PhD

Corporate Social Capital and Firm Performance in the Global Information Technology Services Sector

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Abstract

The confluence of a number of marketplace phenomena has provided the impetus for the selection and conduct of this research. The first is the so called value relevance of intangibles in determining share market performance of publicly listed companies. The growing gap between market and book values has been proposed as an indication of the impact of intangibles on share price values. A second related phenomenon is the increasing reliance on share price appreciation as the principal means for shareholder return as opposed to returns through dividends. This suggests that share prices are becoming an even more critical firm performance measure than traditional accounting-based firm performance measures like return on investment (ROI). A third phenomenon is the rapid growth in marketplace alliances and joint ventures, the number of which has grown rapidly over the past 30 years. The explanation for these phenomena may lie in the concept of corporate social capital (CSC) which, as an intangible asset (IA), has been proposed in several normative studies. CSC has been defined as "the set of resources, tangible or virtual, that accrue to a corporate player through the player's social relationships, facilitating the attainment of goals" (Leenders & Gabbay, 1999, p3). However, constructs for CSC have only been loosely defined and its impacts on firm performance only minimally empirically tested. This research addresses this gap in the literature.

The key aim of this research is to explore the impact of CSC on firm performance. Through the use of CSC as a lens for viewing a firm's intangibles, several important sub-components of the CSC formulation are exposed. These include a firm's market centrality (CENT), absorptive capacity (AC), internal capital (INC), human capital (HC) and financial soundness. Therefore, an extended aim for this research is to identify the differential impacts of the CSC sub-components on firm performance. Firm performance was measured as ROI, market-to-book ratios (Tobin's Q) and total shareholder return (TSR).

Overall, the research results indicate that CSC is a significant predictor of firm performance, but falls short of fully explaining the market-to-book value disparity. For this research an innovative computer-supported content analysis (CA) technique was devised to capture a majority of the data required for the empirical research. The use of a commercial news aggregation service, Factiva, and a standard taxonomy of terms for the search, allowed variables for intangible constructs to be derived from a relatively large sample of firms (n=155) from the global information technology services (ITS) sector from 2001 to 2004. Data indices for joint venture or alliance activity, research and development (R&D) activity, HC, INC and external capital (EC) were all developed using this CA approach.

The research findings indicated that all things aren't equal in terms of how the benefits of CSC accrue to different firms in the sector. The research indicated that for larger, more mature firms, financial soundness does not necessarily correlate with improved shareholder return. The inference is that these firms may have reached a plateau in terms of how the market is valuing them. In terms of market centrality, the research indicates that software firms could benefit from building a larger number of alliances and becoming more centrally connected in the marketplace. The reverse is true, however, for larger, more established firms in the non-software sectors. These companies can be penalised for being over-connected, potentially signalling that they are locked into a suite of alliances that will ultimately limit their capacity to innovate and grow.

For smaller, potentially loss-making firms, the research indicates that investments in HC are potentially the only investment strategy that could result in improvements in profitability and shareholder return. Investments by such firms in R&D or INC developments are likely to depress shareholder value and therefore should be minimised in favour of HC investments. For larger, more established firms, investment in HC is beneficial for both ROI and TSR. Investments in areas like R&D and INC were found to be only beneficial to those firms who have the financial capacity to afford it. Firms that don't appear to have the financial resources to support the level of investments they are making in R&D and/or INC were penalised by the market.

Overall, the research provides specific insights into the links between firms and their performance, through appropriate investments in CSC. In terms of research practice, this research demonstrates the viability of computer-supported CA. Progress in the development of more intelligent search technologies will provide increasing utility to CA researchers, promising to unlock a vast range of textual source data for researchers that were previously beyond manual CA practices.

Key Words: Corporate Social Capital, Intellectual Capital, Intangible Assets, Corporate Reputation, Social Capital, Social Networks, Content Analysis.

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Abbreviations

AC	Absorptive Capacity
AT	Total Assets
BSC	Balanced Scorecard
CA	Content Analysis
CENT	Centrality
CoP	Communities of Practice
CSC	Corporate Social Capital
DIC	Direct Intellectual Capital Methods
DT	Total Debt
EC	External Capital
EPSPI	Earnings per Share
GICS	Global Industry Classification Standard
HC	Human Capital
HRCA	Human Resource Cost Accounting
IA	Intangible Assets
IC	Intellectual Capital
ICD	Intellectual Capital Disclosures
INC	Internal Capital
IP	Intellectual Property
IT	Information Technology
IT&T	Information Technology & Telecommunications
ITS	Information Technology Services
KM	Knowledge Management
LM	Lagrange Multiplier
M&I	Metals and Industrials
MCM	Market Capitalisation Methods
MITI	Ministry of International Trade and Industry
MKVAL	Market Value
MVA	Market Value Add
NA	Networks and Alliances
OV	Organisational Value
PSTKL	Preferred Stock Liquidation Value
R&D	Research and Development
RES	Research and Development Variable
ROA	Return on Assets
ROE	Return on Equity
ROI	Return on Investment
SALE	Net Sales
S&P	Standard & Poors
SC	Social Capital
SCAT	Social Capital Assessment Tool

SCM	Scorecard Methods
SEM	Structural Equation Modelling
SI	Systems Integration
SNA	Social Network Analysis
SN	Social Networks
TCE	Transaction Cost Economics
TobQ	Tobin's Q
TRF	Total Return Factor
TSR	Total Shareholder Return
Zscore	Altman's Z score

Statement of original authorship

I hereby certify that this thesis is original and does not contain without acknowledgement any material previously published or material which to a substantial extent has been accepted for the award of any other degree or diploma of a university or other institute of higher learning.

