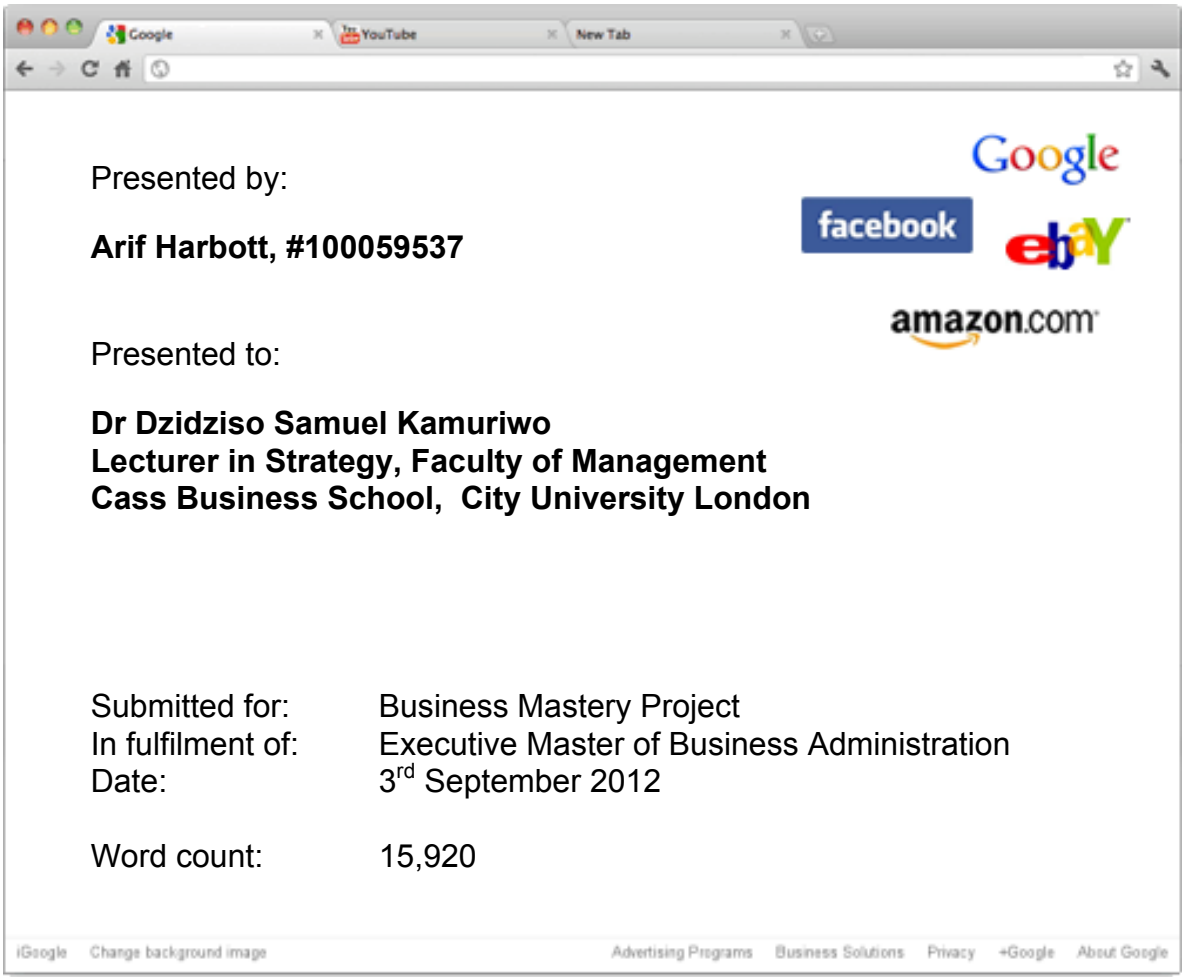
What drives Internet company valuation?

A business model approach to Internet value drivers



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Abstract

With modest financials Facebook's IPO market value was greater than industry stalwarts Yahoo, eBay and Dell. Why do some companies have seemingly high market valuations relative to their financial performance?

This research aims to determine what drives market valuations for Internet companies and to discover whether value drivers vary across the different types of business models.

Given the ubiquity of the Internet and the huge growth in online businesses one would assume a large body of research on Internet value drivers. However the literature review found that this is the first study of business model value drivers since 2001 and reinforces the value of this research.

The objectives of the research were threefold:

1. To identify the value drivers for Internet companies.
2. To create a collectively exhaustive categorisation of Internet business models.
3. To determine whether different business models have varying value drivers.

Existing Internet business model classifications were identified from the literature. The most promising classifications were extended to create a new classification of seven Internet business models: Community, Content, Ecommerce, Infrastructure, Marketplace, Service Provider, and Software.

Accepted best practice is to use financial metrics to value companies. However for Internet companies it is also important to include non-financial website traffic variables.

The literature review identified six value drivers for market value divided into two categories:

1. Non-financial traffic metrics (reach, pageviews, traffic rank)
2. Financial metrics (revenue, EPS, Price-to-Sales).

Data were collected on the 71 firms in the Nasdaq QNET Internet index and were analysed via descriptive statistics and regression models to determine value drivers.

The aggregated results found revenue is the dominant driver of Internet market value; having the highest correlation with market value and the highest R^2 (0.93).

However when the sample was disaggregated into business model categories the results showed that each category had unique value drivers, which were a combination of financial and non-financial drivers.

The data also highlighted that Internet markets seem to go through different phases with traffic drivers playing a disproportionate role in the early stages followed by the progressive importance of financial drivers as the market matures.

The key recommendation is that management should focus on building revenue, not cutting costs, if they want to maximise market value. In addition, management should be aware that each business model has unique drivers and these should be identified, tracked, measured closely.

Keywords: business models, Internet, value drivers, business model classification.

Acknowledgements

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I would also like to thank my advisor Dr Sam Kamuriwo for his patience, insight and constant availability in helping me to conduct this research.

List of Abbreviations

AIC = Akaike's Information Criterion
B2C = Business to consumer
B2B = Business to business
C2C = Consumer to consumer
BM = Business model
CVP = Customer value proposition
EPS = Earnings per Share
IQR = Inter quartile range
ISP = Internet service provider
Saas = Software as a service
VC = Venture Capitalist

In this research the terms web, online, Internet and e-business, e-web are all used interchangeably.

Also market capitalisation, market value, market valuation and market cap are all used interchangeably.

1 Introduction

The objective of this research is to establish the different value drivers that affect market valuation for Internet companies and whether the type of business model plays a role in valuation.

With modest revenues and earnings, Facebook's market value after IPO was greater than industry stalwarts Yahoo, eBay and Dell.

This research wanted to explain how such a young company with relatively low financials commanded such a large market valuation.

What drives market valuations for Internet companies and does the company's business model type have an effect on valuation?

This paper aims to discover the different Internet business models categories and analyse their value drivers.

The literature review found that this is the first study of Internet business models value drivers since 2001. This underlines the value of this study and the results will enhance the body of knowledge.

1.1 Working Hypothesis

Why do some types of companies (such as social network companies) have seemingly high market valuations relative to their financial performance?

The initial observation suggests that there are variations in market valuations that are not related solely to financial performance.

Hypothesis H1 – Non-financial drivers play a disproportionate role in Internet stock market value.

The author's prediction is that the relatively large valuations posted by Facebook and LinkedIn cannot be solely explained by conventional measures alone.

Hypothesis H2 – Value drivers are not uniform across all business models.

The author's prediction is infrastructure businesses (e.g. data centres, ISPs) will have values driven by assets and earnings whereas visitor traffic and "eyeballs" will drive social media companies.

1.2 Objectives of This Research

- To identify the value drivers for Internet companies.
- To categorise and create a collectively exhaustive list of Internet business models.
- To determine if each category of business models has different value drivers.

1.3 Who Will Find the Study Useful?

Many companies are analysing the best Internet business models to identify potential revenue models and to help maximise company value. Venture capital companies are trying to find the best opportunities for the high growth companies and new businesses are building companies hoping to make their fortune on the Internet. The results from this research will provide guidance on the most important value drivers to give companies the best chance of enhancing market valuation.

1.4 Research Rationale

As this is the first study of Internet value drivers and how business models affect them since 2001, the findings will show how the Internet industry has matured and whether there is now more reliance on financial drivers.

This research was driven by the author's passion for the Internet businesses and a fascination with business models. It was inspired by the question of why companies such as Facebook post valuations that seem high compared to their established counterparts even though their financial performance is not as established.[1]

This research was inspired Kozberg (2001). The author plans to assess whether Kozberg's finding are still relevant after eleven years and also to update the categorisation to accommodative new, emerging business models.

The MBA course has aided greatly in writing this report. Many of the topics introduced in the MBA provided the foundation for this paper.

1.5 Structure of this Research

Literature Review. Defines what a business model is and then understands the varying types of business model and how they differ. A new classification is then

[1] Facebook unveils $5bn stock market flotation plans http://www.bbc.co.uk/news/business-16830664

developed and the review is concluded with the understanding of the accepted financial and non-financial drivers.

Methodology. Details the research approach, quality and quantity of the data, the analysis approach as well as limitations.

Data Analysis. Results and observations from the descriptive analysis, covariate analysis, correlation tables and multiple regression models.

Data Discussion and Interpretation. Trends in the data and any observations that enhance the body of knowledge. Business model drivers are identified and factors affecting market value are discussed.

Conclusions. A summary of the research discussing whether the objectives were met. Finally the contributions of the research with suggestions for further studies.

Recommendations. What the results and conclusions imply to various stakeholders such as managers, investors, analysts and how the research can be used in practice.

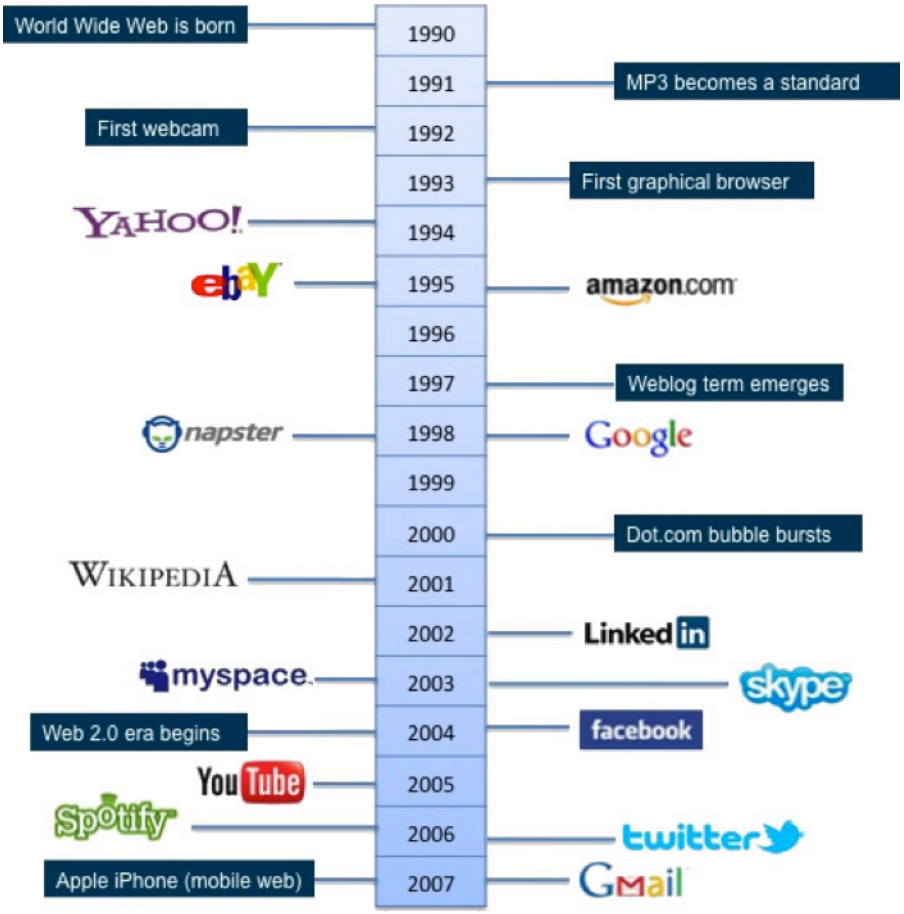

Figure 1: Visual timeline of the Internet. Source: Company websites.

2 Literature Review

This literature review helped identify the theories and ideas to be tested. Over the course of this review material was analysed from in excess of 50 sources.

The information for this literature review has been drawn mainly from working papers, online articles, academic journals, business magazines and books.

Most of the high profile Internet business model studies were conducted before 2003 and the industry has seen huge changes since then.

Due to the large volume of sources reviewed it was important to be structured and each topic was organised into the following format:

- Introduction to the topic – what is it and why is it important?
- Summary of the literature – key ideas and themes, a summary of the key research and how the research affects the study.
- Key research in depth – an analysis of the most important studies.
- Summary – organising the key theories and synthesising the key points.

2.1 Literature Review Reasoning

Sections	*Reasoning*
Defining business models	Before a classification of business models is started it is essential to understand what a business model is. • What is a business model? • How are Internet business models defined?
Classifying business models	Before segmenting the sample a categorisation must be identified or developed. • Is there an agreed classification of business models? • Is a typology or taxonomy preferable? • What is the basis for the various classifications? • How do the classifications differ? • Do the classifications accommodate new business models such as cloud and social networking?
Building the business model classification	An up-to-date classification should be designed for this research to reflect new and emerging business models.
Value Drivers of Internet Companies	The common and most relevant value drivers must be identified in order to build the independent variables for the regression. • What are the factors that drive Internet company valuation? • Are financial metrics enough or do non-financial drivers play a part in the valuation?

2.2 Defining Business Models

2.2.1 Introduction

What is a business model and how is an Internet business model defined? The first step is to understand how a business model is defined and what are its constituent parts. A broad industry approach was taken before narrowing down to assess if Internet business models were treated differently in the literature.

Even though business models have been integral to trading and economic behaviour since pre-classical times (Teece, 2010), they only started getting attention in the mid-1990s as the Internet forced businesses to re-think how they operate (Ghaziani & Ventresca, 2005). Ghaziani & Ventresca (2005) highlighted this when they searched business model in literature from 1975 to 2000. They found that of the 1,729 publications, only 166 were published in the period 1975-1994, the remaining 1,563 were in the period 1995-2000, showing how prevalent the concept had become.

2.2.2 Summary of the Literature

The business model is fundamental to any organisation (Magretta, 2002), this is because business models provide powerful ways to understand, analyse, communicate and manage strategic orientated choices (Al-Debei & Avison, 2010).

Researchers have looked at the business model concept in the context of different domains. The majority of research into business models has been concerned with Internet business models, and there have been many attempts to develop convenient classification schemas (Al-Debei & Avison, 2010).

Lambert (2006) found some definitions of business models are quite abstract and outward looking (Timmers 1998; Hamel 2000; Weill and Vitale 2001; Hawkins 2002; Rappa 2006) while others are detailed and all encompassing of business functions (Chesbrough and Rosenbloom 2002; Mahadevan 2000; Osterwalder et al. 2002).

Hedman and Kalling (2003) state that the wide variation of definitions and business model attributes could be because business model are established according to the business model's intended use and that they are not sufficiently grounded in theory (Hedman and Kalling 2003).

Zott et al. (2011) found that there is no agreement on what a business model is and that the literature is developing in silos depending on the focus of interest of the author. Pateli and Giaglis (2003) found that there is a range of concepts and definitions which have merit, but none of which have been universally accepted.

Al-Debei & Avison (2010) states this lack of agreement could be because:

1. The business model is a relatively new concept
2. It covers diverse functions and industries (e.g. Internet, manufacturing business, strategy, economic, technology)

Al-Debaei & Avison (2010) classified the business model literature into the following groups:

- Define the overall concept (Timmers 1998; Osterwalder et al. 2005; Shafer et al. 2005)
- Understand its relationships with information systems (Hedman & Kalling 2003), and other business concepts i.e. corporate strategy (Mansfield & Fourie 2004)
- Business process modelling (Gordijn et al. 2000)
- Identify constituent elements (Johnson et al. 2008; Mahadevan 2000; Gordijn & Akkermans 2001; Chesbrough & Rosenbloom 2002; Pateli & Giaglis 2003)

Below is a selection of the key definitions of business models:

Afuah & Tucci (2002) p.6 state “An Internet business model is how a firm plans to make money long-term using the Internet”.

Timmers (1998) defines a business model as including an architecture for the product, service, and information flows, a description of the benefits for the business actors involved, and a description of the sources of revenue.

Osterwalder & Pigneur (2005) stated a business model was a conceptual tool that contains a set of elements and their relationships and expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value relationship capital, to generate profitable and sustainable revenue streams.

Shafer et al. (2005) stated business models are a representation of a firm’s logic and strategic choices for creating and capturing value within a value network.

Al-Debei et al. (2008) stated the business model is an abstract representation of an organisation, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organisation presently and in the future, as well as all core products and/or services the organisation offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives.

Lambert (2003) found that the common factor evident in the definitions is the requirement that the business model depict the business in relation to the other entities that form part of the value network. Although some definitions are inclusive of internal business processes and others are not, they all require a description of how the firm expects to generate revenue and how it relates to the other entities in the value network. This suggests that the essential focus of a business model is the interaction of the firm with its marketplace.

2.2.3 Conclusions

Understanding the business model is a crucial first step in the research as it defines the context for the classification scheme.

After reviewing the literature no agreed definition of a business model was found. Worse still there are very wide variations in the definitions as some researchers focus

on one aspect or component (e.g. Timmers 1999) and others focus on a network of relationships (e.g. Al-Debei & Avison 2010).

It seems strange that there is not more use of standards in defining business models; lessons can be learned from the technology field where the use of standard definitions and standard modelling tools are essential for strategic alignment.

In developing a definition a focus on simplicity and definitions tailored for Internet businesses were favoured. The research considers "Internet-based business models" to be companies that build value and revenue on the Internet (Timmers, 1998). Only companies that earn over 51% of their revenue (Hand, 2000b) with their business partners and buyers over the net (either exclusively or in addition to their brick and mortar operations) are considered (Mahadevan, 2000).

2.3 Classifying Business Models

2.3.1 Introduction

With an understanding of business models the review then focused on how models are grouped and classified. The purpose was to find a widely accepted classification of Internet business models that would form the basis for the study's categorisation.

It was useful to examine the chronology of the various approaches as the Industry has seen huge changes since its inception. The concern was that theories developed in the early 2000 are not fit for purpose in the era of smart phones, Facebook, Twitter and tablet devices.

When assessing each classification the assessment criteria from Scott (1981) were used, which states that a classification should be:

1. Intuitively sensible. Grouping similar businesses together with category names that are self-explanatory.
2. Collectively exhaustive and mutually exclusive. Classifying all businesses, and each company must only be assigned to one category.
3. Construct validity. While subjective judgment is required, different people should classify the same firm in the same way, given the same information.
4. Conceptually elegant. Few concepts as possible, with the additional conditions that the concepts also had to be simple.

At this point the important distinction between typologies and taxonomies is highlighted although many researchers use the terms interchangeably. Understanding the differences between taxonomic research and typological research is important because they serve different purposes and have their own limitations and strengths (Lambert, 2006b).

Typologies are derived from deductive research. The researcher conceptualises the types that are relevant to the research which form the basis of the classification. The researcher then identifies cases that possess the characteristics deemed essential to fit the category.

Taxonomies are built empirically as the result of inductive research. The researcher creates grounded theory by first collecting the data and then generalising to the abstract or conceptual.

