Understanding the Relationship Between the Supply Chain and Finance
Functions in Canadian Export Oriented Enterprises and Its Impact on Innovation
Consideration

By

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ABSTRACT

This thesis is an exploratory research effort designed to initiate the development of an explanatory model specifically associated with one component of the financial value chain of global supply chains. Canadian enterprises have not adopted, let alone considered, a newly emerging financial innovation that is accepted as a best practice; that of supply chain finance (SCF). SCF is a technology based cross-enterprise administrative process that is a subcomponent of trade finance.

The research explores this lack of consideration from the context of cross-enterprise, cross-functional and innovation consideration theories; grounded in a comparison of views from both the Supply Chain and the Finance functions towards upstream related supply chain and finance issues. Additionally, as SCF is not an established practice in Canada, a “proxy” line of inquiry, the “source to pay” process, is used to investigate the issue at hand.

As neither the SCF issue nor the cross-functional relationship in question have been investigated academically before, this research is well suited to exploratory research practices, and a three stage mixed methods research design was chosen. The first two stages involved in depth interviews with seven Canadian exporters to explore and refine various lines of inquiry within the context of the “source to pay” process. Subsequent to the first two stages, suggested hypotheses were formulated and a survey tool was designed and executed to provide preliminary evaluation and refinement of a proposed model.

The observations from all three stages have brought preliminary clarity to the practical nature of the relationship between the two functions related to upstream supply chain and finance issues. These observations have also provided suggestions related to cross-functional interface activities that financial institutions may find useful in the pursuit of financial process innovation opportunities within a supply chain. From an academic perspective the research has provided guidance to the development of a proposed explanatory model related to the consideration of SCF. As well, a number of insights for future consideration, particularly related to the application of innovation theory to financial process consideration, have been identified. Suggestions for future research activity related to cross-functional relationships are also provided.

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The thesis was rather unique in that it also included the active participation of my employer, Export Development Canada (EDC). EDC is in my opinion a “national asset” due to its well-earned reputation of transactional excellence and long standing commitment to its client base. However I was (and still am) of the opinion that it is an underleveraged asset that should explore where it can apply its competencies and potentials in new ways, and that message was heard at EDC by various members of the senior management group who endorsed the core idea of this thesis. A heartfelt thanks to Sherry Noble, Gilles Morin and Fergus Groundwater of EDC for providing the endorsement and support for this effort, which truly went beyond the normal boundaries

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1 Chapter 1 – Introduction

The key objective of this thesis is to provide greater clarity to the nature of the relationship (i.e. similarities and differences) between the Finance and the Supply Chain functions in Canadian export oriented enterprises, and the impact that relationship may have on the consideration of supplier focused, technology enabled upstream oriented cross-enterprise financial administrative processes. The genesis of this question arose out of the observed lack of consideration of supply chain related financial administrative processes by Canadian enterprises involved in global supply chains. Implementation of these processes is occurring elsewhere, either driven by foreign anchor entities in global supply chains, or led by government agencies; but not in Canada (Evans & Lamoureux, 2011). The thesis is an effort to identify what variables, and the definition of such, may have an impact on the acceleration of consideration of upstream supply chain finance administrative processes within cross-enterprise relationships. The anticipated benefit of adoption of such processes would be to lead to greater efficiency and effectiveness of the financial value chain with supply chain partners, and in turn improve the competitiveness of Canadian firms. This is the first time this particular functional relationship has been investigated so the research is clearly of an exploratory/discovery nature. The exploratory research itself consisted of three stages. Stages 1 and 2 used case study research methodology as the primary research tool, while Stage 3 was based on a survey tool.

A number of factors will evidence the success of this thesis effort. First, the ability to provide preliminary evidence either in support of or against the proposition that there is a

separation of interests between the Supply Chain and Finance functions in Canadian export oriented enterprises and more clearly define the nature of that separation if it exists. Second, to provide a preliminary indication of a model that can be considered for the evaluation of the capacity of Canadian exporters to consider the adoption of SCF, and finally to contribute to the evaluation and refinement of the theories, in the specific context of SCF, used to support this research.