Laurence George Lock Lee

20th September 2007

Acknowledgements

Some might call it a mid-life crisis, and starting the PhD journey part-time while approaching 50 could certainly qualify as one. There have been a number of advantages in undertaking a PhD later in life. For instance, I could reflect back on a 30+ year career and recall my days in the corporate research laboratories of BHP, working with state-of-the-art technologies, as exciting times before maturity and the commercial world dragged me from the world of 'play' to the world of 'profit'. The PhD journey has enabled me to re-experience the excitement of being at the leading edge.

From a professional perspective, I am indebted to my principal supervisor Professor James Guthrie and associate supervisor Professor Natalie Gallery. It was only well into my PhD journey that I realised not everyone is given the freedom to research the PhD topic of their choice, as I have done. I thank James for that latitude as I'm sure the supervision task was made significantly more onerous as elements of my work moved in areas beyond his own areas of expertise. I am also forever grateful to Natalie for her expert guidance on 'crunching the numbers'. Statistics is often seen as the 'Achilles heel' for many a research student. Natalie has taught me a lot and helped me become much more confident with the quantitative methods that I employed. I also acknowledge both their efforts in converting my well practiced 'consulting speak' into 'academic speak'.

As a mature age student I had the novel experience of attending university at the same time as my children! My daughter Erin has completed a double degree in Visual Communications and Business and my son Gavin is in his final stages of a degree in Building and Construction. One could only imagine the dinner conversations in the Lock Lee household as we shared experiences on research methods and university life in general. My dear wife Julie, who has had to put up with a household full of students, I thank for her patience and tolerance. It's easy to forget that she was the odd one out as we were all locked in our academic pursuits. More significant though, she accommodated my 'mid-life crisis', as I locked myself in the office for hours and days on end when I

probably should have been paying more attention to the household chores and spending more quality time with her.

My final tribute is to Floss, our much loved Maltese/Pomeranian cross dog. Sadly, we have just said goodbye to her after more than 13 years as an integral part of our family. As dog owners know, dogs have an uncanny ability to know whose lap to jump onto when one needs cheering up, or even some respite from an onerous task like a PhD thesis! We all miss her greatly. But the completion of this thesis also marks the start of a new stage in our lives, as our children leave home to make their own way in the world and we look forward to life's next set of opportunities.

1 Introduction

1.1 Background to the Research

Corporate Social Capital (CSC) has been identified as social capital (SC) in the context of corporate or public sector organisations. Leenders & Gabbay (1999) raised the awareness of CSC, focusing on concepts, theories and the application of SC to business. CSC has been defined as "the set of resources, tangible or virtual, that accrue to a corporate player through the player's social relationships, facilitating the attainment of goals" (Leenders & Gabbay, 1999, p3). CSC is often associated with the network of inter-firm alliances or joint ventures. The business press coverage of such activity is escalating exponentially, with more than 70,000 articles reporting on alliances and joint ventures in 2005/6, a rate of close to 200 per day[1]. Around 20% of this activity is in the information technology (IT) sector. With most organisations claiming a multitude of alliances, markets can no longer be characterised by individual buyers and sellers. The macro view of markets now consists of a complex web of inter-organisational activity. The alliance literature mostly focuses on 'the single deal'; however, the sheer growth in the number of alliances being formed will naturally lead to discussions of alliance networks, beyond simple partnerships (Dyer & Nobeoka, 2000; Gulati, Nohria, & Zaheer, 2000; Uzzi, 1997). A firm's ability to leverage its position or build its SC within a complex web of market actors is likely to have a significant influence on its overall performance[2]. The CSC of the firm is not directly measurable in financial terms. As an intangible asset (IA) of the firm its impact on firm performance is the key focus of this thesis.