2.3.2 Summary of the Literature

There are many business model classifications ranging from observed lists with no consistent classification criteria (e.g. Kotzberg 2001; Applegate 2001b; Eisenmann 2002; Laudon and Traver 2003; Rappa 2006), to a more systematic approach which classifies models using as few as two variables (Timmers 1998; Linder and Cantrell 2000) and as many as four variables (Weill and Vitale 2001; Afuah and Tucci 2003) (Lambert, 2006b).

Pateli & Giaglis (2003) stated that business models in the same category usually shared common characteristics, such as pricing or the customer relationship model. They found that category frameworks of business models are based on:

1. Criteria posed for classifying business models
2. Objects classified, whether they are entire business initiatives (such as Amazon, eBay, etc.), possibly combining multiple business models (Timmers, 1998; Rappa, 2001), or atomic business models that can be incorporated into an e-business initiative (Weill & Vitale, 2001).

Lambert (2006b) believed that existing business model typologies could be consolidated to create a more comprehensive typology. However creating a 'master' typology would require considerable subjective judgment and it may lose its potential to simplify reality.

2.3.3 Key Research

2.3.3.1 Interaction Pattern and Value Chain Integration

TImmers (1998) used a value chain de-construction and re-construction for classification, identifying value chain elements and possible ways of integrating information along the chain. These can be fully open, with an arbitrary number of buyers and sellers, or 'semi-open' that is with one buyer and multiple sellers (as in public procurement) or vice-versa. The idea is as follows:

1. Value chain de-construction means identifying the elements of the value chain, for example Porter's nine value chain elements.

2. Interaction patterns, which can be one-to-one, one-to-many, many-to-one, many-to-many.

3. Value chain re-construction, that is integration of information processing across a number of steps of the value chain. The combinations are of the value chain elements involved in such integration.

Possible architectures for business models are then constructed by combining interaction patterns with value chain integration. For example, an electronic shop is 'single actor'-to-'single actor' marketing and sales. A basic electronic mall consists of N times an e-shop. An electronic mall having a common brand offers many-to-1

marketing & sales (brand in- formation is common across 'many' suppliers in the mall). An electronic auction where multiple buyers are bidding for the sales offer of one supplier brings together sales of one supplier at a time with the procurement of multiple buyers, while combining the bid information from the multiple buyers.

This approach while leading to a huge number of potential models, only observed models were included in the classification:

1. e-shop – 24/7 online shopping (e.g. Amazon)

2. e-procurement – electronic tendering and procurement of goods and services. This is often used by large companies in the auto industry and is common practice for large companies or governments.

3. e-auction – online auctions (e.g. eBay).

4. e-mall – collection of e-shops, usually enhanced by a common umbrella, for example of a well-known brand. These do not tend to be prevalent in 2012.

5. e-marketplace – supply and demand for physical and virtual services.

6. Virtual communities – focusing on providing a forum for like-minded individuals. This was the genesis for social media such as Facebook.

7. Value chain service provider – specialise on a specific function for the value chain, such as electronic payments or logistics (e.g. Fedex online).

8. Value chain integrator – focus on integrating multiple steps of the value chain. Revenues are gained through consultancy or transaction fees.

9. Collaboration platform – provide a set of tools and an information environment for collaboration between enterprises (e.g. document or project management).

10. Information broker – this is an area that the Internet has revolutionised. A huge range of information services exist from finance to consumer reports to investment advice.

Timmers (1998) was one of the first studies of business model classifciations and has become the benchmark for future studies. After researching the model it was found that it was written for a credible magazine rather than an academic study. However it was still included as almost every source from the literature referenced it and TImmers is considered a pioneer in business model research. While the approach is interesting the number of categories is too large and some of the labels (e.g. value chain integrator) are not self-explanatory. It is hard to cite other limitations as this was not a research study.[2]

[2] The author contacted Paul Timmers who kindly replied saying that the findings came from a thought leadership article. As it was not a research paper there are many limitations with the validity of the findings.

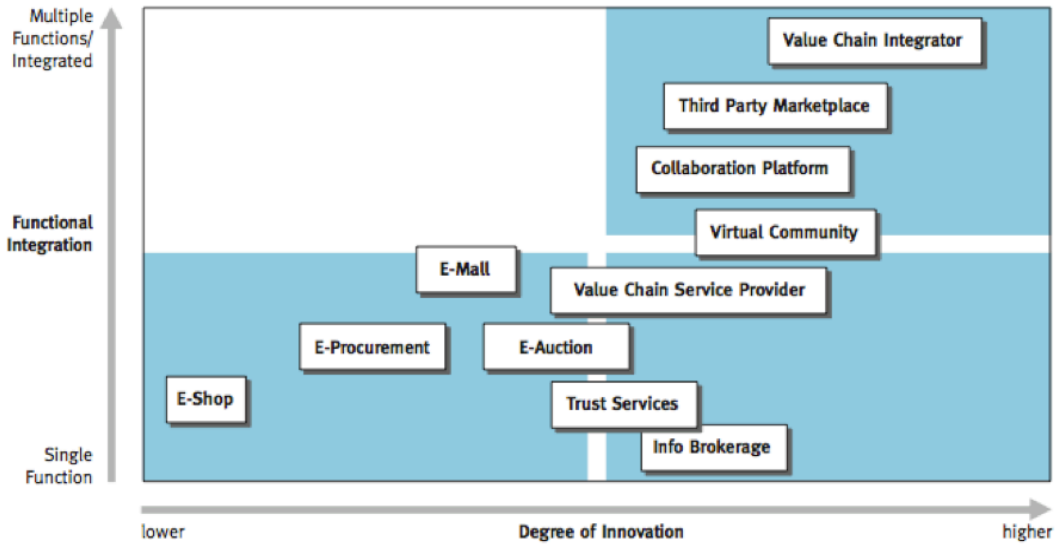

Figure 2: Classification of Internet business models (Timmers, 1998)

2.3.3.2 Classifying Models By Rights Sold and Assets Involved

Weill et al. (2005) built a typology classifying the largest 1,000 companies in America. Although not directly related to Internet companies their approach has been influential to this research. They found that some business models are much more common than others, and that some perform better than others. While no one model seems to do better than another across all six measure of performance, some models do seem to be superior on specific measures.

Weill et al. (2005) argued the heart of any business is what it sells; which fundamentally is the kind of legal right is conferred to the buyer upon the completion of the transaction. They break the rights down into:

1. **Ownership** – continuing right to use the asset in (almost) any way they want including selling, destroying, or disposing of it. This can be further broken down into creators, those firms that make what they sell (e.g. manufacturers) and transformers, those firms that sell others goods (e.g. retailers).

2. **Use** – customers buy the right to use the asset for period of time, but the owner of the asset retains ownership and can restrict the ways customers use the asset. At the end of the time period, rights revert to the owner (e.g. hotel rooms, car hire).

3. **Matching** – customers are matched with potential buyers or sellers of something (e.g. estate agents or auction houses).

On the other axis they plot what types of assets are involved:

1. **Financial** – cash and other assets like stocks, bonds, and insurance policies.

2. **Physical** – durable items (such as houses, computers, and machine tools) as well as nondurable items (such as food, clothing, and paper).
3. **Intangible** – intellectual property, knowledge, goodwill, brand image.
4. **Human** – people's time and effort

		What type of asset is involved?			
		Financial	Physical	Intangible	Human
What rights are being sold?	Creator	**Entrepreneur**	**Manufacturer**	**Inventor**	**Human Creator***
	Distributor	**Financial Trader**	**Wholesaler/ Retailer**	**IP Trader**	**Human Distributor***
	Landlord	**Financial Landlord**	**Physical Landlord**	**Intellectual Landlord**	**Contractor**
	Broker	**Financial Broker**	**Physical Broker**	**IP Broker**	**HR Broker**

Table 1: 16 Business model types (Weill et al., 2005)

From their analysis they defined 16 business model types as seen in Table 1, however some of these are not yet used on the Internet e.g. physical manufacturer.

This research is limited by the fact that it only focused on large market value, American companies. Many of the World's largest companies are not American so the performance results may have been very different with a more global sample.[3]

The study only focuses on the financial drivers of business model performance where as non-financial drivers (management, organisational structure etc.) can also have a large effect on market value (see section 2.5.2.2). This study expands this approach to analyse both financial and non-financial drivers.

Finally the study also used an auto-classification algorithm to classify companies, which the authors admit reduced the reliability of the findings. This study will use human classification due to the highly subjective nature of classification.

2.3.3.3 Classification By Atomic Elements as Building Blocks

Weill & Vitale (2001) identified a finite set of atomic e-business models that each describes the essence of doing business on the Internet.

The eight elements can be combined to create more complex models or used as stand-alone, in this way a wide range of possibilities can be considered quickly:

1. Content provider – the provision of static and dynamic content (e.g. information, news, digital products & services) via intermediaries.

2. Direct to consumer – provides goods or services directly to the customer often bypassing traditional channel players.

3. Full service provider – a full range of services in one domain (e.g. financial, health) from own products and best of breed, attempting to own the consumer

[3] Only 3 of the top 10 companies in the World are American. Source: http://money.cnn.com/magazines/fortune/global500/2011/full_list/

relationship.

4. Intermediary – brings together buyers and sellers by concentrating information (e.g. search agent, auctions).

5. Shared infrastructure – brings together multiple competitors to cooperate by sharing common IT infrastructure.

6. Value net integrator – coordinates the value net (or chain) by gathering, synthesizing, and distributing information.

7. Virtual community – facilitates and creates loyalty to an online community of people with a common interest enabling interaction and service provision.

8. Whole of enterprise – allows a firm-wide single point of contact consolidating all services provided by a large multi-business organisation organized by customer events.

For example Amazon.com combine direct to consumer (own brand products), intermediary (Amazon marketplace), virtual community (reviews) and content provider (affiliates its content to other sites) in their model.

Whilst this tool has a practical use for business strategists, it fails Scott (1981) criteria of not assigning more than one business model to the same unit. However these atomic elements could be used as the framework of creating a taxonomy of Internet business models. Their methodology was based on in-depth case studies with nine firms across the World. This seems too small a sample and it was heavily biased towards American companies with no structure to how the companies were selected. This study will address these issues by looking at a larger sample and a use a more structured selection process.

2.3.3.4 B2C Business Models

Laudon & Traver (2008) proposed a set of B2C categories for businesses based on logical classifications based on observing different types of business models. It is included here because it is one of the more recent classifications identified:

1. Portals – Offers powerful search tools plus an integrated package of content and services.

2. E-tailers – Online version of traditional retailer.

3. Content providers – Information and entertainment companies that provide digital content over the Web.

4. Transaction broker – Processes online transactions for consumers.

5. Market creator – Uses Internet technology to create markets that bring buyers and sellers together.

6. Service provider – Offers services online.

7. Community provider – A digital online environment where people with similar interests can transact, communicate, and receive interest-related information.

As these categories are from a book they have not been identified through the rigour of an academic study. However the classification is very exhaustive and covers almost all of the current business models. The number of categories is also an appropriate size and most of the labels are clear and self-explanatory.

2.3.3.5 The 4C Typology

Wirtz et al. (2010) developed a coherent typology to classify business models, in order to make their study easier and more structured. The 4C typology was designed to be straightforward yet exhaustive, and derive a relatively small number of groups while still ensuring small within-group differences. The resultant framework describes four basic types: Content, Commerce, Context and Connection (see Figure 3).

While this categorisation is elegant it is also useful because of the small number of categories. It is also very relevant to this study as it is one of the more recent categorisations.

However the classification only focuses on web 2.0 companies and fails to capture other Internet business models such as infrastructure companies (e.g. hosting) and software companies. This research will extend this classification to ensure it is collectively exhaustive. Another weakness is the study used in-depth interviews to collect data, which were initiated through an alumni network of a Californian university. This method would highly bias the sample, as the responders would all have studied at the same institution.

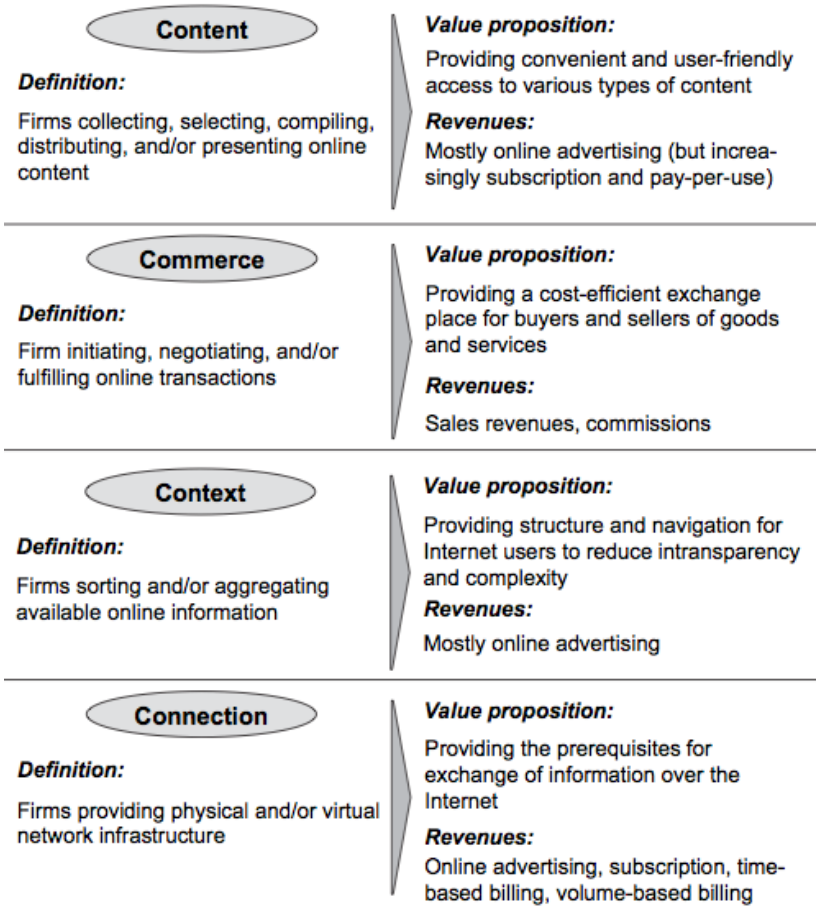

Figure 3: 4C Typology of Internet business models (Wirtz et al., 2010)

2.3.4 Conclusions

Lambert (2006a) finds that there is no taxonomy of business models largely because there is no widely agreed upon concept of a business model. This view is echoed by Osterwalder & Pigneur (2005) and Weill et al. (2005) who find no accepted taxonomy of business models.

Hawkins (2002) goes further to say "Attempts to create taxonomies of business models mostly amount to no more than random, unrelated lists of business activities that just happen to occur on Internet platforms".

Many of the models discussed are simply extensions of a traditional model such as e-shops, where as some of the models have been created because of the openness and connectivity of the Internet (see Table 2 below). In addition early classifications are out of date or do not include newer models such as social networking or cloud services.

However there are some more recent classifications, which incorporate emerging business models and Web 2.0 thinking.

The classification for this research will be a combination of the two most recent classifications, Wirtz et al. (2010) and Laudon & Traver (2008) (see section 2.4), because they include many of the business models seen today and in combination are collectively exhaustive.

Author	Timmers (1998)	Linder & Cantrell (2000)	Tapscott et al. (2000)	Mahadevan (2000)
Classification Name	Current business models	Core operating categories	b-webs	Classification by market structure
Criteria for Classification	Degree of innovation and integration	Core profit making activity on price/ value continuum	Economic control and value integration	Market structure
Number of Categories	10	8	5	3
Category Names	e-shop e-procurement e-auction e-mall e-marketplace Virtual communities Value chain service provider Value chain integrator Collaboration platform Information broker	Price models Convenience models Commodity plus models Experience models Channel models Intermediary model Trust model Innovation model	Agora Aggregation Value Chain Alliance Distributive Network	Portals Market makers Product/service providers

Author	Kozberg (2001)	Applegate (2001b)	Rappa (2001)	Weill & Vitale (2001)
Classification Name	None given	Emerging networked business models	Taxonomy of business models observable on the web	Typology of atomic e-business models
Criteria for Classification	No consistent criteria	No consistent criteria	Revenue and position in value chain	Strategic objectives and source of value
Number of Categories	7	6	9	8
Category Names	Portals Content-community e-tailing Financial services Enablers ISP/Infrastructure Non-sensitive firms	Producers Focused Distributors Portals Infrastructure distributors Infrastructure portals Infrastructure producers	Brokerage Advertising Infomediary Merchant Manufacturing Affiliate Community Subscription Utility	Content provider Direct to consumer Full service provider Intermediary Shared infrastructure Value net integrator Virtual community Whole of enterprise

Author	Wang & Chan (2003)	Weill et al. (2005)	Laudon & Traver (2008)	Wirtz et al. (2010)
Classification Name	Three graph models	The sixteen business models	B2C business models	4C Typology of Internet Business Models
Criteria for Classification	Graph model theory	By rights sold and assets involved	No consistent criteria	No consistent criteria
Number of Categories	4	16	7	4
Category Names	Gift Model Direct Exchange Model Indirect Model Hybrid Models	Entrepreneur Manufacturer Inventor Financial Trader Wholesaler/ Retailer IP Trader Financial Landlord Physical Landlord Intellectual Landlord Contractor Financial Broker Physical Broker IP Broker HR Broker	Portals E-tailers Content providers Transaction broker Market creator Service provider Community provider	Content Commerce Context Connection

Table 2: Summary of business model classifications literature

2.4 Building the Business Model Classification Framework

The review of the literature found no universally accepted method of classifying Internet business models (see section 2.3.4). It was also noted that classification frameworks were out of date and did not accommodate newer business models.

Therefore the author developed a new classification with the following criteria:

1. It needed to accommodate new businesses such as Facebook and cloud services. Many of the classifications were written before these innovations were developed.

2. It should flexible enough to accommodate emerging business models in the fast moving Internet sector.

It was decided to combine and extend Laudon & Traver (2008) with Wirtz et al. (2010) because these were the most up-to-date classifications found:[4]

gure 4: Business model classification framework rationale

Figure 4 shows how the categories were combined or renamed. Two additional categories, infrastructure and software, were added as they were not listed in the classifications.

Laudon & Traver (2008)	Wirtz et al. (2010)	This Study	Rationale
Community provider	Connection	Community	Changed to a more relevant label
Portal Content provider	Content Context	Content	Combined portals and content into the same category as they are in effect performing the same
e-tailer	Commerce	Ecommerce	Changed to a more relevant label
		Infrastructure	Neither classification recognised infrastructure
Transaction broker Market creator		Marketplace	Combinedbroker and market creator as a broker brings buyers and sellers together like a marketplace
Service provider		Service Provider	No changes
		Software	Neither classification recognised software companies or cloud software such as Saas

Cross-checking the classification with the criteria from Scott (1981) it appears they comply with being intuitively sensible with self-explanatory names, collectively exhaustive and mutually exclusive and contain as few categories as possible.

Table 3 (below) shows a list of business models, category traits and revenue models.

[4] See Appendix III and Appendix IV for classification rationale and the criteria used to classify each category.