1.1 Background

The thesis idea originated from the researcher's exposure from 2007 to 2009 to the international practices of foreign enterprises and government bodies in pursuing more efficient and effective utilization of financial value chains within supply chain partnerships, using a financial tool commonly referred to as supply chain finance (SCF) solutions, while supported by a cross-enterprise technology platform. SCF solutions represent a combination of technology solutions and financial services that closely connect global supply chain anchors, suppliers, financial institutions and frequently, technology service providers. They are designed to improve the effectiveness of financial supply chains by preventing detrimental cross-enterprise cost shifting and by improving the visibility, availability, delivery and cost of cash for all participants in a given supply chain (Evans & Lamoureux, 2011). By the very nature of SCF, both the Finance and Supply Chain (SC) functions within an enterprise, and their counterparts in their respective supply chain partners, have a role in considering, adopting and executing SCF solutions.

The thesis idea was further refined by the researcher's exposure to numerous Canadian enterprises from 2007 to 2011. During this period the researcher was active in interviewing over 200 Canadian exporter firms in various industries. The intent of these interviews was to determine if and how Canadian firms were engaging in upstream supply chain activities, and to identify the value propositions they perceived they were achieving currently or expected to achieve in future from such engagements. These interviews were held at all levels of the organizations, and multiple functional interests were represented. When both efforts were compared it became apparent that there appeared to be a significant separation of interests, and an apparent lack of integration between the two functions.

Specifically this separation is characterized by the following observations.

- The SC function is not closely integrated with the Finance function, and generally does not consider the Finance function a strategic partner in ensuring the enterprise's supply chain performance success.
- The Finance function is not closely integrated with the SC function, and generally does not consider the SC function a strategic partner in ensuring the enterprise's financial performance success.
- The SC and Finance functions have different perspectives regarding consideration of innovative technology integration efforts.

With these observations in mind, specific questions were then developed which grounded the structure of the research effort

1.2 Initial Questions

As will be more fully explained in Chapter 2 and 3, to be successful SCF, a new innovation to any firm, requires cross-functional and cross-enterprise interaction. It is with that broad approach that an initial review of academic supply chain and finance literature as well as trade literature related to supply chain activity led to the identification of the following themes as potentially pivotal in explaining the lack of consideration of SCF by Canadian enterprises.

- The degree and nature of cross-enterprise (boundary spanning) alignment of the interests of the respective functions.
- The degree and nature of cross-functional alignment within the enterprise.
- The degree and nature of alignment related to the consideration of innovations.

Additionally the academic literature review also revealed the following observations.

- There is a limited amount of academic literature related to a discussion of, or exploring the Finance function's role in supply chain activities.
- There is a limited amount of comment in the academic literature related to discussing or exploring the relationship between the SC and Finance functions in an enterprise.

- Generally, innovation literature is primarily associated with the adoption, not consideration of innovations. In the context of Supply Chain Management literature there is a substantive body of work on adoption (but not consideration) of process innovations associated with the SC function, whereas in finance literature there is a limited body of work on the adoption of innovations in the supply chain related to the Finance function.

The net result of these observations was the realization that the research effort would need to be exploratory/discovery in nature as there were no material precedents or previous research that could be replicated to address the core issues at hand. With those observations in mind, the following questions were initially established, based on the discussion to be presented in Chapter 3.

- Question 1 (Cross-enterprise): “What are the specific variables driven by the cross-enterprise context of the firm that would influence the consideration of SCF?”
- Question 2 (Organizational – cross-functional): “What are the specific variables in the nature of the relationships between the SC and Finance functions that would influence the consideration of SCF?”
- Question 3 (Innovation – organizational attributes): “What are the specific organizational variables that would distinguish enterprise leaders in the consideration of SCF?”

- Question 4 (Innovation – characteristics of the specific innovation): “What are the specific variables associated with technology innovations that the SC and Finance functions share, that would distinguish functional leaders in the consideration of SCF?”

As SCF is at a nascent stage as a practice in Canada and hence not readily observable, the subject must be addressed indirectly by using as a “proxy”, a process which involves a significant presence of both the Finance and SC functions and also requires interaction with suppliers. Consequently, the upstream process in question that formed the basis of the case study interview guide for Stage 1 and 2 was that of the “source to pay” process. This process will be discussed in more detail in Chapter 2. The specific example of the process that was cited to respondents was that of the Plan/Source/Enable factors of the Supply Chain Operations Reference (SCOR) Manual originated and published by the Supply Chain Council (www.supply-chain.org). The SCOR manual is the product of the Supply-Chain Council, which is a non-profit consortium of practitioners, technology suppliers, academics and government organizations. The methodology, diagnostic and benchmarking tools contained in the manual are intended to facilitate improvements to supply chain processes.