The 'age of intangibles' can be identified as the time when market valuations began to diverge from net tangible asset valuations (i.e. book valuations). The effect can be traced back to the late 1970s when market valuations largely reflected book valuations. In contemporary times, book valuations only account for, on average, less than 50% of

[1] Factiva search on 'joint venture' activity for the year up to 1st August 2006.
[2] In this thesis firm performance is defined in terms of share market and financial performance. Specific measures of return on investment (ROI), Tobin's Q (TobQ) and total shareholder return (TSR) are used to represent firm performance for the empirical work of this thesis.

market valuations on the US stock exchange (Hand & Lev, 2003; Lev & Zarowin, 1999). The growing gap, commonly called Market Value Add (MVA), has been largely attributed to the impact of IA. Intangibles in this sense are not not restricted by the traditional financial accounting definition of assets, but are a collection of non-physical assets that could be identified as being responsible for the MVA in a company's share price. Despite the extensive efforts of many researchers to develop schemes to value these IA (Bontis, Dragonetti, Jacobsen, & Roos, 1999), the ability to fully attribute investments in intangibles to an MVA of greater than 50% of the value of stock markets has proved elusive. Poor agreement on definitions for IA elements and non-rigorous measurement methods are blamed for an inability to accurately value intangibles (Pike & Roos, 2004). For instance, Bond & Cummins (2003) attempted to build an economic model to explain share price valuations from investments in both tangible assets and IA, but still left a large proportion of MVA attributable to unexplained noise. Fama & French (2001) identified a related downward trend in the proportion of firms paying cash dividends since 1978. This trend was partly attributed to the nature of new firms entering the market being more growth-oriented, but they were unable to fully explain higher stock prices using expected dividend and earnings growth models.

Some of the earliest work in characterising IA was conducted by Sveiby & Risling (1986), who identified three broad categories of intangibles: internal capital (INC); external capital (EC); and human capital (HC). Many variations of this basic theme have been advanced, resulting in many versions of IA scorecards (e.g. Intangible Asset Monitor (Sveiby, 1997), A&P Scorecard (Wall & Doerflinger, 1999)**,** Skandia Scorecard (Edvinsson, 1997), Balanced Scorecard (BSC) (Kaplan & Norton, 2004)) but as yet, no agreed international guidelines or standards (Zambon et al., 2003). More troubling is that there has been little evidence of a broad-based adoption of IA scorecards (Ricceri, 2008, forthcoming). Furthermore, collecting and collating IA elements has proved expensive, and interpreting them consistently is problematic. Therefore, their impact on management decision-making has been minimal (Johanson, 2003).

A perceived difficulty in treating the measurement of intangibles in the same way as the measurement of tangible, physical assets is the indeterminacy of intangibles. The categories of HC, INC and EC are not strictly categorical. For example, while human competence is a component of HC, it can also be seen as an essential part of a company's INC and EC. In addition, the interactions or flows between both tangible and intangible resources need to be identified to fully appreciate the influence on value creation (Ricceri, 2008, forthcoming). Measurement schemes also need to meet the requirements of completeness, independence, distinctness, agreeability and scaling, which is not currently the case with the majority of IC measurement schemes (Pike & Roos, 2004; Roos, Pike, & Fernstrom, 2005).

The alternative to the scorecard approach for managing intangibles is the development of IA indexes, aimed at providing a measure for IA performance in a single number. The ratio of market-to-book values is the simplest measurement form. Typically, index measures have been spawned by the accounting profession, with the objective of addressing market information asymmetries through higher levels of disclosure on intangible attributes that impact share price valuations. Measures include the knowledge creation index (Lev, 1999), knowledge capital index, and the value creation index (Low, 2000). A successful IA index is an attractive proposition if it is able to be used as a predictor of future share market performance. A single or smaller suite of measures provides greater potential for prompting management action. However, to be useful, an IA index must provide an in-built guide to management as to the areas where IA performance can be improved. Unfortunately, none of the indexes designed to date has been able to consistently predict share market performance or provide guidance as to what IA elements will have the most impact on market performance.

One point of difference between the organisational theorists' view of intangibles (e.g. Sveiby) and the accountants' view (e.g. Lev) is the focus on internal versus external stakeholders. The organisational theorists' perspective with intangible scorecard mechanisms targets internal organisations / company management. Scorecards are generally customised to particular organisations, with little evidence of scorecard metrics

that can be compared across industries or even across companies in the same industry. The accountants' perspective is largely targeted at external or market-level stakeholders. The ability to compare quantitative IA valuations across companies and industries is important information to disclose when looking to facilitate an efficient marketplace, and is one of the aims of this PhD research.

Pike & Roos (2004) argue that if the value of an IA tool is judged by its ability to prompt successful management action, then developments to date have fallen short. While much of the shortfall could be attributed to the immaturity of the field, a major opportunity exists for formulating new models of intangibles which are both interpretable by general management and correlated with market performance (Lev & Zambon, 2003).

Another marketplace phenomenon is the growth in partnering and alliance activity. For example, Pekar & Margulis (2003) indicate that just 750 equity alliances and joint ventures were formed in the USA throughout the 1970s, and now thousands are formed annually in the USA alone.

The market phenomenon of growing MVA coincident with alliance activity begs the question: Is the growth in alliances and growth in MVA linked? This is one topic area for this research. The concept of SC is introduced as a measurement proxy for the networked marketplace. The concept of SC has historically been developed for public welfare applications. The study of social networks (SN) and SC formation in communities and neighbourhoods has been identified as not dissimilar to a market environment which is highly interconnected by both formal and informal mechanisms (Burt, 2000). The concept of CSC has been coined to identify corporate or public sector organisational applications of SC studies (Leenders & Gabbay, 1999).