Business Model	Examples	Description	Category Traits	Revenue Model
Community	Facebook LinkedIn	Where individuals with similar interests or similar networks can come together and share experiences	Social networking Networking Forums Content sharing User generated content	Advertising Subscription
Content	Google Yahoo!	Collecting, selling or distributing content or content related services.	Portals Search Engines Information sites News sites Content distribution Consumer reviews Special interest guides	Advertising Subscription Transaction fees
Ecommerce	Amazon Play.com	Online shops and retail stores that are available for purchases 24/7	Online shop Product sales	Sale of goods
Infrastructure	Rackspace Akamai	Companies that provide the hardware and services required to run the Internet	Data centres ISP services Website hosting Servers	Sale of hardware Leasing hardware Consultancy Maintenance
Marketplace	eBay Expedia	Bringing together buyers and sellers	Auction sites Matchmaking Many buyers and many sellers	Advertising Subscription Transaction fees
Service Provider	Netflix Comscore	Selling a service rather than a product	Digital products Information/ knowledge Consulting	Sale of services
Software	Saleforce Open Text	Physical or cloud based software for consumers or enterprises	Software as a service (Saas) Desktop software Online and console based games Web applications Mobile applications	Subscriptions Licences One-off fees In game purchases Consultancy

ıble 3: The new business model categories with characteristics

2.5 Value Drivers of Internet Companies

2.5.1 Introduction

With an understanding of business model classification the review focused on the drivers of Internet company valuation.[5] What are the major components that drive Internet company valuation? What are the relative importance of financial drivers (such as revenue, earnings etc.) and non-financial drivers (such as website traffic and unique visitors)?

[5] A 'value driver' is any factor that enhances the total market value created by a company (Amit & Zott, 2001).

2.5.2 Summary of the Literature

Few studies were found on Internet value drivers. After 2001 no studies on Internet business model value drivers were found.

2.5.2.1 Financial Drivers

Historically the high proportion of loss making Internet firms meant traditional valuation approaches, such as discounted cash flow, price earnings ratio and market-to-book ratios, have generally not been considered appropriate (Isimbabi, 2002). However some studies found strong financial drivers can have a positive influence on Internet valuation (Fuertes-Callén & Laínez-Gadea, 2006). The author's opinion is that discounted cash flow is of little value for young Internet firms due to the level of uncertainty involved in forecasting future cash flows (who can predict what cash flows Facebook with generate in 5 years).

After reviewing the studies of Kozberg (2001), Rajgopal et al. (2000), Demers & Lev (2001) and Trueman et al. (2000) and Hand (2000a) the most common financial drivers for Internet companies were the magnitude of:

1. Revenue
2. Book value
3. Earnings
4. Market to book value

2.5.2.2 Non-Financial Drivers

Rajgopal et al. (2000) researched website traffic as many Internet companies have negative earnings. They argued website traffic was important because without a critical mass of visitors it is impossible to build customer relationships that can be converted to future revenues. Their results found that traffic is not a uniformly important factor for all online firms. Content providers and portals that monetise "eyeballs" value traffic a lot more than software vendors and infrastructure companies.

Website traffic measures had stronger correlation with market values of B2C firms than financial variables (Jorion & Talmor, 2001). This was contradicted by Hand (2000a) who found that financial variables "explained such a large proportion of the cross-sectional variation in the market values of Internet firms that the proportion available to be uniquely explained by non-financial data was quite low."

It is the author's initial observation that as the Internet has matured financial metrics are becoming more important. Many of the largest Internet companies now regularly report positive earnings (e.g. Google, Amazon), however a trend is that younger Internet companies focus on traffic before revenue and earnings.

Demers & Lev (2001) examined the importance of website performance:

- **Reach** – the ability to which a website is able to attract unique visitors
- **Stickiness** – how long visitors stay on the site
- **Customer loyalty** – driven primarily by the average number of visits to the site per unique visitor per period.

Their findings suggested that all of these performance measures are value relevant to the share prices of Internet companies in each of 1999 and 2000.

Demers & Lev (2000) find anecdotal evidence that in 1999 the market positively valued strategic alliances (they studied the effect of an alliance with AOL), however they found no evidence of this by 2001. As there is no public data for alliances, this research will indirectly measure alliances through traffic metrics.

Keating et al. (2001) found that investors are weakly positive about stock options most likely due to the effect on employee retention. It appears that after the dot.com crash many employees are less included to favour stock options.

PWC (2011) found PE ratios are not valid for social media or portal companies as they prioritise growth over earnings. Assuming that subscribers can be monetised, an alternative valuation approach of 'value per user' is more useful to compare social media valuations to established telecom operators and broadcasters. While this is an excellent metric this information would be not be readily available for this study.

2.5.3 Key Research

2.5.3.1 Value Drivers of Internet Stocks

Kozberg (2001) researched value drivers for Internet companies building on research from Rajgopal et al. (2000), Demers & Lev (2001) and Trueman et al. (2000). This was the first study that to segment a homogenous sample of Internet companies into different business models and analyse the value drivers in each category.[6]

Kozberg (2001) studied the effect of financial value drivers (such as revenue, book value, net income, market to book value) and non-financial value drivers including:

1. Unique audience – defined as the number of different individuals visiting a website per month.

2. Reach – the percentage of total Internet users that visit the website.

3. Page views – total number of pages seen by all users in the sample, regardless of the means by which they are viewed.

4. Page views per person – total number of pages viewed by the average audience member.

5. Hours per person – total time per visitor.

6. Visits per person – number of times an average user visits a website.

Kozberg (2001) found that overall market value is significantly correlated with net income, book value and also non-financial variables (such as unique audience). Interestingly he found that different categories of business models differ with respect

[6] No evidence could be found that Kozberg (2001) was ever published.

to both value drivers, and the usefulness of accounting and non-financial measures in explaining their valuations.

This is contrary to the findings by Hand (2000b) who found Internet market values are only marginally related to the number of unique visitors to the web site. The number of page views and hours spent on the site are unrelated to Net firms' stock prices after controlling for economic fundamentals. However Kozberg (2001) argues that previous studies, including Hand (2000b), used one large homogenous sample and highlighted the importance of distinguishing the business models employed before determining the importance of traffic related drivers. He stated that aggregation of such a broad collection of business models into a single sample increases the heterogeneity of the sample and lowers the potential explanatory power of any tests.

Kozberg (2001) was the inspiration for this study and heavily influenced the research approach and methodology. This research aims to extend Kozberg (2001) bringing the business model categories and findings up to date in the web 2.0 era.

The research design of Kozberg (2001) was very robust however there were some limitations that this research will improve on:

Kotzberg (2001)	*This research*
No definition of how an Internet business is defined.	A clear definition of Internet companies with criteria for inclusion in the sample (see section 3.6.2).
Nielsen/NetRatings (NNR) "Internet Audience" was used for the traffic data without stating the limitations of this data i.e. US bias and a Nielsen's lack of published methodology for data collection and aggregation.	Global traffic data was used with a supplier with a published and robust data strategy (see section 3.4.3).
Nielsen/NetRatings is compiled on a domain basis not a company basis e.g. NetRatings reports on Amazon.com but ignores Amazon.co.uk, Amazon.fr. Therefore traffic data will not be accurate for each company with multiple sites or multiple web brands.	The traffic data were aggregates for multi-brand/ multi domain companies.

2.5.4 Conclusions

The review highlighted the need to use a combination of financial and non-financial drivers. However finding, validating and aggregating non-financial data has many challenges as there are no agreed standards for reporting non-financial information and obtaining the data was very difficult due to the lack of accurate data sources.

Previous studies show a consensus around financial value drivers, which made the selection of financial drivers easier.

3 Research Methodology

3.1 Research Introduction

A cross sectional study (snapshot) was used due to the lack of historical non-financial traffic data and all the data were obtained from secondary sources. Appendix VII provides a more in-depth research overview.

3.2 Techniques and Procedures

3.2.1 Data Collection

The financial data were of very high quality as they were sourced from Bloomberg which is a well regarded source used by the highest calibre financial institutions. The quality of the non-financial traffic data was lower because in order to generate traffic data a lot of assumptions and extrapolations are required. However the traffic data was obtained from the most credible source and was deemed of acceptable quality.

The quantity of the data was acceptable for a Master's study and inline with previous research studies. However a larger sample would be preferable to extrapolate to the full population of Internet companies.

3.2.2 Sample Selection

As detailed financial information was required it was decided to focus on public companies who are obligated to disclose their financials.

There was a choice of indexes to sample from e.g. NASDAQ, FTSE 100, Dow Jones. However all of these would have required a level of subjectivity to decide which of the companies would meet the requirements of being classified as an Internet company.

Previous studies such as Demers & Lev (2001) and Hand (2000a, 2000b) used the InternetStockList, which is no longer maintained.

The NASDAQ Internet Index (ticker QNET) was selected as it is purpose-built to track the performance of companies engaged in Internet-related businesses (NASDAQ, 2012). The index contains global companies with the requirement that they are listed on the NASDAQ Stock Market, the New York Stock Exchange or NYSE Amex.[7]

All the companies in the NASDAQ Internet Index meet the Internet business model criteria as defined in section 2.2.3.

In addition to the 69 companies in the NASDAQ Internet Index[8], Facebook and LinkedIn were included as both had IPOs after the index's cut off date.

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[7] The NASDAQ Internet contains companies with a market value of at least $200 million and whose primary business is internet-related. Link to methodology: https://indexes.nasdaqomx.com/docs/methodology_QNET.pdf

[8] A list of companies in the NASDAQ Internet Index is: http://finance.yahoo.com/q/cp?s=%5EQNET

Assessing sample sizes of comparative studies: 56 companies (Trueman et al., 2000), 81 companies (Demers & Lev, 2001) and 86 companies (Rajgopal et al., 2000), showed this research's proposed sample of 71 companies is reasonable.

3.2.3 Data Analysis

Once the data were collected they were analysed statistically:

- **Descriptive statistics.** Analysing the total population of firms and then an analysis of each business category.
- **Correlation analysis**. Was performed to check for collinearity.
- **Regression.** Multiple regression models were designed and compared.

3.3 Strategies and Choices

3.3.1 Classifying Internet Business Models

Classifying business models can be performed with in-depth interviews with 'experts' (e.g. Boerrigter 2008). However the majority of studies (e.g. Al-Debei & Avison 2010; Timmers 1998; Weill & Vitale 2001) adopted a quantitative approach.

The search process relied mostly on the use of electronic libraries (e.g. EBSCO, JSTOR, ScienceDirect and Google Scholar) using keyword searches. In addition the small number of books on the subject were reviewed.

A custom classification of Internet business model categories was developed for this study to accommodate new Internet business models (see section 2.4).

During data collection the author manually identified each company's business model by analysing the sources of revenues from company reports. Where a business had more than one model; the classification was determined based on the largest revenue source. Classification criteria can be found in Appendix IV.

3.3.2 Financial Value Drivers

The literature review highlighted consensus on the primary financial value drivers (see section 2.5.2.1).

One difference was Demers and Lev (2001) who used price-to-sales ratio rather than market-to-book because Internet companies have few tangible assets which depresses their book value. Isimbabi (2002) agreed with this approach. These persuaded the author to adopt the price-to-sales ratio in this study.

The following financial drivers were selected as independent variables:

1. Revenue
2. Earnings
3. Price-to-sales

Financial and valuation data was obtained from Bloomberg data. The query was built up using Bloomberg ratios (such as market to book price) based on the most recent financial reports at the date of the search.[9]

3.3.3 Non-Financial Value Drivers

Kozberg (2001), Hand (2000a), Hand (2000b) used non-financial data from the Nielsen/NetRatings (NNR) "Internet Audience" database which carried detailed information on the web browsing habits of approximately 57,000 Internet companies. However this database is no longer freely available.

The best alternative was Alexa.com, which provides information for the most visited Internet sites.[10] The traffic data is gathered by tracking users who have the Alexa toolbar installed; this is then extrapolated to be representative of the wider population. This extrapolation means that the data may not be entirely accurate.[11]

Although Alexa provides traffic rank, reach, pageviews, pageviews per user it does not contain unique visitors, which was cited as a driver in previous studies.

Based on the literature review the non-financial drivers selected were:

1. Traffic – a ranking of the website traffic.
2. Reach – the percentage of Internet users that visit a particular web property.
3. Page views – the number of pages that are viewed.

Figures collected represented a month's worth of data.[12]

Additional relevant variables are included as potential covariates: web age[13], years incorporated, years public, industry, and country.

3.4 Methodology Weaknesses

Some weaknesses relate to choices made due to time constraints of a Masters study.

- Focusing on public companies biased the population's age due to the time it takes to reach IPO. Therefore trends from newer companies were overlooked.

- The NASDAQ Internet Index introduced geography biases towards American companies. This is somewhat offset by the fact that many of the Internet companies are global e.g. Amazon, Google, eBay etc.

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[9] The financial data were collected on 19th April 2012.

[10] Alexa's methodology can be found here: http://www.alexa.com/help/traffic-learn-more

[11] Alexa was the only source that aggregated global traffic data. The other sources had purely American data.

[12] The non-financial data was collected on 21st April 2012.

[13] As some companies were incorporated before the birth of the Internet the author used web age i.e. the year the companies website went live for a more meaningful comparison.

- While a sample of 71 companies is comparative to previous studies it may be too small to extrapolate to the whole population of Internet companies.

- There were matching issues between business model categories i.e. infrastructure companies were older than social media companies. Ideally each category would have been matched in terms of age, size, industry etc.

- The research focused on pure Internet companies (see definition in section 2.2.3) and ignored influential Internet companies with both an online and offline model (hybrid model) such as Microsoft, Oracle etc.

- This cross-sectional analysis meant the results are influenced by the current economic cycle of global recession. A longitudinal study would yield more reliable results as a pre and post crash analysis could have been compared. However historical non-financial traffic data could not be obtained.

- Data quality and reliability are paramount when relying exclusively on secondary data. Misstated financials would skew the findings.

- The value drivers of Internet companies are very subjective and the literature review highlighted a large number of drivers. However the literature omitted variables such as management, registered users, website usability etc. all of which could be potential value drivers.

- Some companies had multiple business models; therefore results attributed to one model actually contained a mix of two or more models. Ideally the firms revenues would have been split based on revenues and classified separately.

- Aggregating non-financial data (e.g. website traffic) for multi-brand or multi-domain companies is prone to errors and omissions. For example Amazon operates many different sites e.g. Amazon.com, Amazon.co.uk, Amazon.fr etc.

3.5 Methodology Summary

- Cross-sectional study.

- Mixed sequential approach with qualitative (business model classification) and quantitative (regression and descriptive statistics) analysis.

- Secondary data only (drawn from Bloomberg and Alexa).

- Seven independent variables (financial and non-financial website traffic) with the dependent variable of market value.

- Seven business model categories were determined.

- Sample of 71 companies drawn from the NASDAQ Internet Index.

4 Data Analysis

In the following section the data are analysed with general observations from the whole sample and then descriptive statistics for each of the business models are discussed. In addition the correlation and regression models are developed with discussion of the results.

4.1 General Observations

Before subdividing the sample it is useful to analyse the aggregates.

Sample=71	*Mean*	*Median*	*Std Dev*	*Min*	*Max*
Age (years)	14	15	3	4	19
IPO Year	2004	2004	5	1992	2012
Market Value ($)	9,356,313,640	1,002,750,720	28,344,330,799	231,227,504	199,461,044,224
Traffic Rank[14]	32,289	4,025	61,908	328,712	1
Reach	2.32	0.03	8.35	0.00	50.32
Pageviews	0.24	0.00	0.93	0.00	5.44
Revenue ($)	2,568,010,988	353,294,016	7,687,617,994	60,512,000	48,077,000,704
EPS ($)	1.84	0.44	5.32	-4.64	30.17
Price-to-Sales	4.43	2.74	4.73	0.43	22.90

- As expected the firms are quite young as the Internet was only brought online in 1990. The oldest company is AOL (19 years) and the youngest is Groupon (4 years) with the median being 15 years.
- The majority of firms (77%) have a positive EPS.
- As one would expect for an Internet focused study the traffic data includes the highest ranked websites; Google, Facebook, Yahoo and, Baidu, ranked 1,2,4 and 5 respectively, of the World ‘s most popular websites.
- Certain variables have large standard deviation, perhaps indicating the influence of outliers.
- The median IPO year is 2004, which is unexpected as it is after the first dot.com crash in 2001. This suggests a new generation of companies has emerged and entered the financial markets post-2001.

[14] Traffic rank is the only variable where a lower figure is better. E.g. Rank 1 is the highest. See Appendix I for a list of the variable definitions.

Looking at Figure 5 (below), the distributions of the dependent variable and potential independent variables exhibit extreme positive skew (apart from traffic rank which has extreme negative skew). The mean (average) and standard deviation are generally considered poor measures of central tendency and dispersion respectively for heavily skewed data (Bowerman et al., 2009). It is preferable to use the median, and the interquartile range (IQR).

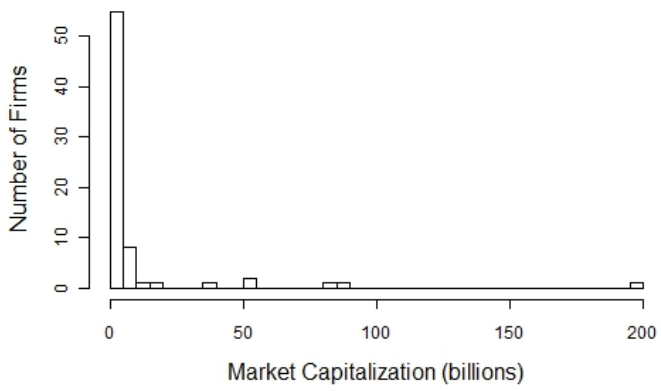
Outliers, or extreme values, are of concern because of the strong influence, relative to the other values, they exert on the average. This is important because Least Squares regression is computed using the mean. The outliers for each variable are listed in Figure 5. They are listed in order of magnitude.[15]

We note that the median ($1,002,750,720) is at the upper end of the IQR, which is a symptom of positive skew. We also note the extreme distance of the maximum ($199,461,000,000, Google) from the median relative to the distance of the minimum ($231,227,504) from the median. This indicates a very non-symmetric distribution or an extreme outlier. Because there are eight positive outliers, over 10% of our observations, it suggests a non-symmetric distribution. The standard deviation of $28,344,330,799 shows just how much the highest outliers influence the sample.

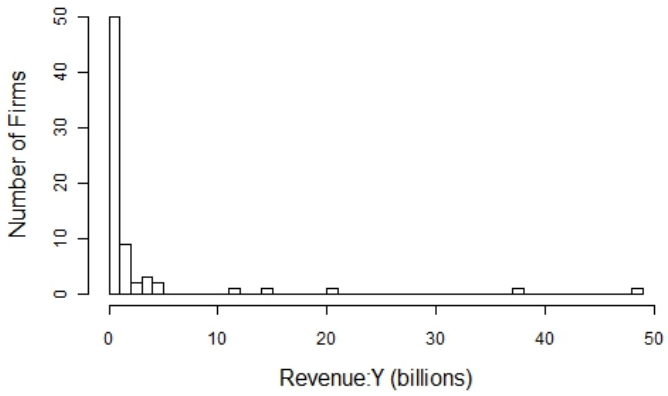
Interpretation of the remaining variables is similar with the exception of EPS. EPS would have a symmetrical distribution if not for the four largest outliers. There appears to be a break in the plot. It could be plausible that EPS would exhibit such behaviour naturally or perhaps there is some other factor influencing the EPS for these companies. Three of these companies had relatively expensive share prices however there are other companies with larger share prices which were not outliers.

[15] A data point is considered an outlier if it lies more than 1.5*(IQR) above the 3rd Quartile or below the 1st Quartile.