As a result, when it came time to discuss each of the four previously referenced questions directly with respondents in Stage 1 and 2, the phrase “...in consideration of SCF?” , would be replaced by “...in consideration of improvements to the cross-enterprise “source to pay” process?”.

1.3 Exploratory Research

A clear articulation of what exploratory research means in this thesis, and how it was conceived to contribute to explanation building is deemed appropriate. The nature of multi-method exploratory research (Wilkinson, 1999; Stevens 2002; Van Hoek et al., 2008; Leech & Onwuegbuzie, 2009; Yin, 2009) is that there needs to be an acceptance that the reason such research is being done, is to acquire increased precision and validity of use, around variables that are considered relevant to the question at hand. However when such research is executed in a context where no previous effort has been done, there is a lack of identification of what variables can or should apply, let alone a precision of definition associated with such variables. This type of research is very much like a journey where limitations and shortfalls will be uncovered as the research effort is pursued, and it may not bring full clarity to the issue even when the effort associated with the research design is completed. It will however clearly move the boundaries of discussion as to where future research should be focused on, that would not have been possible without such initial research. It is in the spirit of the forgoing understanding of exploratory research that this thesis effort was undertaken.

The research efforts to be described were directed at developing a proposed model that would be the first ever model to attempt to explain the propensity to consider SCF. In essence, explanation building associated with a specific operational supply chain activity that is SCF. This thesis was not intended to test a model in the classic sense of proving cause effect relationships generalizable to a population. This was an effort to take

variables that were initially considered to be relevant based on the domain knowledge of the researcher supported by several established theoretical streams associated with supply chain activity. Then evaluate and modify the variables based on the results of the various stages of the research design, with the ultimate objective of proposing a model that was focused on SCF, within the context of the Supply Chain/Finance functional relationship. In terms of structuring the discussion to follow, common terms in hypothesis testing such as independent variables and dependent variables are used. They should however be interpreted, particularly in the context of Stage 1 and 2, as ideas and relationships that are being qualitatively explored (i.e. they are lines of inquiry) to gain increasing confidence in the perceived validity of the proposed model. This effort ultimately leads to a final proposed model (Figure 5, Chapter 8) that is a step towards a model that could be empirically tested at a future date.

1.4 Original Contribution

This research will contribute in the following manner to academic research, policy initiatives and informed practitioner behavior.

- Academically the research is differentiated from previous research or supports previous research, in a number of ways:
 - Respond to a call in the academic literature for more cross-functional research in supply management practices (Mentzer, Dewitt, Keebler, Min, Nix, Smith & Zacharia, 2001)

- The research will take established theories and apply them in a previously unexamined context, that of the SC and Finance cross-functional relationship.
- As SCF is not an accepted practice, this research will focus on the pre adoption (i.e. consideration) of innovation (Olshavsky & Spreng, 1996; Frambach & Schillewaert, 2002), which is not usually a focus of innovation research.
- The functional relationship will be evaluated primarily in the context of innovation initiation and consideration, whereas most published research evaluates the relationships based on firm performance (e.g. profitability, sales growth, overall customer satisfaction) subsequent to adoption of the innovation (Ellinger, Taylor, & Daugherty, 1999; Ellinger, 2000 (a); Ellinger, Daugherty & Keller, 2000 (b)).
- Generally, within the literature reviewed, it was the perception of a single function that was collected as to how the relationship works between two functions (e.g. logistics view of the relationship with marketing). In a minority of cases (e.g. Ellinger et al., 2000 (b); van Hoek, Ellinger, & Johnson 2008; Ashenbaum, Maltz, Ellram & Barratt, 2009) the research design brought two functions within an enterprise into the respondent pool. It was the intention of this research to follow the latter approach for Stage 1 and 2.
- Most of the existing organizational and innovation research is associated with firms focused on domestic interactions (e.g. auto, food processing, retail).

This study will be focused on firms that export, which would be a first step to examining innovation consideration in a cross-national context as encouraged by Frambach & Schillewaert (2002).