1.2 Definitions

Given the relative infancy of the selected field of study, definitions are important. Terms like social capital, corporate social capital, intangible asset performance, intellectual capital, absorptive capacity, relationship capital, organisational capital, internal capital, external capital, human capital, human competence and knowledge capital are yet to achieve unified meanings in the field. The approach taken in this thesis is to provide a working definition of the key terms and the subsidiary or synonymous terms that the key terms also represent, for the purposes of this thesis alone. The intent is not to be distracted by fine semantic variations between terms unless they have a material effect on the research at hand.

A list of the definitions of key terms can be found in Appendix A – Definition of Key Terms.

1.3 Research Question and Hypotheses

The key focus of this research is to relate the concept of CSC to a number of firm performance measures.

The research questions to be addressed are:

1. **What impact does corporate social capital have on firm performance?**
2. **a) To what extent do sub-elements of corporate social capital contribute to firm performance?**
   b) To what extent do sub-elements of corporate social capital detract from firm performance?

Empirical research literature has used a variety of firm performance measures, for example, ROI, sales volumes, share price movement and earnings. However, in most cases only a single performance measure is used, which does not provide a perspective of

overall firm performance. For this research, three firm performance measures – ROI, Tobin's Q (TobQ – a market-to-book value measure) and total shareholder return (TSR) – are used. These measures were selected to provide a balance of accounting performance measures and market-based performance measures. Sales performance is used as a control variable for firm size.

The hypotheses addressing these questions are built up through a five-layer construct for CSC. An integrated model of CSC can be developed through five building block layers as shown in Figure 1.

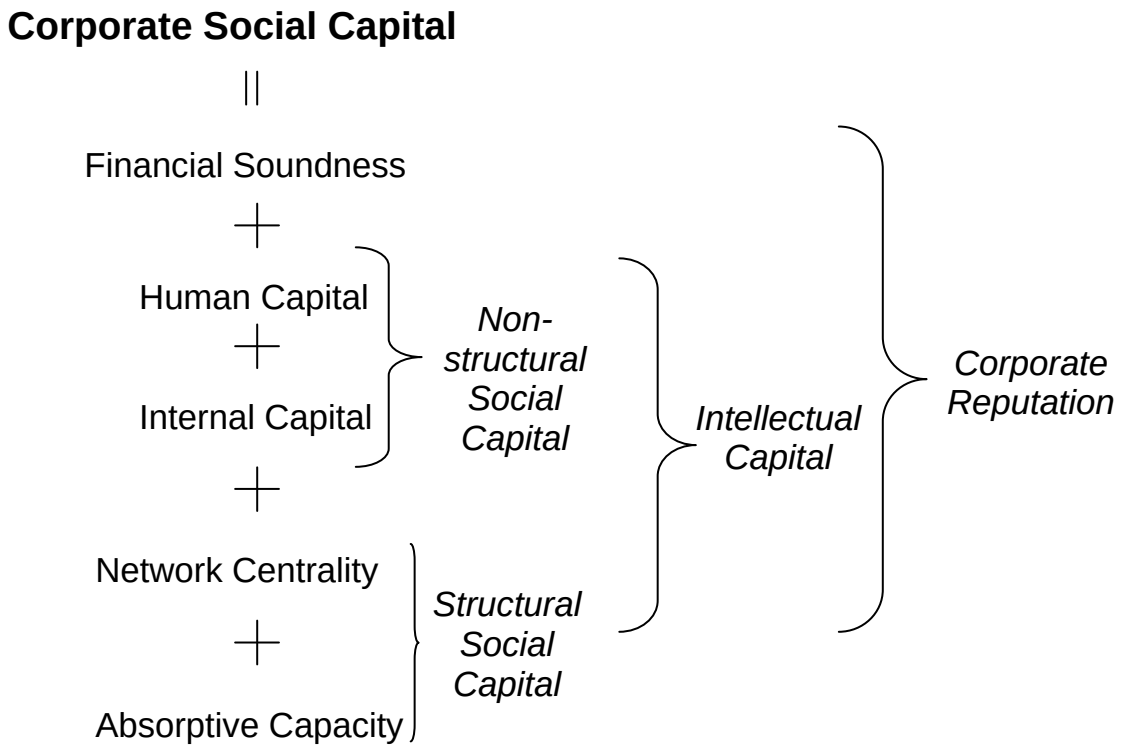

Figure 1 – Integrated Model for Corporate Social Capital

The above model builds a picture of CSC through integrating identified subsidiary elements. The intent is not to claim that the concepts of structural SC, non-structural/qualitative SC, IC and corporate reputation are simply component parts of CSC. Rather, the intent is to say that if one looks at the world through the lens of CSC,

one might identify these contributing components. The terms on the left of the diagram – absorptive capacity, network centrality, internal capital, human capital and financial soundness – conceptually may not be additive, but for this research they are operationalised and therefore measured as distinctive variables. The bracketed terms on the right (e.g. intellectual capital, structural social capital) are concepts that these variables could represent. They provide a link between concepts and how they are operationalised.