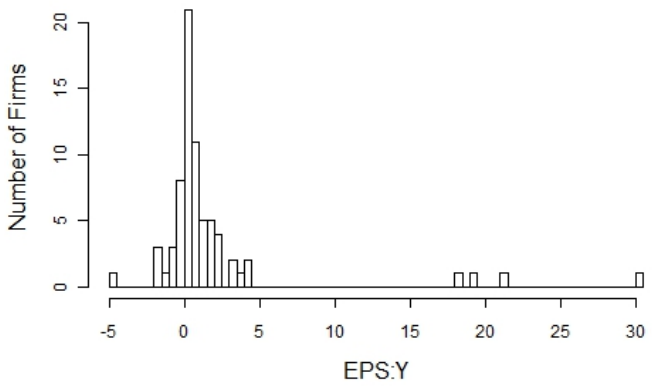
Market Value ($)	
Minimum	231,227,504
1st Quartile	444,693,408
Median	1,002,750,720
3rd Quartile	4,067,309,056
Maximum	199,461,000,000
Outliers[16]**:** Facebook, Yahoo!, pricline.com, Baidu, eBay, Linkedin, Amazon, Google	



Revenue ($)	
Minimum	60,512,000
1st Quartile	185,050,584
Median	353,294,016
3rd Quartile	1,036,704,000
Maximum	48,077,000,704
Outliers: Netflix, Expedia, Linkedin, priceline.com, Yahoo!, ebay, Baidu, Yandex, Google, Amazon	

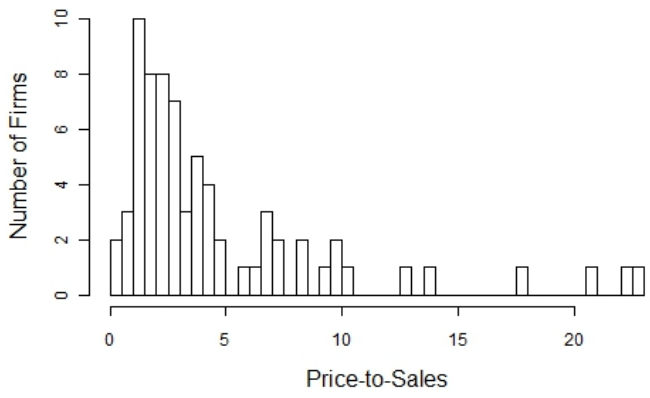


EPS ($)	
Minimum	-4.64000
1st Quartile	0.10000
Median	0.44000
3rd Quartile	1.49500
Maximum	30.17000
Outliers: Sina (below), Netease, Sohu.com, Netflix, Yandex, Baidu, priceline.com, Google	

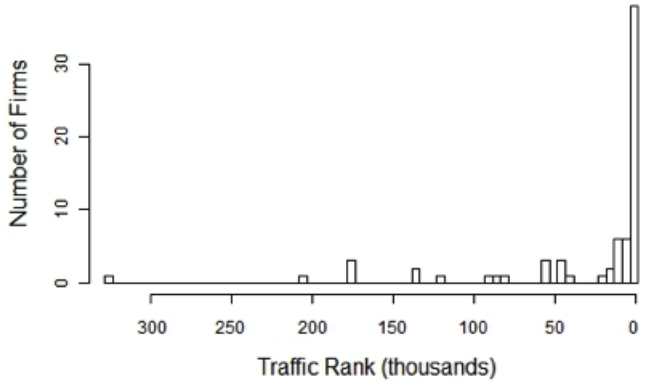


[16] All outliers are listed appear in order of increasing magnitude as in the histogram.

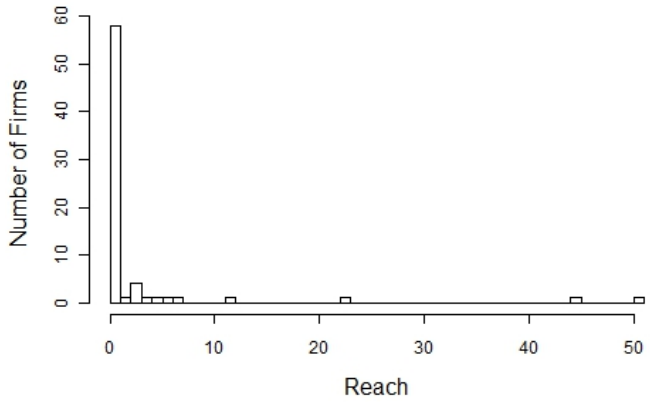
Price-to-Sales	
Minimum	0.426304
1st Quartile	1.773934
Median	2.771939
3rd Quartile	5.852181
Maximum	22.904877
Outliers: Yandex, MercadoLibre, Qihoo, Facebook, Baidu, Linkedin	



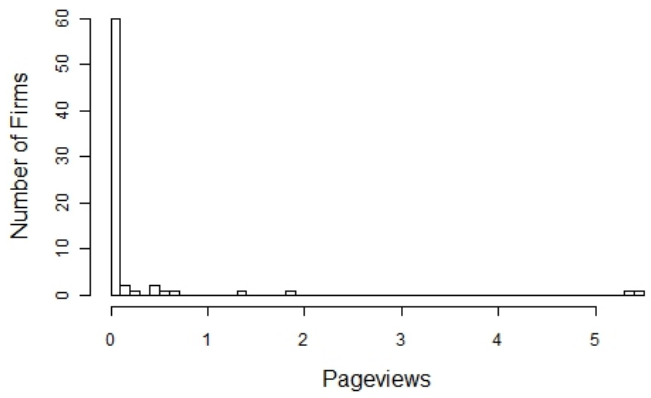
Traffic Rank	
Minimum	328,712.0
1st Quartile	444.5
Median	4,025.0
3rd Quartile	32,289
Maximum	1.0
Outliers: Limelight Networks, Boingo Wireless, Realnetworks, Saba, DealerTrack, Internap Network Services, Cornerstone, Perficient	



Reach	
Minimum	0.0006
1st Quartile	0.0060
Median	0.0333
3rd Quartile	0.2570
Maximum	50.3200
Outliers: Qihoo, Netflix, AOL, Soho.com, IAC, Yandex, ebay, Netease, Sina, Linkedin, Amazon, Baidu, Yahoo!, Facebook, Google	



Page Views	
Minimum	0.000010
1st Quartile	0.000174
Median	0.001787
3rd Quartile	0.015715
Maximum	5.444200
Outliers: Ancestry, IAC, Netflix, AOL, Sohu.com, Netease, Sina, Yandex, Linkedin, ebay, Amazon, Yahoo!, Baidu, Facebook, Google	



4.2 Descriptive Statistics

No. Firms = 71	*No. Firms*	*Median Market Value*	*Median Revenue*	*Median Traffic Rank*	*Median Web Age*	*Median IPO Year*
Community	4	6,551,375,360	6,551,375,360	303	13	2011
Content	12	3,174,082,688	460,930,496	51	16	2000
Ecommerce	8	452,485,584	0.28	9,346	15	2004
Infrastructure	10	849,111,104	15.15	66,556	14	2002
Marketplace	12	1,813,564,992	303	640	14	2007
Service Provider	9	789,688,768	0.2567	8,350	14	2007
Software	16	795,120,224	2.8289	32,889	15	2003

The number of firms in each category ranges from four (community) to sixteen (software), indicating that some models are much more common. Perhaps due to different degrees of barriers to entry or market size.

Most of the categories have similar median web ages, however the median IPOs have a much larger range. This could indicate that companies tend to IPO when their category is in favour with investors.

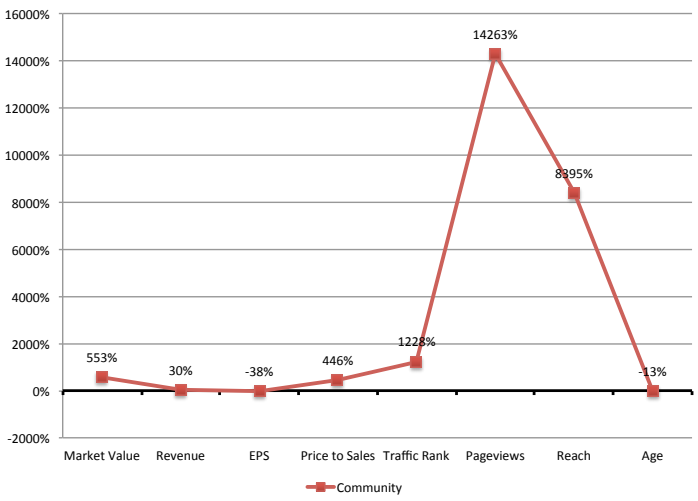
At first glance it appears that traffic is much more important to some categories (Content, Community) than others.

The next section looks at each business model category individually in detail.

Full descriptive statistics for each model can be found in Appendix VI.

4.2.1 Community

Community (Medians)	
Market Value ($)	6,551,375,360
Revenue ($)	460,930,496
EPS ($)	0.28
Price-to- Sales	15.15
Traffic Rank	303
Pageviews	0.2567
Reach	2.8289
Age (Years)	13
IPO Year	2011
Years to IPO	13
Number of firms in category = 4	



Graph of category medians compared to the aggregate medians.

Top 3: Facebook, LinkedIn, Ancestry.com

Predictions for this model:

- High traffic because scale of visitors is required to build revenue streams.
- Below above average financials due to the newness of the category.

The hot IPOs of the last two years have been Facebook and LinkedIn, which are both in this category. For all the hype around social media companies it seemed odd that there were not more companies in this category.

The small number of firms (four) meant that the figures were open to outlier bias. The small number of companies could be due to the network effect of communities, only a certain number can be supported in the market (e.g. how many Facebook-like sites can exist). If this is the case it provides high entry barriers and the largest communities will continue to grow and thrive. Also the switching costs (in terms of time) are high, migrating your community, friends, photos etc. to another company is time consuming, therefore a widely adopted community has lock-in.

The data in Figure 6 seems to support the predictions. The scale of website pageviews, which were 14,263% above the aggregate norm is extreme. While the EPS of -38% below the average was in line with the predictions. It was interesting to note that revenue figures were 30% higher than the norm. This suggests that this will be a profitable category once a profit suitable model is found to monetise the huge website traffic.

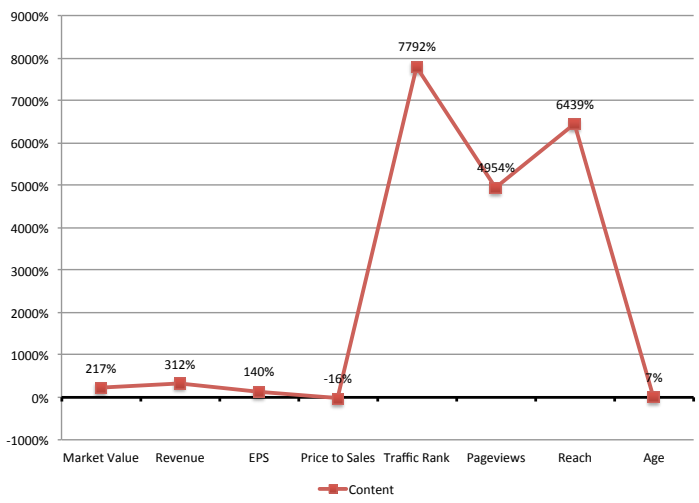
A price-to-sales ratio 446% above the aggregate perhaps indicates that the prices are over inflated and shows potential of a valuation bubble.

The standard deviations across all measures were very high but this was possible due to the low sample size.

gure 7: Content – Medians comparison

4.2.2 Content

Content (Medians)	
Market Value ($)	3,174,082,688
Revenue ($)	1,455,765,472
EPS ($)	1.06
Price-to-Sales	2.33
Traffic Rank	51
Pageviews	0.0903
Reach	2.1775
Age (Years)	16
IPO Year	2000
Years to IPO	6
Number of firms in category = 12	



Graph of category medians compared to the aggregate medians.

Largest: Google, Baidu, Yahoo!

Predictions for this model:

- High traffic because scale of visitors is required to build revenue streams.
- Above average age as the earliest Internet companies used this model (e.g. Yahoo)
- Above average financials due to the category maturity.

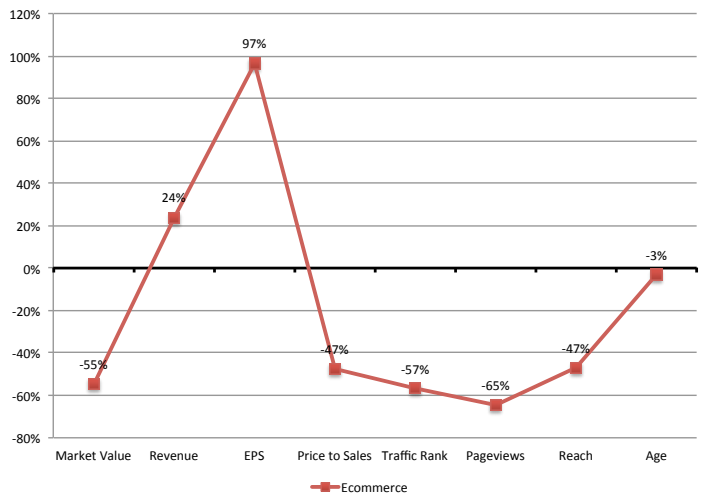
This is the strongest category with above average score for all metrics; this is partly due to the mighty Google skewing the results. Looking across all categories, Google has a market value 2.3 times larger than the second largest company (Amazon) and 863 times the smallest company (Carbonite).

As predicted the category has traffic figures far above the aggregate (see Figure 6); traffic rank (7792% above aggregate), pageviews (4959%) and reach (6439%). As the main revenue model of this category is advertising this high traffic seems logical as traffic is directly related to advertising revenues.

Even though the market value is 217% above the aggregate, the price-to-sales is 16% below the aggregate, which perhaps implies that investors think the values are under priced.

4.2.3 Ecommerce

Ecommerce (Medians)	
Market Value ($)	452,485,584
Revenue ($)	437,303,008
EPS ($)	0.87
Price-to-Sales	1.46
Traffic Rank	9,346
Pageviews	0.0006
Reach	0.0177
Age (Years)	15
IPO Year	2004
Years to IPO	7
Number of firms in category = 8	



Graph of category medians compared to the aggregate medians.

Largest: Amazon, Vistaprint, Shutterfly

Predictions for this model:

- Above average age as this was a very early Internet model.
- High revenue and profitability due to a well defined revenue and profit model.

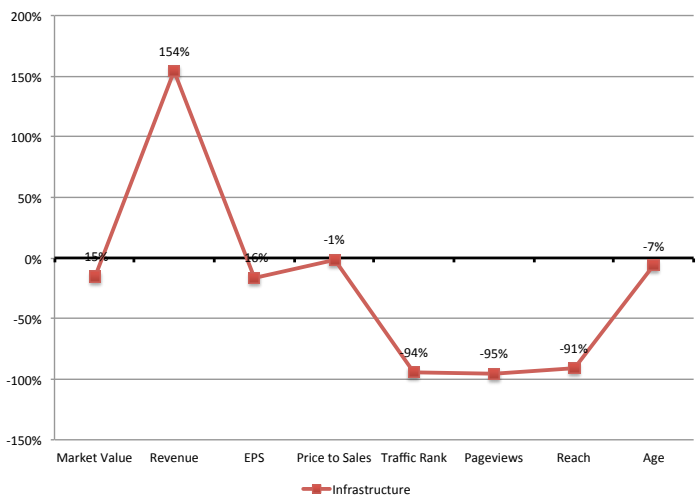
This category is a case of Amazon and the rest. Looking across all categories Amazon has the second largest market value ($87b) and the highest revenue ($48b). The presence of Amazon creates a huge standard deviation in financial metrics as Amazon has 21 times the market value of all the other companies in the category combined.

As expected due to the clear business model both revenue and EPS are above the aggregate.

However traffic figures are low which is surprising. The low traffic could be explained by the companies niche positions e.g. PetMed (pet medicines), Blue Nile (fine jewellery) which occupy narrow customer segments. It could also be explained by the transactional nature of the sites, whereas other categories offer free services.

4.2.4 Infrastructure

Infrastructure (Medians)	
Market Value ($)	849,111,104
Revenue ($)	896,453,504
EPS ($)	0.37
Price-to-Sales	2.74
Traffic Rank	66,556
Pageviews	0.0001
Reach	0.0029
Age (Years)	14
IPO Year	2002
Years to IPO	4
Number of firms in category = 10	



Graph of category medians compared to the aggregate medians.

Largest: Rackspace, Equinix, Akamai

Predictions for this model:

- High revenue figures due to the low volume high value transactions.
- Low traffic data as sales are focused on B2B market.

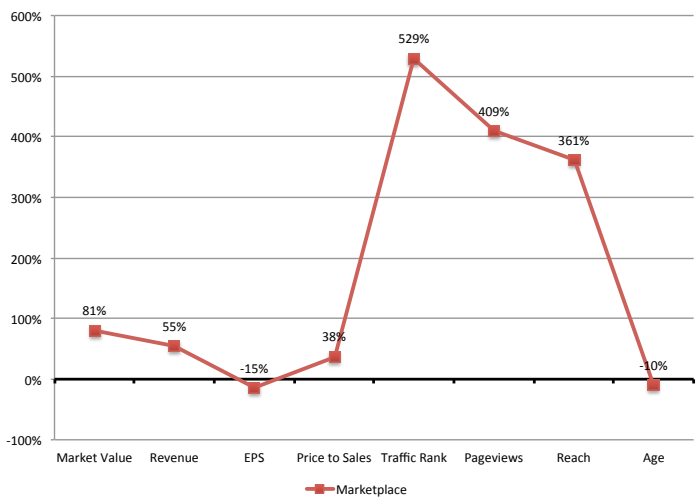
This is the only category that is predominantly B2B companies. This is one explanation for why the traffic figures (see graph in Figure 9) are far below the aggregate as business users make up a small percentage of Internet traffic.

As expected the revenue figures are 154% above the aggregate but EPS is 16% below. This could indicate that the services are expensive to provide and the high capital costs involved in providing and maintaining the infrastructure networks.

This category has the lowest standard deviation in age, which makes sense as the heavy capital costs mean that barriers to entry are high. The majority of companies in the category were founded before the year 2000. After that it seems that younger competition have not entered the market successfully.

4.2.5 Marketplace

Marketplace (Medians)	
Market Value ($)	1,813,564,992
Revenue ($)	547,098,496
EPS ($)	0.38
Price-to-Sales	3.81
Traffic Rank	640
Pageviews	0.0091
Reach	0.1535
Age (Years)	14
IPO Year	2007
Years to IPO	7
Number of firms in category = 12	



Graph of category medians compared to the aggregate medians.

Largest: eBay, Priceline, Groupon

Predictions for this model:

- High traffic figures, as scale is required to match buyers and sellers.
- High revenue and EPS due to high margins on commissions.
- High market value due to strong financials.

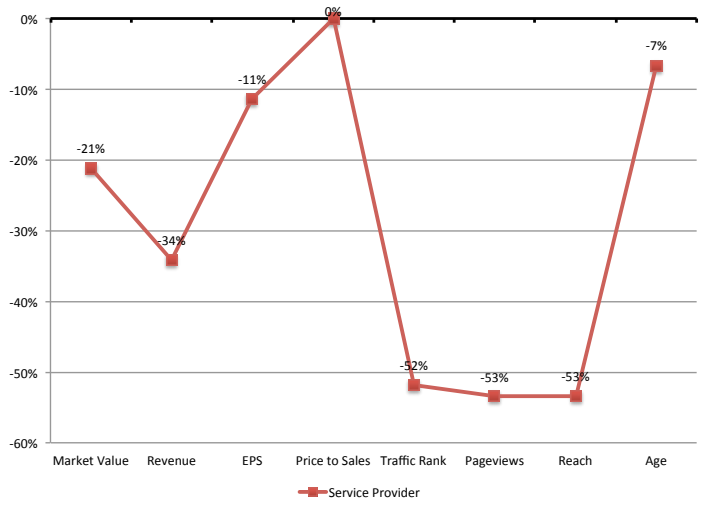
As expected the traffic figures were all way above the aggregate. This is because marketplaces rely on network externalities; as more people join a bandwagon effect is created.