- The research will also provide original segmentation based on the type of supply chain the respondent's firm represents, as well as an organizational stratification of respondents.
- The research will allow the application of established theoretical work related to intra and inter organizational behaviour, and innovation, to financial processes innovation; as well as having secondary application to Global Value Chain, Finance and Small and Medium sized enterprise (SME) literature streams.
- From a policy perspective, the application of SCF has attracted attention (Evans & Lamoureux, 2011), and as such, this research will contribute to a more informed opinion about the future relevancy of national structural initiatives that could facilitate credit availability, and cash flow efficiency/effectiveness issues.
- From an applied perspective, practitioners will acquire a clearer idea of the nature of the barriers to SCF, and the relevant variables that may favour its consideration. Both of which will have ancillary effects in defining such corporate efforts as enterprise marketing strategies, supplier relationship strategies, cash management behaviour, and competency development.
- From a cosponsored perspective, insights are provided as to the opportunities and challenges associated with the development and execution of such research where both an academic and a government institution are involved.

1.5 Research Plan

Subsequent to the review of the literature and the identification of the variables to be considered, the actual execution of the research involved in a mixed methods approach consisting of three exploratory stages. The case study method was chosen for Stages 1 and 2, grounded in the suggestions of Eisenhardt, 1989; Miles & Huberman, 1994; and Yin, 2003; while Stage 3 was framed as a survey instrument, evaluated by various statistical applications. This type of mixed methods approach, although not a dominant approach, is acquiring increasing support as a means to study complex issues (Leech & Onwuegbuzie, 2009; Yin, 2009) in many disciplines. Within the context of the supply chain literature, the mixed methods approach also continues to gain support. Van Hoek et al., (2008) notes that the vast majority of research associated with the alignment of supply chain related functions is primarily survey based, and that such efforts could be readily enhanced if combined in research designs that encouraged qualitative measures (e.g. in depth interviews, case studies) as well. The three stages are presented in more detail below.

- Stage 1 was an exploratory/discovery case study effort with three enterprises, based on face-to-face interviews. These interviews were directed at both the SC and Finance functions exploring various variables and lines of inquiry related to the four questions posed with the intent to evaluate their applicability with the two functions, as well as begin to define how these variables could be

operationalized in the Stage 2 draft survey instrument. A proposed model suggesting relationships and lines of inquiry was also developed.

- The observations and experiences garnered from Stage 1 were used to refine the variables/lines of inquiry that did receive support, and remove those variables/lines of inquiry from further consideration that were not supported. The remaining variables/lines of inquiry were then re-evaluated in Stage 2 with four enterprises, by face-to-face interviews directed at both the SC and Finance functions, using a draft survey as the prime tool for discussion during the interviews. At the end of Stage 2, further minor modifications were made to the previously proposed model resulting in a revised model incorporating suggested hypotheses. This revised model was then examined further in Stage 3.
- Stage 3 took the suggested hypotheses, and by means of various statistical analyses explored the nature of the relationships between the functions, and amongst the selected variables with the dependent variable. The statistical analysis (Wilkinson, 1999; Stevens 2002) in Stage 3 was used to bring greater clarity to operationalizations of variables, modification of hypotheses, and insights to survey structure. The intention and objective of the statistical analysis was not the testing of cause effect relationships.
- The data sets used were based on an Export Development Canada (EDC) current client and potential prospect lists, and third party lists associated with the light manufacturing and information technology sectors in Canada.

1.6 Organization of Thesis

A particular emphasis has been placed in this document on providing sufficient information explaining how the research protocol evolved from the theoretical and practical research that preceded the primary research, through the various iterations of the research protocol as the effort migrated through the three stages of the exploratory research design. Such an audit trail is considered a best practice in exploratory research (Miles & Huberman, 1994; Yin, 2003/2009). However, it can create somewhat of a challenge to the reader as it can complicate the ability to follow the flow of changes in definitions and terminology as the research project evolves. Several efforts to alleviate this challenge have been made. First, the Chapter/Appendices Map in Figure 1 is presented below.

Figure 1 – Chapter/Appendices Map

Figure 1 provides a basic break down of which Chapters are primarily a discussion of the issues; and those that are primarily dealing with data analysis and the associated Appendices related to these Chapters. Secondly, for reference purposes, Appendix 12 (Audit Trail) provides a chronological trail of how the complete discussion based on this research effort evolved starting with the original constructs to the final hypotheses. Finally, comments will be made when beneficial at the end of each Chapter to advise the reader that certain observations will be changing in the next Chapter(s), in order to build in the expectation of these changes.

An additional reason for this audit trail, independent of supporting the basic tenet of replicability of research, is that in the researcher's view there is a high probability that further research may be undertaken by EDC to continue to expand on the findings of this research. Consequently, the more clarity provided in the audit trail, the more efficient and effective similar future efforts by EDC would be.