The order of the variables from bottom to top has been selected deliberately to describe a staged enrichment of the CSC concept from a base formulation of structural SC, which includes network centrality and AC. AC caters for the ability to absorb knowledge from alliances. IC is added as a status attribute for the firm and therefore adds to the firm's CSC. Corporate reputation can be formulated as IC with the addition of financial soundness. Collectively, the concepts of network centrality, AC, INC, HC and financial soundness can then be incorporated into an integrated model for CSC.

The research questions and related hypotheses have been drawn from several bodies of theory, which are developed in some detail in Chapter 2. First, Polanyi's (1944) economic theories and anthropological analysis note that ancient economies were ruled by social relations. Humans sought out material goods that would enhance their social standing. Polanyi believed that economies have only been controlled by markets in relatively recent times. This research introduces the prospect that markets may in fact be controlled by social relations. A second set of theories relates to SC, which incorporates theoretical concepts like Burt's (1992) structural holes theory, Coleman's (1990) social theory and Granovetter's (1973) strength of weak ties theory. These theories consider SC as a network of social relationships. Inter-firm network theories, inclusive of social exchange theory (Blau, 1964; Cook, 1982) have been developed to explain a firm's collaborative behaviour. A third set of theories relates to IC and knowledge management (KM), including intangible capital theory (Sveiby & Risling, 1986), which articulates the components of intangible capital (i.e. human, internal/structural and external/relational

capital). Knowledge-based theories of the firm (Kogut & Zander, 1993) argue for knowledge being the basis for a firm's competitive advantage.

The ensuing prospective theory relating CSC to firm performance from this research relates to core concepts from each of the above theories. Having outlined the research problem being addressed, along with the nominated hypotheses, the next section provides justification for the research undertaken.

1.4 Justification for the Research

1.4.1 Growth in MVA

The growth in MVA over the past three decades, together with the growth in the interconnectedness of players within our marketplaces, presents a significant challenge for investors, company directors and management, as well as regulators and the accounting profession. The decreasing relevance of traditional accounting measures to share market performance (Lev & Zarowin, 1999) is of particular concern, leaving company executives effectively flying blind in trying to build market value for their shareholders. The dotcom boom leading up to 2000 provided a graphic illustration of how disconnected market valuations could be to traditional accounting measures of earnings and net tangible asset valuations (Roos, Pike et al., 2005). However, the consequential dotcom bust also worked to deflate interest in MVA growth to the extent that the phenomenon was viewed by many as an aberration[3].

In order to reinforce the continuing importance of researching intangibles and their impact on share market performance, a research exercise was conducted to extend the original work of Lev & Zarowin (1999). These authors demonstrated the decreasing usefulness of financial information in their study of over 5000 US firms over the period 1977 to 1996. They looked at the relationship of financial measures to earnings, cash

[3] Baruch Lev Keynote presentation at the 1st Workshop on Visualising, Measuring, and Managing Intangibles and Intellectual Capital, Ferrara, Italy 18-20th Oct, 2005.

flows and earnings plus book values to stock price variations. In each case a decreasing correlation over time was demonstrated.

For the current study, a pilot study replication of the Lev & Zarowin (1999) method, comparing industrial stocks drawn from the Standard and Poors (S&P) 500 Industrials and Materials sectors with the high technology knowledge-based stocks drawn from the S&P 500 Information Technology and Telecommunications (IT&T) sectors for the period 1980 to mid–2004, was conducted. The findings of the pilot study reinforce the original Lev & Zarowin (1999) findings, identifying the long-term trend existing for both industrial and knowledge-intensive sectors. For the IT&T sector, the retreat from the extreme valuations of the dotcom period is seen simply as a return to a long-term trend that has been in effect now for over 25 years.

This pilot study (Appendix B – Pilot Study Results) specifically compared the relevance of financial measures over time for the physical asset-intensive industry sectors of materials and industrials (M&I: Global Industry Classification Standard, GICS 15 and 20 respectively) and the high technology, IA-intensive, IT&T (GICS 45 and 50 respectively) sectors of the S&P 500. The underlying proposition is that the weakening relevance of financial accounting measures demonstrated by Lev & Zarowin (1999) is associated with the growth in the number of IT&T service companies. This proposition infers a second proposition: that there is no weakening of the relevance of financial measures over time for physical asset-intensive firms. The results of the pilot study reinforce the view that the loss of value relevance in financial accounting data is still present for both physical and non-physical-intensive sectors.

For this thesis, the global information technology services (ITS) sector, specifically those IT firms listed on the US stock exchange (GICS code 45) between 2001 and 2004, was chosen for analysis. The period was deliberately chosen to avoid the dot com boom and bust, where intangible values grew and then collapsed at abnormal rates. The sector was chosen as illustrative of a growing sector that relies on intangibles. That said, the

weakened value relevance of financial information identified by Lev & Zarowin (1999) exists for the whole market, as indicated by the pilot study.