Revenue is 55% above the aggregate however EPS is 15% below, there is no obvious reason for this. As their service relies on matching buyers and sellers the cost of the transaction should be low (which implies higher gross profit). Further analysis would be required to assess whether the cost of customer acquisition is high and thus would involve higher operating costs.

gure 11: Service Provider – Medians comparison

4.2.6 Service Provider

Service Provider (Medians)	
Market Value ($)	789,688,768
Revenue ($)	232,392,000
EPS ($)	0.39
Price-to-Sales	2.77
Traffic Rank	8,350
Pageviews	0.0008
Reach	0.0155
Age (Years)	14
IPO Year	2007
Years to IPO	6
Number of firms in category = 9	



Graph of category medians compared to the aggregate medians.

Largest: Netflix, ValueClick, OpenTable

Predictions for this model:

- High traffic revenue and EPS as services often yield superior margins to products.
- Below average traffic data due to low transaction model with less reliance on monetising 'eyeballs'.

The service provider is the worst performer with medians below the aggregate for all metrics. This is surprising as one of the predictions was for high profit margins which are usually associated with service businesses.

The low traffic data was not surprising as transactions are low volume and rely heavily on B2B transactions. There was the highest traffic rank standard deviation for any category due to the mix of consumer-focused companies (such as Netflix and OpenTable) and B2B companies.[17]

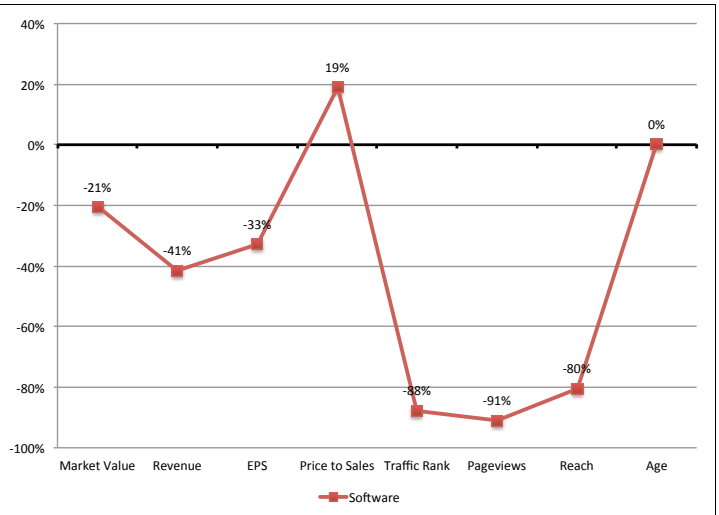
However the below aggregate revenue and EPS figures seemed contrary to their offline peers (such as professional service and law firms), who are very profitable. A possible explanation could be that services rendered over the Internet are of lower value and profitability.

[17] Consumer companies have higher traffic due to the larger proportion of consumer Internet traffic.

gure 12: Software – Medians comparison

4.2.7 Software

Software (Medians)	
Market Value ($)	795,120,224
Revenue ($)	206,812,496
EPS ($)	0.30
Price-to-Sales	3.30
Traffic Rank	32,889
Pageviews	0.0002
Reach	0.0065
Age (Years)	15
IPO Year	2003
Years to IPO	6
Number of firms in category = 16	



Graph of category medians compared to the aggregate medians.

Largest: Netease, Open Text, Qihoo

Predictions for this model:

- High earnings as software firms have high profit margins.
- High valuations due to the hype around cloud and software-as-a-service.

This category was the most common containing sixteen companies. This is perhaps because of the low barriers to entry and the dynamic technology environment creating opportunities for new entrants.

Lower than aggregate revenue and EPS was surprising. Perhaps some of the newer software providers have free versions of their product and are not enticing customers to pay for premium versions.

Investors do not seem to favour this category, shown by lower than aggregate market values combined with higher than aggregate price-to-sales ratio. This implies that even at lower valuations the investments are not attractive.[18] Interestingly two of the top three firms by market value were Chinese companies, which points to their strength in Internet software.

The low traffic rank figures were combined with the lowest standard deviation of any category. Software providers use multiple distribution channels (e.g. app stores, retail stores etc.) thus leveraging the traffic of their retailers.

[18] A lower the price-to-sales ratio the more attractive the investment is. Source: http://www.investopedia.com/articles/fundamental/03/032603.asp

4.3 Correlation Analysis

While many of the correlations are numerically large and nearly all are significant the scatterplots do not show a strong linear relationship and much of the apparent linearity seems to arise through a few outliers.

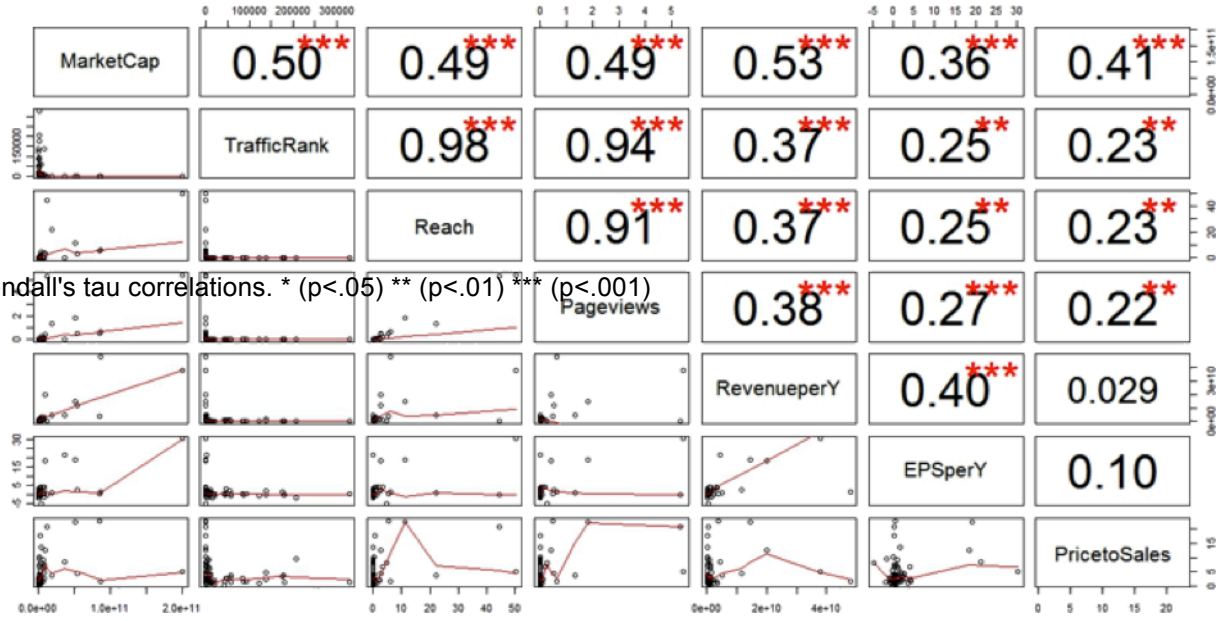
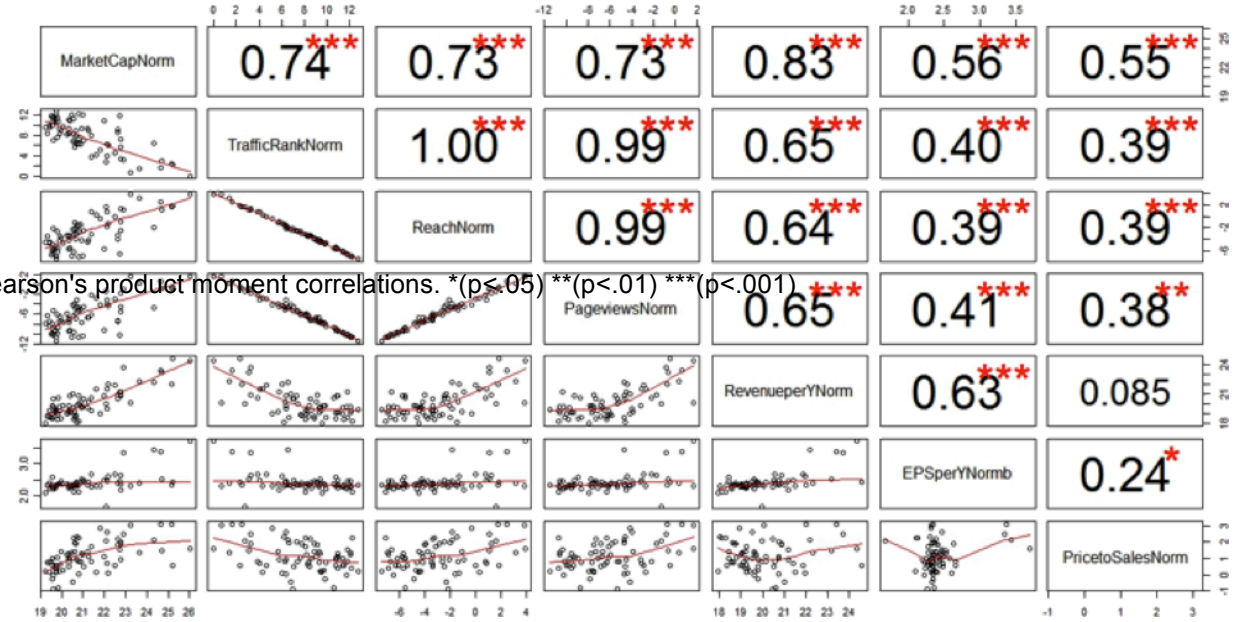


Figure 13: Kendall's tau correlations. * (p<.05) ** (p<.01) *** (p<.001)

A more symmetrical distribution was achieved for the extremely skewed variables by transforming them with the log function. The following pairwise relationships result:[19]



gure 14: Pearson's product moment correlations. *(p<.05) **(p<.01) ***(p<.001)

[19] Note: Due to negative values, EPSperY was shifted to the right by 10 units before taking the log

Now a strong linear relationship exists between the six independent variables and the dependant variable. However there is also a high degree of collinearity among the predictors. Indeed it is indeed nearly perfect between the three non-financial metrics.

Examining the expected relationships between the variables it is reasonable that a greater reach would lead to more pageviews and thus a higher (lower) rank. As web traffic increases, revenue is likely to also increase or perhaps higher revenues would necessitate more web traffic. Therefore a strong relationship here is not surprising.

In the scatterplots a consistent relationship with market capitalisation appears with revenue. This relationship is also very strong, indeed the strongest.

4.4 Non-Parametric Tests

Figure 15: Pearson's product moment correlations. *(p<.05) **(p<.01) ***(p<.001)

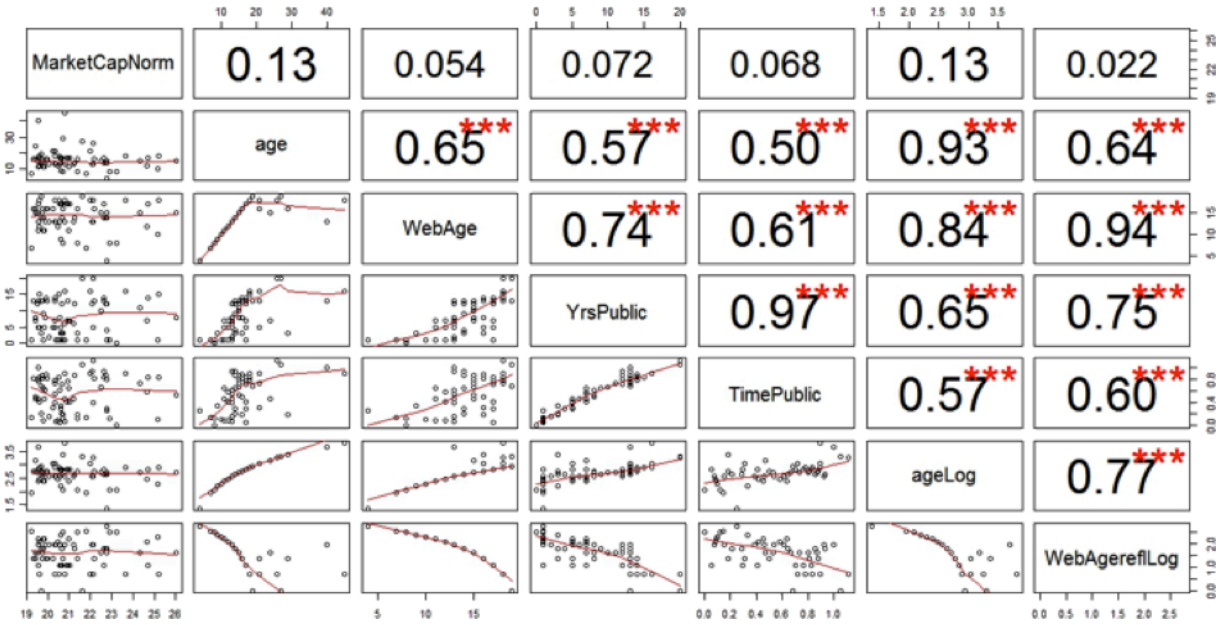
Appendix IX describes the non-parametric tests conducted due to the low sample sizes and extreme skew. The tests showed no business model category had market values larger than another business models. While the medians appear to vary, as do the maximum values, the minimum values are much more similar.

4.5 Regression Results

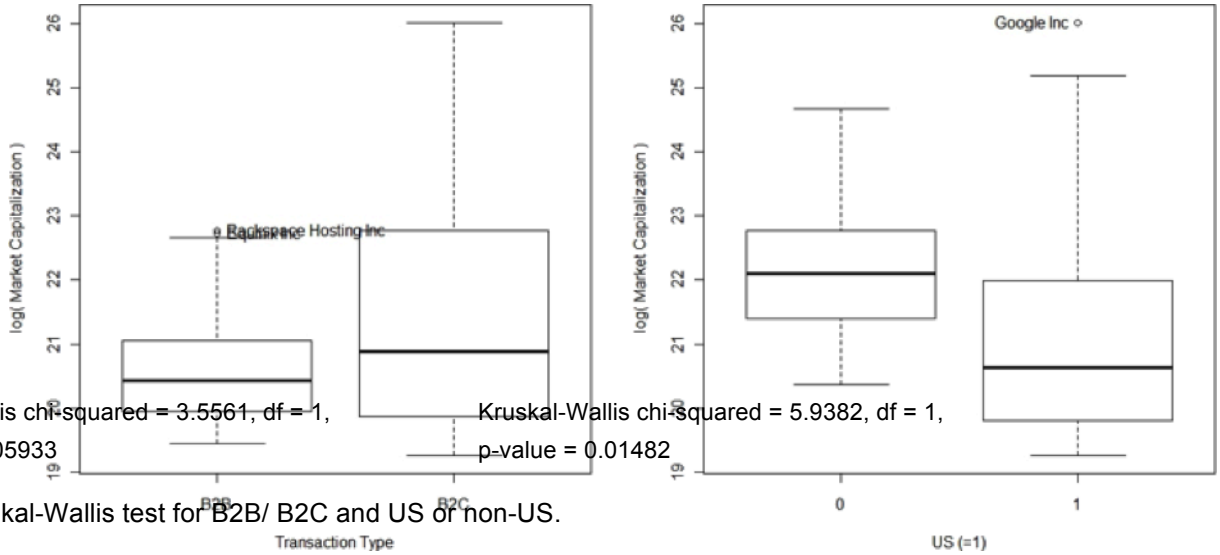
4.5.1 Covariate Analysis

In addition to the six independent variables, it is logical to assume that perhaps additional covariates affect market value.

Market value might be related to a company's progression through the business life cycle. Therefore various measures of age were examined: age of the company, age since inception of a website, years as a public company and a proportion of the company's time with an Internet presence spent public.



These measures show strikingly little association with the transformed response variable (MarketCapNorm). Transforming the variables moderated the extreme values but only further supported the weak association.



Kruskal-Wallis chi-squared = 3.5561, df = 1, p-value = 0.05933

Kruskal-Wallis chi-squared = 5.9382, df = 1, p-value = 0.01482

gure 16: Kruskal-Wallis test for B2B/ B2C and US or non-US.

The association between market value and both the type of business transaction (B2B or B2C) and whether the company is US based was examined (see Figure 16). Using the Kruskal-Wallis rank sum test to test if the distributions of the categories B2B and B2C are equal one fails to reject null hypothesis of equality with a significance level of 0.05 (p-value = 0.05933 > 0.05). The data do not offer strong support that one type is associated with higher market value.

The categorical variable of whether the company is US based or outside the US one would reject the null hypothesis at a significance level of 0.05 as it is larger than the p-value = 0.015. The conclusion is that as a group, companies based outside the US have larger market values than those based in the US. (Note, that this statement is restricted to the universe of companies listed on an US-based exchange).

However it should be recognised that there were only a small number (12%) of non-US firms in the population. As the sample was drawn from US stock exchanges, it seems logical that only the best foreign companies, whose performance or scale were not suitable for their home exchange would seek a US listing.

Additionally, two measures of competition were considered as covariates. First, the company's relative strength within its business model was assessed by taking the size of the company relative to the size of the total market share for each business model (market value for company *i* / total market value for business model *j*). The second measure accounted for the number of competitors relative to the size of the market segment (total market value for business model *j* / # of companies with business model *j*).

Both of these measures are directly calculated from other predictors so fail to be suitable covariates due to a high association with variables of interest to include in the model. The first has a strong association with the Internet business model and the second has a strong correlation with revenue (0.558, p-value < .00001). Covariates should not have a strong relationship with other dependent variables.

Also considered were how established an individual company was within its market segment. It was thought that perhaps earlier innovators in their Internet business model would have an edge and therefore greater market value. The companies were ranked by age within each business model and Spearman's rank correlation was computed for market value and age rank. The correlation was weak (rho = -.067) and insignificant for any reasonable level of significance (p-value = 0.58). The null hypothesis that the correlation is zero (rho = 0) cannot be rejected. This result was surprising and future research study could determine if this is different in other less technological industries such as manufacturing or pharmaceuticals.

