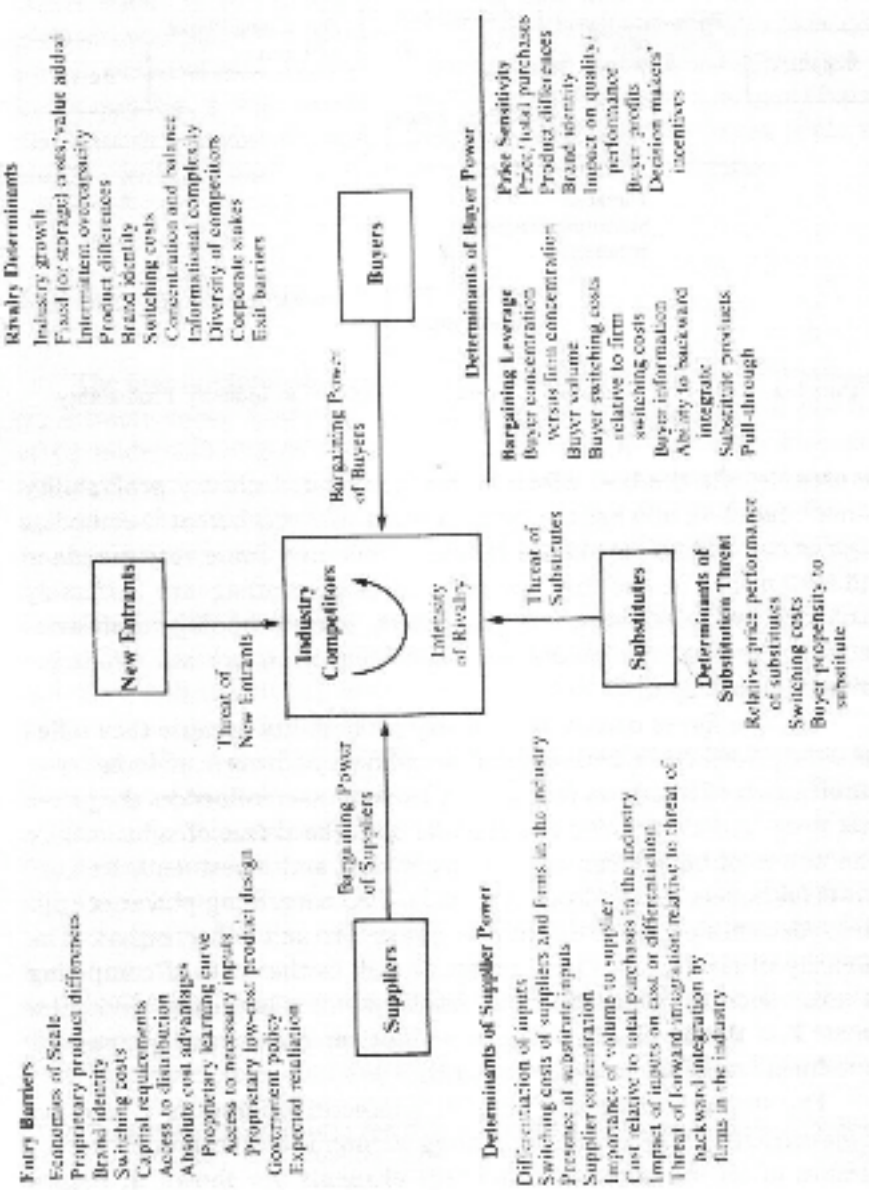
NIST (2013) 'Security and Privacy Controls for Federal Information Systems and Organizations' National Institute of Standards and Technology, SP 800-53 rev.4, April 2013, Appendix D: Security Control Baselines – Summary', ppD-1 to D-43.at http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-53r4.pdf

Osterwalder A., Pigneur Y. & C.L. Tucci C.L. (2005) 'Clarifying Business Models: Origins, Present, and Future of the Concept' Commun. AIS 15 (May 2005)

Ovans A. (2015) 'What Is a Business Model?' Harvard Business Review, 23 January 2015, at https://hbr.org/2015/01/what-is-a-business-model

Appendix 1

Determinants of Power in the Competitive Forces Model
From Porter (1985)



Appendix 2

Nine Laws of Price Sensitivity and Consumer Psychology

From Nagle & Holden's 'The Strategy and Tactics of Pricing'
https://en.wikipedia.org/wiki/Pricing_strategies

Aspects of apparent relevance to IAPs' and ISPs' secure service offerings are asterisked

** 1. **Reference Price Effect** – buyer's price sensitivity for a given product increases the higher the product's price relative to perceived alternatives. Perceived alternatives can vary by buyer segment, by occasion, and other factors.

2. Difficult Comparison Effect – buyers are less sensitive to the price of a known or more reputable product when they have difficulty comparing it to potential alternatives.

** 3. **Switching Costs Effect** – the higher the product-specific investment a buyer must make to switch suppliers, the less price sensitive that buyer is when choosing between alternatives.

** 4. **Price-Quality Effect** – buyers are less sensitive to price the more that higher prices signal higher quality. Products for which this effect is particularly relevant include: image products, exclusive products, and products with minimal cues for quality.

5. Expenditure Effect – buyers are more price-sensitive when the expense accounts for a large percentage of buyers' available income or budget.

6. End-Benefit Effect – the effect refers to the relationship a given purchase has to a larger overall benefit, and is divided into two parts: Derived demand: The more sensitive buyers are to the price of the end benefit, the more sensitive they will be to the prices of those products that contribute to that benefit. Price proportion cost: The price proportion cost refers to the percent of the total cost of the end benefit accounted for by a given component that helps to produce the end benefit (e.g., think CPU and PCs). The smaller the given components share of the total cost of the end benefit, the less sensitive buyers will be to the components' price.

7. Shared-cost Effect – the smaller the portion of the purchase price buyers must pay for themselves, the less price sensitive they will be.

8. Fairness Effect – buyers are more sensitive to the price of a product when the price is outside the range they perceive as "fair" or "reasonable" given the purchase context.

** 9. **The Framing Effect** – buyers are more price sensitive when they perceive the price as a loss rather than a forgone gain, and they have greater price sensitivity when the price is paid separately rather than as part of a bundle.