1.4.2 Connecting Social Capital and Firm Performance

The study of SC as it relates to business and markets is still a relatively recent phenomenon, with the majority of the research being of a normative, rather than an empirical nature (Florin, Lubatkin, & Schulze, 2003; Leenders & Gabbay, 1999). The linkage between SC and IA performance has been largely neglected but this could simply be attributed to the disparate disciplines from which these concepts have emerged, that is, sociology and accounting. The organisational theorists' approach to intangibles could identify SC as a component of EC, though in many cases EC is typically defined more narrowly as relationships with customers and suppliers (Sveiby, 1997).

However, in this thesis, SC has a broader interpretation which can be relevant at the individual, firm or market level. As such, it can be argued that CSC plays a role across all of the identified components of IC, as illustrated in Figure 2:

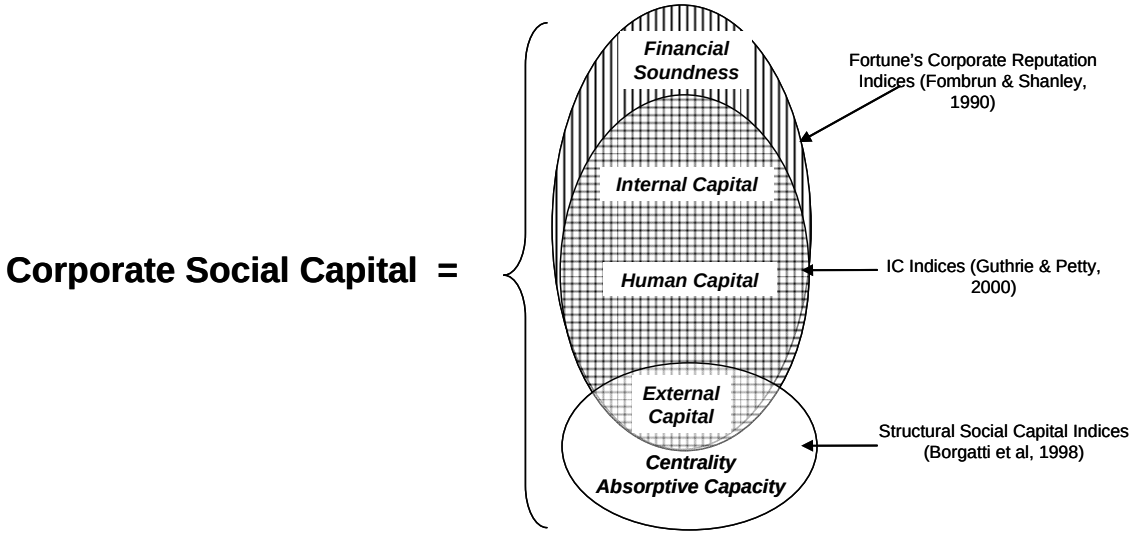

Figure 2 – Corporate Social Capital and Intellectual Capital

The above formulation of CSC incorporates the accepted formulation of IA made up of HC, INC and EC (Guthrie & Petty, 2000). It also acknowledges the overlap between formulations of corporate reputation and an expanded formulation of EC to incorporate the structural aspects of relationships. In this research, a concept of CSC is formulated and built up as shown in Figure 1. The model shown in Figure 2 identifies an overlap between the structural aspect of SC and the EC component of the IA formulation. It identifies corporate reputation as equivalent to the IA concept, with the addition of financial soundness. These formulations are discussed in more detail in Section 2.4.

The commonality between IC elements and CSC include, for example, an individual's SN, a firm's alliance structures and stakeholder relationships, which are both CSC and IC elements and provide a tangible linkage between CSC and IC. Other IC elements like reputation, patents, skills and experience that may not be explicitly defined as part of CSC, do contribute to CSC by acting as attractors for potential connections, and therefore CSC development. For example, a firm looking to develop an alliance arrangement will be attracted by elements like reputation, brand and the skills and experience of the staff in prospective organisations.

1.4.3 Methodology Justification

The basic methodology chosen for this research is positivist (Hussey & Hussey, 1997). This approach follows similar lines as research studies conducted to link CSC to organisational performance (Burt, 2003; Coleman, 1975; Lin, 1982). While the principal novel elements in this research are around SC, additional associated elements like financial soundness, corporate reputation and AC, included in the overall model, have been drawn from prior research, which have all made use of the positivist approach.

The research methods used for the SC formulation rely on social network analysis (SNA) techniques (Wasserman & Faust, 1994) applied to transaction databases and CA of textual reports, as will be explained in Chapter 4. Traditional SNA and SC measurement initiatives have relied on survey techniques. The different choice of data sources is

justified by the difficulty in capturing a sufficient and representative group of potential survey respondents for the domain under study. Unlike public welfare-related research, where the prospective survey respondent pool can be quite large, appropriate respondents for assessing the SC of firms in the IT marketplace are significantly fewer and difficult to access. On the other hand, published information on the ITS market and the firms that participate in this market is prolific. Sampling the available literature and databases provides a much greater opportunity for the selection of an appropriate representative sample for analysis than looking for appropriate human survey respondents.