Kruskal-Wallis chi-squared = 3.1688, df = 1, p-value = 0.07506

Kruskal-Wallis chi-squared = 6.0227, df = 1, p-value = 0.01412

gure 17: Kruskal-Wallis test for revenue and price-to-sales

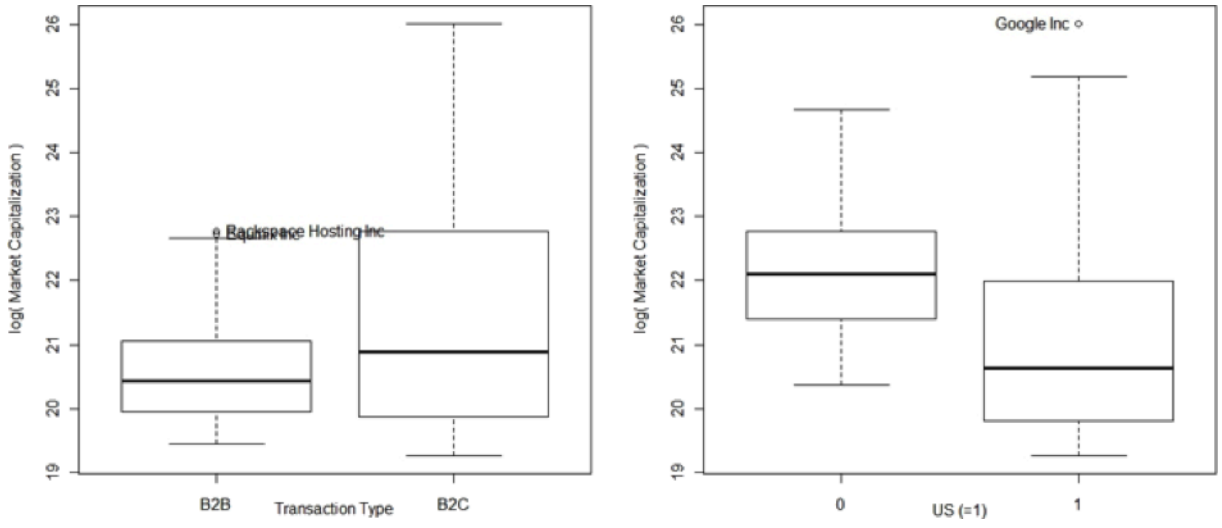
In conclusion, the only potential covariate was whether the company is US-based or not. This was rejected due to the small sample of non-US based companies.

4.5.2 Model Selection

As already seen there is a high degree of collinearity between the independent variables, therefore many of them were removed from the regression model.[20]

Due to linear relationships between the variables after the natural logs were computed, the following references always refer to transformed variables.

4.5.3 Model 1 – Best Model for Market Value



[20] If two independent variables are highly correlated, they are providing the same information regarding the value of the dependent variable so are not both necessary in the model. Furthermore if collinearity exists in the independent variables the coefficient estimates (the contribution of the predictor variable) can be imprecise.

This model considers the best regression model for market value. The correlation analysis showed that revenue had the strongest relationship with market value. The only other independent variable, not significantly correlated with revenue, is price-to-sales. However price-to-sales is correlated with market value.

Also included is a geography covariate variable US, after checking that it is not associated with the other independent variables.

The null hypothesis of equal distributions of the log transformation of revenue for US-based and non-US-based cannot be rejected at a significance level of 0.05 (p-value = .07506). For the log transformation of price-to-sales however the null hypothesis was rejected at a significance level of 0.05 (p-value = .01412). We conclude that US-based firms have smaller price-to-sales values as a group than non-US-based firms. This indicates an interaction between two independent variables (see Figure 17).

Figure 18: Model 1: Regression equation and results

Ln(Market Capitalisation) =
2.07221 + 0.64582*I(US) + 0.87096*Ln(Revenue) + 0.94870*Ln(Price-to-Sales)

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	2.07221	0.74069	2.798	0.006713 **
US	0.64582	0.16342	3.952	0.000189 ***
Ln(Revenue)	0.87096	0.03438	25.331	< 2e-16 ***
Ln(Price-to-Sales)	0.94870	0.05996	15.821	< 2e-16 ***

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4215 on 67 degrees of freedom
Multiple R-squared: 0.9342, Adjusted R-squared: 0.9313
F-statistic: 317.2 on 3 and 67 DF, p-value: < 2.2e-16
AIC = 84.70668

The p-value of far below << 0.001 indicates strong rejection of the null hypothesis that none of the variables in the model are informative in predicting market capitalisation.

The p-values for the individual estimates (the last column of the table) are all well below the significance level of 0.001 except the intercept term, which is below the significance level of 0.01. For each of these parameter estimates we reject the null hypothesis that the coefficient is equal to zero, and thus the variable does provide significant information in predicting market value.

The adjusted R^2 value is exceptionally large at 0.93.[21]

[21] R^2 is adjusted down to correct for the number of independent variables used.

Examining the residuals, the difference from what the model predicts and the values observed, can tell us whether or not the model is appropriate to use to make inferences. These errors should be random. The residuals for this model are not entirely satisfactory. The first plot of the residuals, the difference between the value produced by the above equation and the actual value, should be distributed randomly around 0 on the y-axis. While there are at least three abnormally large residuals Yandex is the largest and gives the impression there are larger errors for larger values of market value. This is undesirable as it means our estimates of larger market values are less precise.

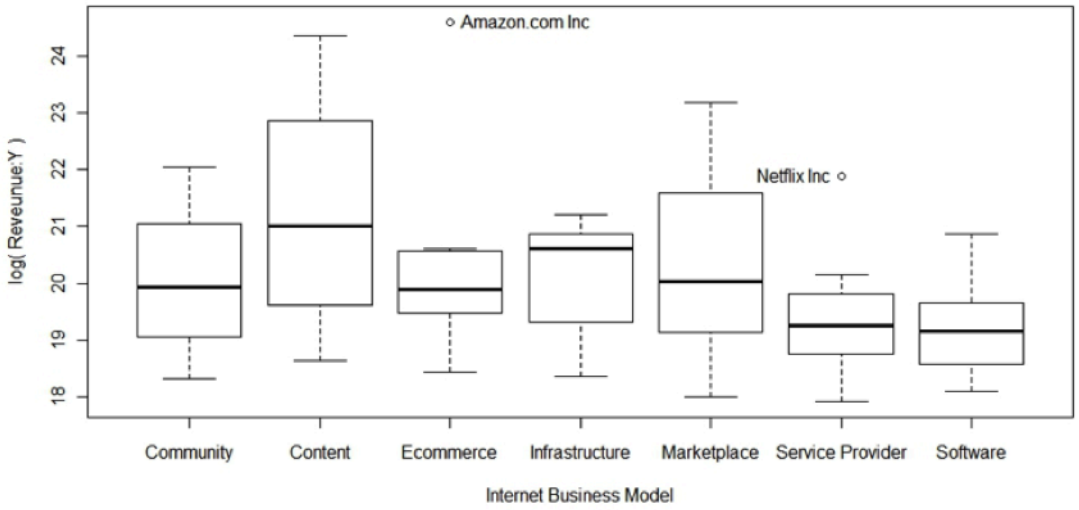
The equation for the model is presented in Figure 18. When the company is US-based the dummy variable *US* takes the value 1 and the parameter increases the mean log market capitalisation by 0.64582 when the revenue and price-to-sales are held constant. This is equivalent to increasing market value by the multiple $e^{0.64582}$ = 1.907551. For example, an average market value of 1,500,000,000 would be 1,500,000,000 * 1.907551 = 2,861,326,500 if the company is US-based.

Kruskal-Wallis rank sum test: chi-squared = 12.4189, df = 6, p-value = 0.05325

Figure 19: Kruskal-Wallis test for revenue and Internet business model

For the coefficients of revenue and price-to-sales, an 1% increase in either when all other variables in the model remain constant produces a 0.87% and a 0.95% increase in market capitalisation respectively.

4.5.4 Model 2: Modelling Market Value With Business Model



This model focuses on modelling market value with the different Internet business models. Revenue is again included because of its strong relationship with market value as well as its consistent distribution across business models (no association between revenue and business model). Including further independent variables renders the business model variables non-significant because of their superior predictive power. Also, additional predictors do not have equal distributions across the Internet business models or have strong correlation with revenue.

The p-value = 0.05325 > 0.05 significance level means not rejecting the null hypothesis and conclude the distribution of revenue within each business model is equal.

Ln(*Market Capitalisation*) =
3.89752 + 0.92366*Ln(*Revenue:Y*) - 1.45546*I(*Content*) - 1.98825*I(*Ecommerce*) - 1.34302*I(*Infrastructure*) - 1.01376*I(*Marketplace*) - 1.29835*I(*Service Provider*) - 1.09590*I(*Software*)

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	3.89752	1.56007	2.498	0.015101 *
Ln(Revenue)	0.92366	0.07489	12.333	< 2e-16 ***
Content	-1.45546	0.49374	-2.948	0.004484 **
Ecommerce	-1.98825	0.51624	-3.851	0.000277 ***
Infrastructure	-1.34302	0.49827	-2.695	0.009005 **
Marketplace	-1.01376	0.48667	-2.083	0.041310 *
Service Provider	-1.29835	0.50823	-2.555	0.013057 *
Software	-1.09590	0.47462	-2.309	0.024236 *

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8422 on 63 degrees of freedom
Multiple R-squared: 0.7531, Adjusted R-squared: 0.7257
F-statistic: 27.46 on 7 and 63 DF, p-value: < 2.2e-16
AIC = 186.6139

gure 20: Model 2: Regression equation and results

The null hypothesis that all the coefficients are equal to zero is as the p-value <<< .00001. The coefficients for each independent variable are significant at a significance level of 0.05 and the null hypotheses that each coefficient is equal zero are rejected. The R^2 adjusted for the number of independent variables is lower than the previous model but still strong at 0.7257.

The residuals are much improved in comparison to Model 1 although still not perfect. The residuals are centred around zero but the variance is not uniform. Larger fitted values have larger residuals, which is not optimal. Residuals with leverage greater than (2*8)/71 = 0.225 have large leverage and Ancectry.com is of the most concern as it has the most influence.

As both market value and revenue are log transformed, the coefficient of 0.92 on for revenue can be interpreted as an 1% increase in revenue corresponds to a 0.92% increase in market value. The business models are included as separate dummy variables, which mean that the effect of the business model is included only when the

model is observed. For example, when we wish to predict market capitalisation for a company in the Content business segment the equation becomes:

Ln(Market Capitalisation) =

3.89752 + 0.92366*Ln(*Revenue:Y*) - 1.45546*1- 1.98825*0 - 1.34302*0 - 1.01376*0 - 1.29835*0 - 1.09590*0

= 3.89752 + 0.92366*Ln(*Revenue:Y*) - 1.45546.

Thus the effect of the Content business model is to reduce the log of market value by 1.45546 or divide market capitalisation by $e^{1.45546}$ = 4.28448. Note that the estimate of the average log of market capitalisation for the business model Community is result of each dummy variable for the remaining six models in the equation having the value 0. As such each of the parameter estimates for these six models provides the average log market value relative to that of the model Community.

gure 21: Model 3: Regression equation and results

4.5.5 Model 3: Modelling Market Value With Non-Financial Variables

This model excludes revenue in favour of including one of the non-financial traffic variables, which are also strongly correlated with market value. It will utilise both types of independent variable to model market value. All three website traffic variables have similarly strong relationships with market value as well as similarly moderate correlations with price-to-sales. Pageviews is slightly less collinear with price-to-sales and is the most normally distributed.

Ln(*Market Capitalisation*) = 22.32104 + 0.29535*Ln(*Pageviews*) + 0.57360*Ln(*Price-to-Sales*)

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	22.32104	0.35839	62.282	< 2e-16 ***
Ln(Pageviews)	0.29535	0.03965	7.449	2.19e-10 ***
Ln(Price-to-Sales)	0.57360	0.14601	3.928	0.000203 ***

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.011 on 68 degrees of freedom
Multiple R-squared: 0.6163, Adjusted R-squared: 0.605
F-statistic: 54.61 on 2 and 68 DF, p-value: 7.183e-15
AIC = 207.9272

The null hypothesis that all the estimated coefficients are all equal to zero is emphatically rejected as with a p-value <<<< .00001. Each of the coefficients is also significantly not equal to zero as all p-values < 0.001.

The residuals appear moderately well distributed around zero and rather uniformly distributed at all levels of the fitted values. They also maintain a reasonable degree of normality. Of the biggest concern are the three large positive residuals: Amazon, Equinix, and Google.

Modelling market value with pageviews and price-to-sales, the parameters for the estimated regression model can be interpreted as a 1% increase in pageviews results in a .30% increase in market value when price-to-sales remains constant. Conversely, a 1% increase in price-to-sales results in a .57% increase in market value when pageviews remains constant.

4.5.6 Choosing The Best Model

Akaike's Information Criterion (AIC) is an alternative measure to determine the best model. A lower value indicates a better model. Though the previous three models were constructed with slightly different ideas in mind Model 1 has a far superior AIC (84.71) than both Model 2 (186.61) and Model 3 (207.93).

In spite of this there remains some concern to the validity of the model based on the less than desirable characteristics of the residuals which call into question a number or assumptions; the normality of the residuals and the homogeneity of variance.

Despite having higher AIC both Model 2 and Model 3 seem to be better models based on the behaviour of their residuals. If the only aim is to predict market capitalisation then Model 2 may be more precise. Its adjusted R^2 is larger, 0.7257 compared to 0.605 for Model 3, and its AIC lower, 186.61 versus 207.93 for Model 3.

Model	*AIC*	*R^2*	*Residual Error*	*P-Value*
Model 1: Revenue and price-to-sales	84.71	0.93	0.4215 on 67 df.	< 2.2e-16
Model 2: Revenue and business model	186.61	0.73	0.8422 on 63 df.	< 2.2e-16
Model 3: Page views and price-to-sales	207.93	0.61	1.011 on 68 df.	7.183e-15

These results will be discussed in the following chapter.

5 Data Discussion and Interpretation

5.1 General Discussion

The results have some interesting trends when compared to the body of knowledge as this study provides observations against the backdrop of the 2008 financial crisis.

There were large standard deviations on most categories due to outliers. This shows that there are big differences between the largest and smallest firms in each category. Further research would be required to assess how this compares to traditional offline industries such as manufacturing.

Trueman et al. (2000) found the median age of companies since IPO to be less than two years whereas this study found the median to be eight years. This seems logical due to the time elapsed between the studies, however it does indicate that older Internet companies are not being displaced by younger competitors.

In contrast to previous studies (Trueman et al. (2000), Hand (2000a)) the majority of firms (77%) now have a positive EPS. This indicates that the Internet has matured over the past 10 years and companies have found profitable business models. This is especially true for Content and Community models who appear to have found ways to monetising their huge visitor traffic.

A possible reason for the increase in firm profitability is that as the industry matures costs may be lower as companies have already invested in their brands, have large customer bases which produce scale advantages, established infrastructure and there is less of a “land grab” mentality. It would also mean that traditional valuations methods (based on financials) would now be more relevant to Internet companies.

Trueman et al. (2000) found that in general Internet firms were not profitable but were growing rapidly. They concluded that investors in the market were paying for growth, rather than current performance. Whilst this appears to have changed it is not so across all business model categories. Younger categories such as community (social media) and software (Saas) exhibit lower profitability but higher valuations. This implies that younger categories are following the same pattern as the early Internet i.e. traffic is more important than financials with the assumption being that profitability can be created once a market leading position is established.

The strongest regression model (as determined by the best combination of AIC, R2 and residual error) was revenue and business model. This highlights that the business model does make a difference to valuation, perhaps due to the category popularity or because of business/ economic cycles.

5.2 Revenue Drives Market Value

The data showed that revenue was the strongest predictor of market value for the firms at an aggregated level.

The correlation and regression analysis were designed to identify the value drivers that affected market value. Ideally the regression analysis would have been conducted on each category of business model however a much larger sample would have been required to do this which was beyond the time constraints of this research.

Upon log transformation the six independent variables exhibited a strong linear relationship with the dependent variable.

In contrast to previous studies the results showed a near perfect collinearity between the traffic variables. While this makes sense that they should be related the literature review did not mention high collinearity.

Market value was positively correlated with all traffic variables. This perhaps explains why companies who reached a 'critical mass' of traffic were more favoured by investors. This agrees with prior studies (e.g. Demmers and Lev 2001; Hand 2000b).

Revenue, and to a lower degree EPS, were positively correlated with the traffic variables. However the correlation was much stronger than Demmers and Lev (2000) which provides more evidence that firms have become more competent at monetising their web traffic.

There was a very strong R^2 for all regression models meaning that the chosen independent variables were a good predictor of market value.

The model with the highest R^2 (0.93) used the variables of revenue and price-to-sales. In addition revenue had the highest correlation with market value at 0.83, therefore it appears revenue is a key component in influencing market value. This means that it is important for management across all categories of business model to focus on building revenue (not optimising costs) in order to enhance market value.

However due to the high power of revenue driving market value, revenue was not significantly correlated to price-to-sales ratio. It would be logical to assume that they would be correlated as price-to-sales is the ratio used by investors to determine the relative attractiveness of stocks. The fact that they are not correlated represents a potential opportunity for investors to find undervalued stocks.

These findings agree with Hand (2000a) who also found revenues dominate market value. The author believes that as the Internet industry matures further, there will be fewer loss making firms, and the importance of revenue will only get stronger.

The strongest regression model (as determined by the best combination of AIC, R^2 and residual error) was revenue and business model. This highlights the business model does influence valuation, perhaps due to the category popularity or because of business/ economic cycles.

5.3 Business Models Have Varying Value Drivers

At an aggregated level the data showed that revenue drives market value, however an analysis at the disaggregated business model level reveals another story. In fact almost every model has a variety of different drivers.

The descriptive statistics highlight each business model's value drivers:

Business Model	*Key Points*	*Value Drivers*
Community	• High price-to-sales ratio indicates market values are inflated • Very high market values compared to financials • Extremely high traffic metrics	• Pageviews • Reach • Traffic rank
Content	• Strongest category with above average score for all metrics (skewed by Google) • Strong traffic and financial metrics • Low price-to-sales indicates underpriced stock	• Traffic rank • Reach • Revenue
Ecommerce	• Above aggregate financials • Below average traffic figures • Large standard deviation skewed by Amazon	• EPS • Revenue
Infrastructure	• Predominantly B2B firms • Above aggregate revenue but below aggregate EPS indicating high costs • Majority founded before the year 2000 with few new entrants indicating high barriers to entry	• Revenue
Marketplace	• Above aggregate revenue but below aggregate EPS with no obvious reason for this • High traffic metrics due to the matching nature of services	• Traffic rank • Pageviews • Revenue
Service Provider	• Worst category with below aggregate medians for all metrics • Large traffic variations due to mix of B2B and B2C • Unexpectedly low financials indicate Internet services have lower profitability than offline services	• Not conclusive • Financials more important
Software	• Most frequent category perhaps due to the low barriers to entry and dynamic environment • Category seems out of favour with investors with underpriced valuations • Strong Chinese performance	• Not conclusive • Financials more important

This shows that each business model has differing value drivers and this agrees with the findings of Kotzberg (2001). The studies also agree on the usefulness of both financial and non-financial measures in explaining market valuation between different business model categories.

Interestingly some business models have very clear value drivers and others do not. An explanation for why some categories did not exhibit any clear trends could be:

- Anomalies in the data (i.e. a limitation of a cross-sectional study).
- Greater diversity within the firms of the intra-categories.
- There are no clear value drivers to be found.

Categories with a higher proportion of B2C companies focus more on traffic than B2B companies, which seems logical. B2B firms are more transaction orientated and the quality and type of traffic is more important than the volume. In B2B firms the financial metrics were much more important than traffic.

5.4 Business Models Can Be Ranked

Not all business models are created equal. It appears that some models are more successful than others in terms of delivering above median market values.

By combining the results from the Model 2 regression and by analysing how many metrics were above the median (e.g. revenue, traffic etc.) allowed each business model to be ranked:

1. Content (Best)
2. Community
3. Marketplace
4. Ecommerce
5. Infrastructure
6. Software
7. Service Provider

This poses interesting questions as to whether companies in the lower ranked models should try to change models. The author's opinion is that there are successful companies in each category, which highlights that there are opportunities in all of the models.

In terms of market value ranking Community, Content and Marketplace models have market value medians 553%, 217% and 81% respectively above the aggregate median. Regression model 2 showed that Community has the highest valuations.

It should be noted that even in the lower ranked categories (such as Software and Service Provider) there were highly prosperous firms (e.g. Netflix and Open Text), highlighting opportunities across all categories.

5.5 No Relationship Between Market Value and Company Age

The covariate analyses found no relationship between market value and age.

The notion of 'first mover advantage' i.e. being the first company to enter a market is perceived to provide long-lasting competitive advantages. However this analysis dispels this notion for the Internet industry, as newer entrants have been able to overcome barriers to entry and catch up to the first mover.

This is perhaps due to the dynamic and fast-changing nature of the Internet. New companies are seemingly able to develop competing products and gain market share quickly. Many of the business model categories require relatively low levels of assets in order to enter the market. This may increase the number of potential entrants and increase the chance of new disruptive businesses.

5.6 The bias of foreign companies

Section 4.5.1 weakly concluded that companies based outside of the US have larger market capitalisations than those based in the US (although this statement came with certain caveats). However the regression analysis in section 4.5.3 showed that US companies have higher market capitalisations based on their financials.

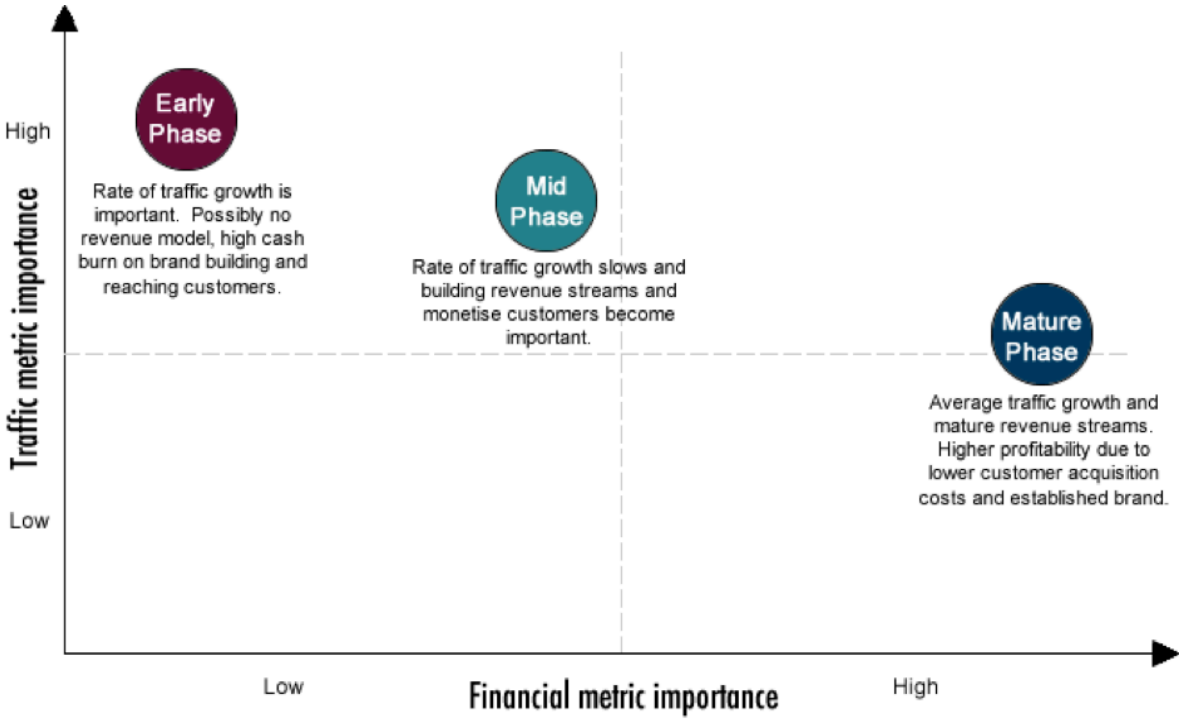
This suggests that strong companies based outside of the US are listing on US stock exchanges and investors are not pricing them as favourably perhaps due to some geographic bias mindset.

5.7 Value Driver Maturity Model

gure 22: Value Driver Maturity Model

Trends discussed from the literature review and data from this research show:

- Internet companies are becoming more profitable over time.
- For young categories (e.g. Community); non-financial drivers play a disproportionate role in the absence of earnings.
- Mature companies (public companies) are judged by whether they meet revenue and earnings targets.



The author loosely infers from these data that Internet categories go through phases with varying emphasis on value drivers (see Figure 22). The author suggests the value driver maturity model in which younger companies are judged more on traffic variables, whereas more mature companies are primarily judged on financial drivers.

This could suggest why pre-IPO companies can command large valuations without established revenue and furthermore why post-IPO their share price falls if earnings and revenue targets are not met. Post-IPO the market has moved the company along the maturity model and thus changed the criteria on which they are judged.

6 Conclusions

Given the ubiquity of the Internet and the huge growth in online businesses it would be expected that there would be a huge body of research on Internet value drivers. The literature review found that this is the first study of business model value drivers since 2001 and reinforces the value of this research.

In this study, the author identified a new categorisation of Internet business models and the value drivers that affect market value for each category.

The data showed that while revenue is the dominant driver of Internet market value across the whole population, when analysed at a business model level each category exhibited a variety of drivers.

It is important to note that the analysis and recommendations need to be tempered to the weaknesses in the research design. The results could be due to other variables (such as website usability or management) and the study uses a cross section approach that is biased by economic and seasonal cycles.

6.1 Addressing the Research Question

The following discussion examines whether the research objectives were met:

Objective 1: Identify the value drivers for Internet companies

The regression results analysing the entire sample showed that revenue is the dominant driver of market value. Even when the sample is disaggregated into separate business models there are a range of financial and non-financial drivers for each category (apart from Community which rely solely on non-financial drivers).

Therefore the hypothesis: “H1 – Non-financial drivers play a disproportionate role in Internet stock market value” is rejected for mature public companies.

However the value driver maturity model highlighted that when companies are young this hypothesis cannot be rejected.

Objective 2: Create a collectively exhaustive categorisation of Internet business models

A review of the literature discovered that the existing business model classifications were either out of date or did not accommodate newer Internet models. Therefore this study developed a new, up-to-date classification with clear criteria, incorporating the best elements from previous classifications.

Objective 3: Determine if different business models have different value drivers

Descriptive statistics indicated that different business models do indeed have different value drivers. This is a point that very few previous studies have highlighted so this research adds to the body of knowledge.

This discovery answers the question driving this research, which was "Why do some types of companies (such as social network companies) post seemingly high market valuations relative to their financial performance?" Variations in market value are not only driven by financial performance. At a business category level there is a range of value drivers; including website traffic and the popularity of the business model.

The data support the acceptance of the hypothesis: "H2 – Value drivers are not uniform across all types of business models".

In addition the research showed that value drivers change depending on the age of the company with more emphasis on financial drivers as the company matures.

6.2 Contributions of the Research

This research provides contributions to the body of knowledge and provides some tools for Internet stakeholders:

- Internet business models categorisation framework with revenue models.
- Critical success factors and value drivers for each type of business model.
- An up-to-date understanding of the drivers of Internet market value.
- An understanding of the business model concept for Internet businesses.
- Advice for management of Internet companies to maximise market value.

6.3 Further Research

This study identified many interesting ideas for further research:

- A longitudinal study contrasting value drivers before and after the 2008 financial crisis would provide insights as to whether value drivers change with market cycles. It would also provide more robust findings less biased by one specific set of market conditions and would show how value drivers change over time.

- The long-term viability of a business largely stems from the robustness of the value stream, which influences the revenue stream and the logistical stream (Mahadevan, 2000). This research does not assess the long-term viability of each business model.

- How can a company change their business model? This might depend on whether the company has its roots in the traditional or digital World. As the Internet is dynamic and has frequent changes. Internet business models need to be more adaptable and flexible than traditional businesses (Al-Debei & Avison, 2010).

- A larger, more balanced geographic sample would allow a contrast with this study to assess whether the findings could be extrapolated to the wider Internet industry.

- It would be interesting to study if the value drivers for younger, pre-IPO companies are different to the ones highlighted in this study.

7 Recommendations

The following recommendations have been drawn from the research targeting a range of stakeholder groups who are involved with publically listed companies.

Management looking to maximise valuation should concentrate on growing revenues not cutting costs.

Executives who have compensation incentives tied to stock prices should focus on increasing revenue rather than cutting costs and improving profits.

While cost cutting may have some effect on market value, the data point to revenue as the dominant driver of market value for Internet businesses as a group.

Generating revenue for Internet companies takes time and many firms are heavily loss making until they find ways to monetise their traffic or assets. However by the time a company IPOs it needs to have successfully developed its financial metrics or it will be pressured by the financial markets to do so.

This recommendation seems contrary to the observation at the start of this research, which was that Facebook's IPO market value was high relative to its revenue figures. However it should be noted that Facebook's share price has tumbled 38% since its IPO in May after missing revenue targets.[22] Perhaps becoming a public company is a game-changer insomuch as the company is now being judged on its financial performance i.e. it has moved along the Value Driver Maturity Model.

Indeed it's likely that younger, pre-IPO companies have different value drivers to public companies and are judged more on non-financial traffic drivers.

Know your business model and understand its specific drivers.

Whilst the data showed that revenue was the dominant driver of value across the aggregated population the study did highlight that not all business models have the same drivers.

With this in mind it is essential that managers understand those value drivers that most impact their business model.

This implies that a business needs to classify themselves and in practice this is not straightforward. Many businesses are a combination of business models and have a mix of offline and online activity. These 'hybrid businesses' are more difficult to classify. The suggestion is that each major category of revenue is assessed and a business model assigned for each.

Be aware that drivers change based on the maturity of the company.

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[22] http://www.latimes.com/business/la-fi-facebook-shares-20120728,0,1045145.story

The proposed Value Driver Maturity Model (see Section 5.2) suggests that value drivers move from being dominated by non-financial when a company is young, towards financial drivers as the company matures.

As a business reaches its strategic milestones it must assess whether it has moved along the maturity curve. If it has then it needs to change it focus and this should be reflected in its management-reporting dashboard. If a company fails to recognise that it is now being judged more on financial metrics this may negatively impact its share price.

When companies build their internal reports and management dashboards they should consider reporting on the success metrics for their model. It may also feature as an additional element on a balance scorecard.

B2B and Ecommerce companies should concentrate on financials.

B2B companies (as per the Infrastructure category) should concentrate on revenue to drive their market value. The data showed the market value of B2B companies is not driven by traffic at all. This is perhaps because the B2B market is smaller and transactions are typically of lower frequency and higher value.

Ecommerce companies are driven by earnings and to a lesser extent revenue, like B2B companies their value drivers are purely financial. Ecommerce companies should focus on improving their profit margins, either through increasing scale or by backward integration along the value chain. Amazon has showed great strength in backward integration by manufacturing the Kindle and by creating a new market for digital books.

B2C companies should focus on traffic with the long-term focus on revenue.

B2C companies as highlighted by Community, Content and Marketplace categories are primarily driven by traffic. However it appears that for the more established categories of Content and Marketplace revenue is also a key value driver.

Therefore the mentality for new companies in these categories is to grow traffic at the expense of earnings. This means a higher degree of external investment will be required to fund the growth phase. This approach implies that breakeven may be later than for traditional businesses, as a revenue model may not be developed until a critical mass of users is established.

Management should focus on one non-financial traffic metric.

Contrary to previous studies this research found an almost perfect collinearity across all the non-financial traffic metrics. Therefore management need only focus on one traffic metric in their reporting and analytics dashboards.

Low barriers to entry mean new businesses should be confident about entering the market.

The research showed no relationship between market value and age, which dispels the notion of the ‘first mover advantage’ producing long-lasting competitive

advantages for Internet companies.

If you are a new entrant to the Internet industry, the data shows that there is a good chance that you will be able to overcome the barriers to entry. This is perhaps due to the fast pace of change or because customer switching costs are low.

The exception is Infrastructure where the majority of companies were founded before the year 2000. Perhaps the asset-heavy nature and high customer switching costs of this category creates high barriers to entry

Venture Capitalists (VCs) should look for 'home runs' in the Community, Content and Marketplace categories.

Business models vary in their attractiveness with some categories achieving higher median valuations. Most notably Community, Content and Marketplace have the most attractive market values.

VC returns have been dominated by a small number of very large winners (Fraser-Sampson, 2010); these home runs can make or break a fund.[23] Therefore VC funds should concentrate on funding companies with the highest-ranking business model to give them the best chance of achieving home runs.

However it could be argued that focusing on the most successful categories could potentially mean competing with the most successful companies.

Investors should consider looking at traffic data when analysing opportunities.

Investors who invest in Internet companies should consider trends in traffic data especially for Content and Community categories. Especially in early-stage companies the traffic growth trajectory can be indicative of future revenue, assuming that management have a proven revenue model to convert the traffic into profit.

Finding appropriate databases of Internet traffic is not easy and each database has its own advantages and disadvantages. However the benefits of utilising traffic data could give investors an edge in picking the best performing stocks.

Non-US firms might reconsider listing on a US stock exchange.

The data weakly concluded that non-US firms are not priced as favourably when compared with their US counterparts. This loosely suggests that non-US companies might be better off listing in another geography (such as Europe).

However there may be other attractions to listing on the US exchanges that are not factored into the price, such as access to capital, the credibility gained from listing in the US or access to lobby or special interest groups.

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[23] A home run is an investment that returns the whole of the capital of the fund at least once. This is usually accepted as a 25x return.

Emerging businesses should have a clear plan for their revenue model before listing on a stock exchange.

The data suggest that as a business develops it moves from a non-financial bias to being judged more and more by financial metrics.

This implies that emerging businesses should have a clear plan for revenue well in advance of when it is required.

As some businesses are struggling to find online revenue models. Table 3 has a list of common revenue models that managers can used for idea generation and can then test their viability for their business.

A common classification framework should be developed for Internet companies.

The literary review found no agreed classification for Internet companies. Lambert (2006b) stated the classification of business models, the recognition of similarities and differences between them and the development of classes of business models are fundamental to business model research.

The author believes that a common classification framework is required in order for the business community to have a common language and frame of reference. This will make it easier for companies and investors to discuss business strategy.

Research budgets are wasted trying to continually develop yet another classification framework (as was done in this study). In order to facilitate a unified classification the business and academic community will need to work together to build a consensus on the pragmatic and research requirements.

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Appendix I – Variable Definitions

Historical accounting data was obtained from Bloomberg.

- *Revenue* – Total sales over the last year's reporting period, in USD.
- *EPS* – Earnings per share = net profit (earnings) per ordinary share, in USD.
- *Market Capitalisation* – Total value of the tradable shares of a public company. Share price multiplied by the number of shares outstanding, in USD.
- Price-to-sales – A ratio of dividing the company's market cap divided by the company's revenue in the most recent year.

Data obtained from Alexa.

- *Traffic Rank* – Three months of aggregated historical traffic data from millions of Alexa Toolbar users and data from other diverse traffic data sources, and is a combined measure of page views and users (reach). This is the only figure where a lower number is preferable e.g. a rank of 1 is the highest score.
- *Reach* – Measures the number of users. Reach is typically expressed as the percentage of all Internet users who visit a given site. So, for example, if a site like yahoo.com has a reach of 28%, this means that of all global Internet users measured by Alexa, 28% of them visit yahoo.com.
- *Pageviews* – The number of pages viewed by site visitors. Multiple page views of the same page made by the same user on the same day are counted only once. The page views per user numbers are the average numbers of unique pages viewed per user per day by the visitors to the site.

Age (Web Age)
Is the number of years since the companies website went live, not the number of years the company has been incorporated. This decision was taken as some of the companies moved from an offline to an online business e.g. Monster Worldwide Inc. was incorporated in 1967 but did not launch their website monster.com until 1994. By calculating age as the years since the website was launched it makes the comparisons more relevant.

Industry Classification
Industry categorisation is based on Industry Classification Benchmark (ICB), an industry classification taxonomy developed by Dow Jones and FTSE. It is used to segregate markets into sectors within the macro economy. The ICB uses a system of 10 industries, partitioned into 20 super sectors, which are further divided into 41 sectors, which then contain 114 subsectors.[24]

[24] See http://en.wikipedia.org/wiki/Industry_Classification_Benchmark

Appendix II – The Sample Of Firms Studied

The following table contains a list of all the firms in the NASDAQ Internet Index (QNET), in addition Facebook and LinkedIn.

#	Ticker	Name	Year Launched	Year IPO	Country	Business Model
1	ACOM	Ancestry.com Inc	1996	2009	USA	Community
2	FB	Facebook Inc	2004	2012	USA	Community
3	LNKD	Linkedin Corporation	2002	2011	USA	Community
4	ANGI	Angie's List Inc	1995	2011	USA	Community
5	AOL	AOL Inc	1993	1992	USA	Content
6	BIDU	Baidu Inc/China	2000	2005	China	Content
7	GOOG	Google Inc	1997	2004	USA	Content
8	IACI	IAC/InterActiveCorp	1994	1992	USA	Content
9	INSP	InfoSpace Inc	1996	1998	USA	Content
10	MOVE	Move Inc	1993	1999	USA	Content
11	SINA	Sina Corp/China	1999	2000	China	Content
12	SOHU	Sohu.com Inc	1996	2009	China	Content
13	WBMD	WebMD Health Corp	1995	2005	USA	Content
14	XOXO	XO Group Inc	1996	1999	USA	Content
15	YHOO	Yahoo! Inc	1994	1996	USA	Content
16	YNDX	Yandex NV	2004	2011	Netherlands	Content
17	AMZN	Amazon.com Inc	1994	1997	USA	Ecommerce
18	NILE	Blue Nile Inc	1999	2004	USA	Ecommerce
19	NTRI	Nutrisystem Inc	1999	1999	USA	Ecommerce
20	PETS	PetMed Express Inc	1996	2004	USA	Ecommerce
21	SFLY	Shutterfly Inc	1999	2006	USA	Ecommerce
22	STMP	Stamps.com Inc	1996	1999	USA	Ecommerce
23	UNTD	United Online Inc	2001	2007	USA	Ecommerce
24	VPRT	VistaPrint NV	1995	2005	Netherlands	Ecommerce
25	VNET	21Vianet Group Inc	1999	2011	China	Infrastructure
26	AKAM	Akamai Technologies Inc	1998	1999	USA	Infrastructure
27	WIFI	Boingo Wireless Inc	2001	2011	USA	Infrastructure
28	CCOI	Cogent Communications Group Inc	1999	2004	USA	Infrastructure
29	ELNK	Earthlink Inc	1994	1997	USA	Infrastructure
30	EQIX	Equinix Inc	1998	2000	USA	Infrastructure
31	INAP	Internap Network Services Corp	1996	1999	USA	Infrastructure
32	LLNW	Limelight Networks Inc	2001	2007	USA	Infrastructure
33	RAX	Rackspace Hosting Inc	1998	2008	USA	Infrastructure
34	VRSN	VeriSign Inc	1995	1998	USA	Infrastructure
35	DHX	Dice Holdings Inc	1996	2007	USA	Marketplace
36	EBAY	eBay Inc	1995	1998	USA	Marketplace
37	EXPE	Expedia Inc	1996	1999	USA	Marketplace
38	GRPN	Groupon Inc	2008	2011	USA	Marketplace
39	AWAY	HomeAway Inc	2004	2011	USA	Marketplace
40	LQDT	Liquidity Services Inc	1999	2006	USA	Marketplace
41	MELI	MercadoLibre Inc	1999	2007	Argentina	Marketplace
42	MWW	Monster Worldwide Inc	1994	1996	USA	Marketplace

43	OWW	Orbitz Worldwide Inc	2000	2007	USA	Marketplace
44	PCLN	priceline.com Inc	1997	2001	USA	Marketplace
45	TZOO	Travelzoo Inc	1998	2003	USA	Marketplace
46	Z	Zillow Inc	2004	2011	USA	Marketplace
47	CARB	Carbonite Inc	2005	2011	USA	Service Provider
48	SCOR	comScore Inc	1999	2007	USA	Service Provider
49	LPSN	LivePerson Inc	1995	2000	USA	Service Provider
50	NFLX	Netflix Inc	1997	2002	USA	Service Provider
51	OPEN	OpenTable Inc	1998	2009	USA	Service Provider
52	PRFT	Perficient Inc	1997	1999	USA	Service Provider
53	QNST	QuinStreet Inc	1999	2010	USA	Service Provider
54	VCLK	ValueClick Inc	1998	2000	USA	Service Provider
55	VELT	Velti PLC	2000	2011	USA	Service Provider
56	CTCT	Constant Contact Inc	1995	2007	USA	Software
57	CSOD	Cornerstone OnDemand Inc	1999	2011	USA	Software
58	TRAK	DealerTrack Holdings Inc	2001	2005	USA	Software
59	DRIV	Digital River Inc	1994	1998	USA	Software
60	JCOM	j2 Global Inc	1995	1999	USA	Software
61	KEYN	Keynote Systems Inc	1995	1999	USA	Software
62	KITD	KIT Digital Inc	1998	2009	USA	Software
63	LOGM	LogMeIn Inc	2003	2009	USA	Software
64	NTES	Netease Inc	1997	2000	China	Software
65	EGOV	NIC Inc	1994	1999	USA	Software
66	OTEX	Open Text Corp	1994	1996	USA	Software
67	QIHU	Qihoo 360 Technology Co Ltd	2005	2011	China	Software
68	RNWK	RealNetworks Inc	1994	1997	USA	Software
69	SABA	Saba Software Inc	1997	2000	USA	Software
70	VOCS	Vocus Inc	1997	2005	USA	Software
71	WWWW	Web.com Group Inc	1999	2005	USA	Software

Appendix III – Classification Rationale

The following table shows how the categories of Laudon & Traver (2008) and Wirtz et al. (2010) were combined. Some of the categories were combined and some categories were simply label changes.