Typically, prior research has formulated the concept of SC through qualitative attributes collected via surveys (ABS, 2004; Stone, 2001) or concentrated on the structural network aspects of SC using SNA (ABS, 2004; Borgatti, Jones, & Everett, 1998; Stone, 2001). SC measures have two dimensions: structural and non-structural/qualitative. The quality of social relations can be divided into social trust, which is personal, and institutional trust, which works at an organisational level. Reciprocity is a common qualitative SC attribute that refers to in-kind exchanges that are not necessarily economically-based, typically returned favours. Qualitative measurement constructs, such as those identified above, form the basis of typical SC survey instruments (e.g. Stone, 2001).

The structural network measures are based on measuring connections. Survey respondents are typically asked with whom they connect or interact (i.e. nominate their 'ties'). Often, the relative strength of a tie, for example, strong, moderate or weak, is also collected. A SNA map (sociogram) can be generated from the data collected to assist with visualising the nature of connections. Statistical calculations on the number and nature of ties can then provide measures like network size, density and heterogeneity (Wasserman & Faust, 1994). Using demographic information collected about the respondents, the networks can be studied at the individual or aggregate (firm, organisation or national) level.

The linkage between SC, whichever way it is operationalised, and organisational performance has been typically achieved using regression analyses. Formulation of the

SC constructs using survey-based data runs the risk of inadequate sampling to formulate a conclusion about market-wide impacts. Who should participate in such a survey is also problematical. Should they be market analysts, company managers, investors or the general public? SN formulations also often rely on survey data and therefore suffer from the same issues. Another issue for methodologies based purely on SNA is determining how much of the qualitative aspects of SC can be reasonably inferred through ties in a network.

For this research, a methodology was designed to avoid the shortcomings of surveys by using broad-based market data and information to infer SC values. By drawing from a broad base of analyst reports, annual reports, news articles and market data based on transactions, partnerships and alliances, a characterisation of CSC could be formulated for the marketplace situation. In this research, an attempt was made to integrate the formulation of CSC using both structural and qualitative elements. While SNA was used as the principal technique for identifying the structural elements of CSC, qualitative attributes of CSC were developed using CA of textual reports for selected firms to reinforce the structural SC measures developed from the SNA. The resulting SC measures, which comprise indices for market centrality, AC (measured as R&D activity), HC, INC and financial soundness are therefore seen as more robust than those developed purely on survey data (see Section 4.6).

The dependent variables for firm performance were ROI, MVA and TSR. The selection of firm performance measures balances traditional accounting measures (ROI) with a market-based measure (TSR) and MVA, which is somewhere in between. MVA used a modified TobQ measure (Chung & Pruitt, 1994) which was calculated from published data and has been shown to be less susceptible to manipulation than measures like market-to-book ratios. ROI and TSR were sourced from published financial sources.

The overall data collection and methodological approach is illustrated in Figure 3:

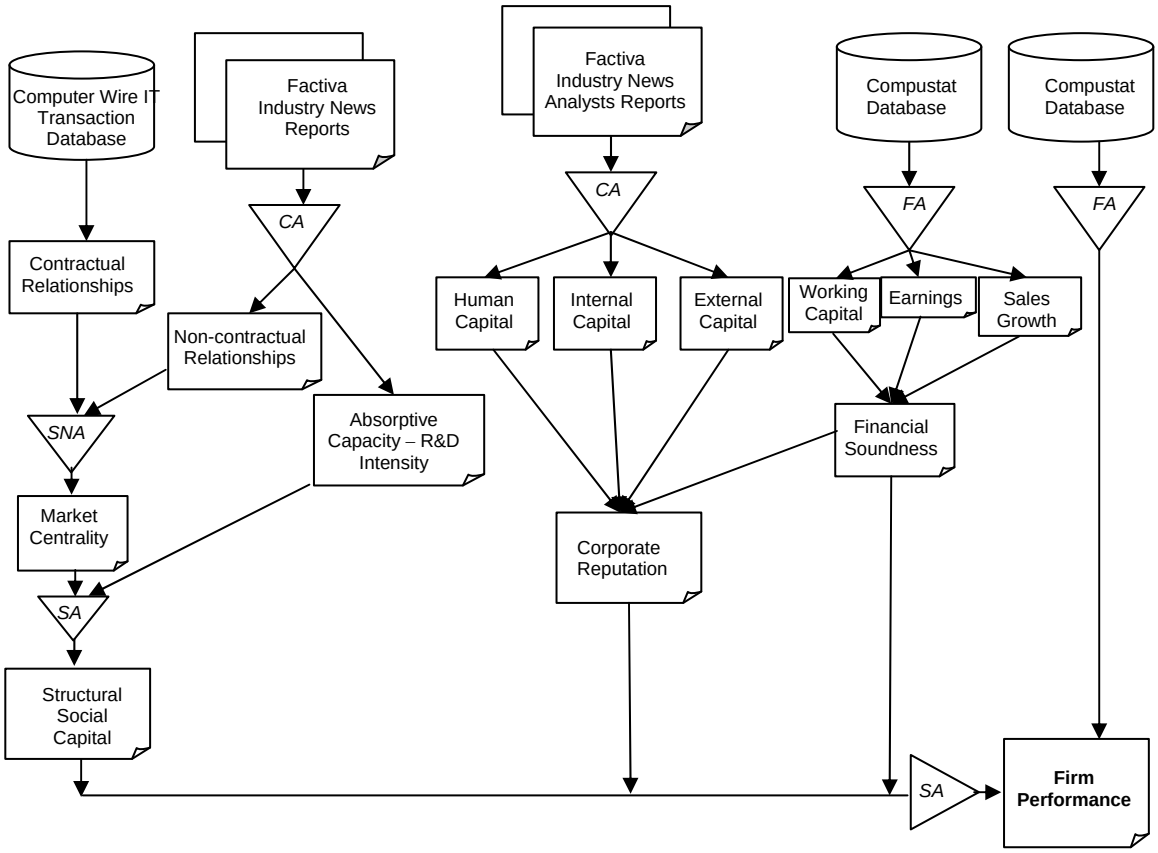

Figure 3 – Methodology Overview[4]

The mixed methodology illustrated here employs SNA, CA, financial analysis and multivariate statistical analysis methods and is explained in detail in Chapter 4.

1.5 Outline of the Thesis

This thesis is organised as follows:

- Chapter 1 introduces the research problem. It summarises the approach and results, providing a condensed overview of the project and a roadmap for how the problem is addressed through the succeeding chapters.

[4] SA = Statistical Analysis; FA = Financial Analysis

- Chapter 2 positions the research within the relevant literature. It builds a theoretical foundation and then traces the development of research issues leading to the main research problem being addressed.

- Chapter 3 details the research problems being addressed by the thesis and the hypotheses being proposed.

- Chapter 4 describes the methodology adopted. The methodology has been crafted from a number of sources. Its justification and implementation are described in detail.

- Chapter 5 documents the analysis of the data undertaken in testing the hypotheses identified.

- Chapter 6 presents the conclusions and implications for the research. Contributions to extended theory in the field are identified. Implications for the practical application of the results are also discussed. Finally, opportunities for future research are identified and discussed.

1.6 Limitations of Scope and Key Assumptions

The boundaries for this research specifically relate to the industry of focus and the level of analysis. The industry of focus is the global ITS sector. This industry has been chosen for a number of reasons. First, the sector contains firms which are largely intangible asset, or knowledge-based and therefore representative of a changing economy (Knoke, Yang, & Granados, 2002). The sector constitutes close to 20% of the S&P 500[5], so is therefore a significant sector in the world's economies. Second, there is a richness of information available about the sector, providing fertile ground from which to draw research data. Third, the author is familiar with the sector, having worked in it for most of his career.

[5] Based on the proportion of IT companies in the S&P 500.

The unit of analysis is 'the firm' within the marketplace. SC as a concept has relevance at the individual, firm or national level. This research focuses on the firm and its relationships with other firms in the marketplace. In focusing SC measures at the firm level, there is an implicit assumption about the nature of the firm as being made up of people who have social relationships with people in other firms. Collectively, these relationships represent the SC of the firm (Coleman, 1988).

Intangible market performance has been defined as the gap between market and book values (MVA) (Stewart, 1997; Sveiby, 1997). In taking this stance, there is an assumption that the use of intangibles in this way suggests that there are some unknowns, beyond current definitions of intangibles that impact market performance. Intuitively, one could identify a high market-to-book value with strong firm performance, especially if the performance is sustained over a long period of time. An alternate view of MVA is its use as an indicator of whether a firm or market is currently over- or under-valued (Smithers & Wright, 2000). That is, high MVA is only a temporary situation. This thesis makes the assumption that MVA is not just an indicator of a temporary situation, but a key firm performance indicator of future wealth.

ROI has been chosen as indicative of accounting performance measures. Alternate measures such as return on assets (ROA) and return on equity (ROE) and earnings margins were tested in pilot studies and found to be highly correlated to ROI for the sample used for this research. TSR was selected to represent the market performance of a firm. The assumption is made that TSR provides a better representation for the interests of the shareholder than simply using share price movements.

1.7 Conclusion

This introductory chapter lays the foundation for the thesis. The research problem has been identified and research questions stated. A justification for the research has been argued both from the perspective of generating theoretical knowledge and providing a contribution to emerging business practice. The methodology has been briefly described

and justified. Definitions, assumptions and scope limitations have been stated. On these foundations the thesis proceeds to the following chapters with a detailed description of the research conducted.