Two extra categories, infrastructure and software, were added as they were not listed in the classifications.

Laudon & Traver (2008)	Wirtz et al. (2010)	Harbott (2012)	Rationale
Community provider	Connection	Community	Changed to a more relevant label
Portal Content provider	Content Context	Content	Combined portals and content into the same category as they are in effect performing the same
e-tailer	Commerce	Ecommerce	Changed to a more relevant label
		Infrastructure	Neither classification recognised infrastructure
Transaction broker Market creator		Marketplace	Combinedbroker and market creator as a broker brings buyers and sellers together like a marketplace
Service provider		Service Provider	No changes
		Software	Neither classification recognised software companies or cloud software such as Saas

Appendix IV – Classification Criteria

Business Models	Examples	Description	Category traits	Revenue Model
Community	Facebook LinkedIn	Where individuals with similar interests or similar networks can come together and share experiences	Social networking Networking Forums Content sharing User generated content	Advertising Subscription
Content	Yahoo.com Google	Collecting, selling or distributing content or content related services.	Portals Search Engines Information sites News sites Content distribution Consumer reviews Special interest guides/ tips	Advertising Subscription Transaction fees
Ecommerce	Amazon Play.com Zappos	Online shops and retail stores that are available for purchases 24/7	Online shop Product sales	Sale of goods
Infrastructure	Rackspace Akamai	Companies that provide the hardware and services required to run the Internet	Data centres ISP services Website hosting Servers	Sale of hardware Leasing of hardware Consultancy Maintenance
Marketplace	eBay Monster Expedia	Brining together buyers and sellers	Auction sites Matchmaking Many buyers and many sellers	Advertising Subscription Transaction fees
Service Provider	Netflix comScore	Selling a service rather than a product	Digital products Information/ knowledge Consulting	Sale of services
Software	Salesforce	Physical or cloud based software for consumers or enterprises	Software as a service (Saas) Desktop software Online and console based games Web applications Mobile applications	Subscriptions Licences One-off fees In game purchases Consultancy

Appendix V – Breakdown By Category and Geography

Business Model	Community		Content		Ecommerce		Infrastructure	
Category	B2C	B2B	B2C	B2B	B2C	B2B	B2C	B2B
Country								
USA	Ancestry.com Angie's List Inc Facebook Inc Linkedin Corp		AOL Inc Google Inc InterActiveCorp Move Inc WebMD Health XO Group Inc Yahoo! Inc	InfoSpace Inc	Amazon.com Blue Nile Inc Nutrisystem Inc PetMed Express Shutterfly Inc Stamps.com Inc United Online		Boingo Wireless Earthlink Inc	Akamai Tech Cogent Comm. Equinix Inc Internap Net Limelight Net. Rackspace Host. VeriSign Inc
China			Baidu Inc/China Sina Corp/China Sohu.com Inc					21Vianet Group
Netherlands			Yandex NV			VistaPrint NV		

Business Model	Marketplace		Service Provider		Software	
Category	B2C	B2B	B2C	B2B	B2C	B2B
Country						
USA	eBay Inc Expedia Inc Groupon Inc HomeAway Inc Monster Orbitz priceline.com Travelzoo Inc Zillow Inc	Dice Holdings Liquidity Srvcs	Carbonite Inc Netflix Inc OpenTable Inc	comScore Inc LivePerson Inc Perficient Inc QuinStreet Inc ValueClick Inc Velti PLC	LogMeIn Inc	Constant Contct Cornerstone DealerTrack Digital River Inc j2 Global Inc Keynote Sys. KIT Digital Inc NIC Inc Open Text Corp Saba Software Vocus Inc Web.com Grp
Argentina	MercadoLibre					
China					Netease Inc Qihoo 360 Tech	

Appendix VI – Descriptive Statistics

	No. Firms	Median Market Value	Median Revenue	Median Traffic Rank	Median Web Age	Median IPO Year
All Categories	71	1,002,750,720	353,294,016	4,025	15	2004
Community	4	6,551,375,360	6,551,375,360	303	13	2011
Content	12	3,174,082,688	460,930,496	51	16	2000
Ecommerce	8	452,485,584	0.28	9,346	15	2004
Infrastructure	10	849,111,104	15.15	66,556	14	2002
Marketplace	12	1,813,564,992	303	640	14	2007
Service Provider	9	789,688,768	0.2567	8,350	14	2007
Software	16	795,120,224	2.8289	32,889	15	2003

Community

No. Firms = 4	Min	Max	Median	Standard Deviation
Market Value ($)	872,915,200	85,000,000,000	6,551,375,360	40,513,914,807
Revenue ($)	90,043,000	3,711,000,000	460,930,496	1,696,623,604
EPS ($)	-1.60	1.41	0.28	1.25
Price-to-sales	2.58	22.90	15.15	11.13
Traffic Rank	3,296	2	303	1,571
Pageviews	0.0019	5.3317	0.2567	2.5888
Reach	0.0395	44.4800	2.8289	21.4451
Web Age (Years)	8	17	13	4.43
IPO Year	2009	2012	2011	1.26
Years to IPO	8	26	13	8.30

Content

No. Firms = 12	Min	Max	Median	Standard Deviation
Market Value ($)	252,066,496	199,461,044,224	3,174,082,688	57,011,173,008
Revenue ($)	124,257,000	37,904,998,400	1,455,765,472	11,653,981,347
EPS ($)	-4.64	30.17	1.06	10.53
Price-to-sales	1.20	22.44	2.33	6.29
Traffic Rank	45,201	1	51	12,908
Pageviews	0.0001	5.4442	0.0903	1.5803
Reach	0.0043	50.3200	2.1775	14.7856
Web Age (Years)	8	19	16	3.23

IPO Year	1992	2011	2000	6.10
Years to IPO	1	13	6	3.49

Ecommerce

No. Firms = 8	*Min*	*Max*	*Median*	*Standard Deviation*
Market Value ($)	267,443,904	86,771,425,280	452,485,584	30,459,687,909
Revenue ($)	101,585,000	48,077,000,704	437,303,008	16,834,786,443
EPS ($)	0.43	1.89	0.87	0.59
Price-to-sales	0.45	4.25	1.46	1.18
Traffic Rank	41,073	10	9,346	13,537
Pageviews	0.0002	0.6303	0.0006	0.2220
Reach	0.0038	6.2080	0.0177	2.1845
Web Age (Years)	11	18	15	2.45
IPO Year	1997	2007	2004	3.74
Years to IPO	3	27	7	7.80

Infrastructure

No. Firms = 10	*Min*	*Max*	*Median*	*Standard Deviation*
Market Value ($)	318,926,976	7,771,174,400	849,111,104	3,443,058,170
Revenue ($)	94,558,000	1,606,841,984	896,453,504	535,596,609
EPS ($)	-0.23	1.76	0.37	0.59
Price-to-sales	0.64	9.14	2.74	2.87
Traffic Rank	179,102	915	66,556	62,428
Pageviews	0.0000	0.0162	0.0001	0.0051
Reach	0.0010	0.0947	0.0029	0.0351
Web Age (Years)	11	18	14	2.33
IPO Year	1997	2011	2002	5.48
Years to IPO	1	12	4	3.87

Marketplace

No. Firms = 12	*Min*	*Max*	*Median*	*Standard Deviation*
Market Value ($)	329,019,424	53,484,187,648	1,813,564,992	17,115,821,823
Revenue ($)	66,053,000	11,651,653,632	547,098,496	3,339,887,476
EPS ($)	-1.03	21.27	0.38	6.08
Price-to-sales	0.43	13.55	3.81	4.01

Traffic Rank	10,402	21	640	2,892
Pageviews	0.0013	0.5053	0.0091	0.1438
Reach	0.0115	2.8490	0.1535	0.7870
Web Age (Years)	4	18	14	4.22
IPO Year	1996	2011	2007	5.28
Years to IPO	3	29	7	7.44

Service Provider

No. Firms = 9	*Min*	*Max*	*Median*	*Standard Deviation*
Market Value ($)	231,227,504	5,989,645,824	789,688,768	1,791,778,145
Revenue ($)	60,512,000	3,204,577,024	232,392,000	997,371,802
EPS ($)	-1.84	4.28	0.39	1.66
Price-to-sales	1.27	6.85	2.77	2.21
Traffic Rank	328,712	101	8,350	114,826
Pageviews	0.0000	0.0557	0.0008	0.0183
Reach	0.0006	0.9780	0.0155	0.3206
Web Age (Years)	7	17	14	2.78
IPO Year	1999	2011	2007	5.13
Years to IPO	2	11	6	3.67

Software

No. Firms = 16	*Min*	*Max*	*Median*	*Standard Deviation*
Market Value ($)	278,385,728	7,783,300,608	795,120,224	1,928,813,879
Revenue ($)	73,022,000	1,158,368,000	206,812,496	319,396,737
EPS ($)	-1.74	3.93	0.30	1.58
Price-to-sales	0.98	17.55	3.30	4.18
Traffic Rank	206,966	27	32,889	67,649
Pageviews	0.0000	0.1762	0.0002	0.0437
Reach	0.0008	3.4130	0.0065	0.8532
Web Age (Years)	7	18	15	3.38
IPO Year	1996	2011	2003	5.19
Years to IPO	3	17	6	4.14

Appendix VII – Research Methodology

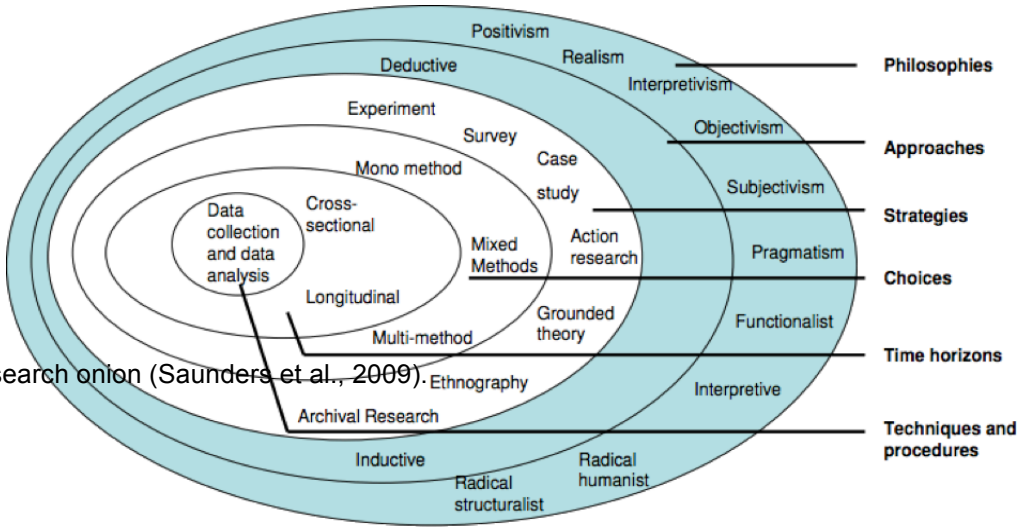


Figure 23: Research onion (Saunders et al., 2009).

The research onion methodology was adopted for this research to provide a structured method in which to design the research.

Research Philosophy

This is a positivism study using existing theory to develop hypotheses, and then facts and data, rather than impressions, drive the frameworks.

Research Ethics

There are no ethical issues connected to this research as the literature and secondary data were from public sources.

Time Horizons

A cross sectional study (snapshot) was used due to the limitations of not being able to obtain historical non-financial data. The Alexa database does not provide historical traffic data.

Data Types

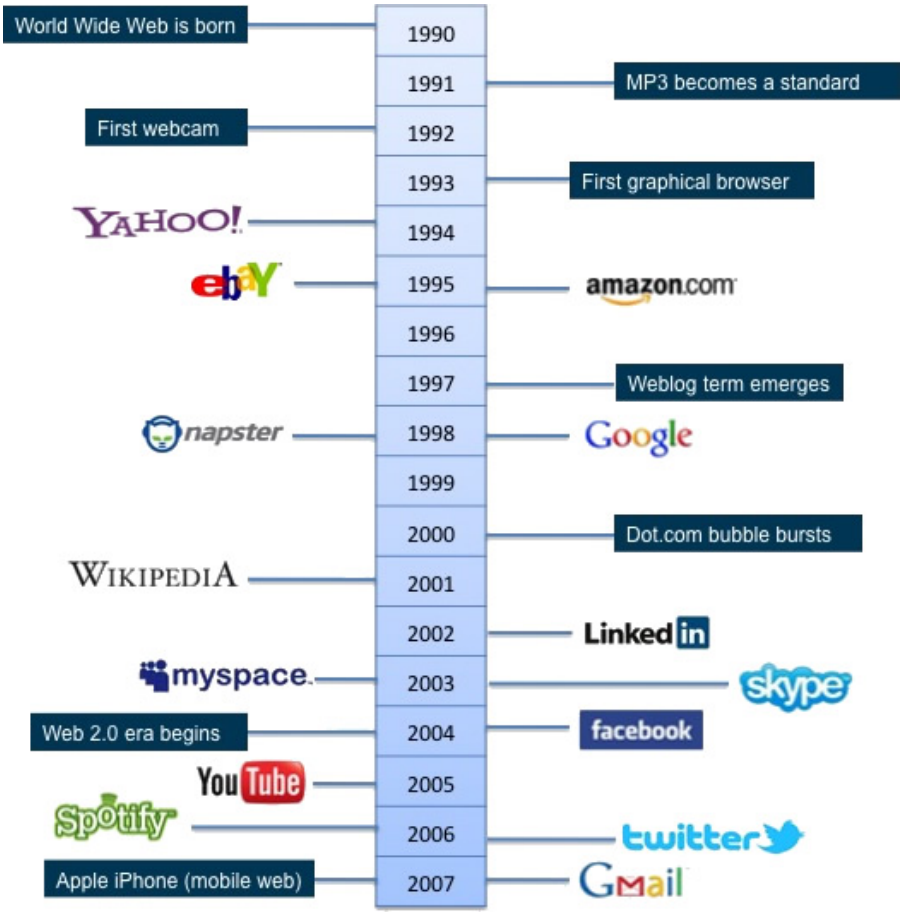
The study used a mixed approach with quantitative and qualitative data. A classification of business models was determined from the literature to provide answers to the research hypotheses. These answers and hypothesis are confirmed by analysing the quantitative data. Hence a sequential mixed approach is used.

Appendix VIII – History of Internet Business Models

The World Wide Web (WWW) has been in existence since December 1990 (Source: World Wide Web Consortium). Since it inception it has seen huge growth and change. Many businesses are still only just coming to terms with how to build revenue streams from their legacy offline assets.

From 1992 to circa 2003 the Internet was in the period widely known as Web 1.0 (Cormode & Krishnamurthy, 2008). During this period most of the content on the Internet was consumed by reading or by retailing from sites such as Amazon.com. This was mainly due to constraints in technology (AJAX and scalable scripting languages were not widely available) and that most businesses were transferring their pre-Internet businesses online with little change in mind-set.

After the dot.com crash in 2000 businesses started to re-think their strategy. From 2003 we entered the web 2.0 era where new companies emerged and new model for operating on the Internet was born. This new era brought new front-end interfaces such as AJAX, a strong social component and the new innovation of user-generated content (Cormode & Krishnamurthy, 2008). The web 2.0 era has created a new landscape where businesses such as Facebook, Google, YouTube and LinkedIn provide their services for free and have looked to use innovative business models in order to build revenue.



Appendix IX – Non-Parametric Tests

The first test analysed the quartile ranges of each Internet business model for each of the independent variables.

The Community category only has four observations so one is the min, one is the max and the remaining two lie one within the lower quartile (1st quartile – median) and one in the upper quartile (median – 3rd quartile).

Two non-parametric tests were performed on these groups. Non-parametric tests are required due to the low sample sizes and extreme skew. The Kruskal-Wallis rank sum test determines if all distributions of values for the business models are equal. If the test finds that not all distributions are equal, i.e. some have larger values than others, then the Wilcoxon rank sum test is used to compare the distributions of each pair of Internet business model to determine if they differ.

Market Value					
Business Model	**Min**	**25th Percentile**	**Median**	**75th Percentile**	**Max**
Community	872,915,200	970,291,840	6,551,375,360	30,325,000,000	85,000,000,000
Content	252,066,496	1,000,928,816	3,174,082,688	11,276,185,088	199,461,000,000
Ecommerce	267,443,904	388,422,696	452,485,584	1,165,247,072	86,771,174,400
Infrastructure	318,926,976	469,010,656	849,111,104	6,868,307,840	7,771,174,400
Marketplace	329,019,424	906,704,352	1,813,564,992	5,158,396,032	53,484,187,648
Service Provider	231,227,504	521,068,224	789,688,768	938,690,624	5,989,645,824
Software	278,385,728	354,672,160	795,120,224	1,254,079,008	7,783,300,608

Kruskal-Wallis rank sum test: chi-squared = 10.1218, df = 6, p-value = 0.1196
Using a significance level of 0.05 we fail to reject the null hypothesis that the distributions are equal for all internet business models. (p-value = 0.1196 > 0.05)

This means no business model category has market values larger than another business model. While the medians appear to vary significantly, as do the maximum values, the minimum values are much more similar. One can also see that the smallest 75th quartile (Service Provider) is nearly as large as the largest 25th percentile (Content). This means that the largest business model by market capitalisation overlaps nearly 25% of its values with the smallest.