The thesis is organized into nine Chapters. Chapter 1 has provided the foundation rationale for this research project as well as a brief overview of the research plan. Chapter 2 provides a review of literature to explain the relevancy of the financial value chain within the context of global supply chain literature. This is followed by a discussion of both the definition of as well as the practical application of SCF to date, in order to place the concept within the broader context of global supply chains thereby further justifying the relevancy of the research in question. Chapter 3 explores the academic literature related to supply chain cross-enterprise and cross-functional integration; and the impact

of organizational variables and the specific characteristics of the innovation on the consideration of such, on the innovation in question. The constructs to be explored in the Stage 1 of the effort are also identified. This is the initial step in developing a proposed explanation, to address the questions previously posed. Chapter 4 then discusses the variables, grounded in the previously identified constructs, arriving at suggested lines of inquiry that shaped the development of the discussion guide used for Stage 1 of the research effort. Chapter 4 concludes with a discussion related to the definition of the proposed dependent variable, and finally presents the proposed model that grounded the Stage 1 of the research effort. Chapter 5 will discuss the specifics of the research design and methodology, with a particular emphasis on the rationale for the choice of the case study method as the primary research tool for this thesis, as well as a discussion of the key mechanisms used to enhance the reliability and rigor of the case study portion of the research effort.

Chapters 6, 7 and 8 provide the results of the study. Chapter 6 discusses observations from the individual cases studies from Stage 1, how those observations affected the choice of variables to be retained for Stage 2, how this choice of variables resulted in modifications to the proposed model, and how the lessons learned from Stage 1 also influenced the Stage 2 interviews. Additionally, Chapter 6 discusses observations from Stage 2 individual cases studies, which provided further refinements to the effort, particularly around the specific content and structure of the survey developed for Stage 3 of the research effort. Chapter 7 provides an exploratory analysis of the respondent sample using descriptive statistics, functional group differences using Manova analysis,

and the association of the independent variables in the research model to the dependent variable using correlation, factor and multiple regression statistical analyses. Chapter 8 provides a discussion of the key observations pursuant to each line of inquiry, the application of the results from the perspective of a financial institution's support of SCF, provides further refinements to the model and suggests future research efforts directly linked to the current effort. Chapter 9 summarizes the more significant contributions of this effort to academic research, provides a discussion of suggested limitations and shortfalls of this exploratory research effort, and itemizes a number of research opportunities inferred from the current research. Chapter 9 concludes with a general evaluation of the success of the research as it relates to the original expectations of the research as provided in Chapter 1.

Support related to branding and resources was provided by EDC during the 2010 - 2012 period. This support entailed the use of the EDC brand in all three Stages, as well as provision of assistance in the actual execution of the survey tool. In balance, this arrangement was a net positive particularly for Stage 1 and 2, but in the case of Stage 3, certain challenges occurred in the actual survey process, that created less than optimal execution. Based on these challenges, a brief discussion around partnering with Crown corporations related to exploratory research will be discussed further in Chapter 9.

Chapter 2 will now discuss SCF's relevancy in relation to supply chain activities and provide a definition of it. Also, as SCF cannot be observed in Canada as it has not yet

being accepted, the “proxy” for SCF which shares many of the SCF attributes and which will be used in the initial stages of the research, will be discussed.

2 Chapter 2 – Research Relevancy

The association of the financial value chain to supply chain activities does not appear to have been explored extensively in the academic literature. This Chapter provides a review of literature to explain the relevancy of the financial value chain within the context of global supply chain literature. This is followed by a discussion of both the definition of, as well as the practical application of SCF to date, in order to place the concept within the broader context of global supply chains thereby further justifying the relevancy of the research in question. Finally, the Chapter will discuss in more detail the “source to pay” proxy that was used for the purposes of discussion with the firms that participated in the case studies in Stage 1 and 2.

2.1 Relevancy/Motivation

From an academic perspective, supply chain (SC) literature evidences three value chains within global supply chains (i.e. goods, information and finance) (Mentzer et al., 2001; Mentzer et al., 2008; Pfohl & Gomm, 2009). However the vast majority of the literature related to SC's, is associated with the goods and information value chains where there is clearly a large amount of dialogue. However, there is a relative absence of discussion regarding how the financial value chain (e.g. financial information and cash cycle) could affect competitive sustainable advantage through value enhancement to the supply chain. It is suggested that this absence may be because Finance is not perceived as a direct contributor to the “sourcing > production > marketing” continuum, or a major contributor to the supplier or customer experience. Lambert (2008) supports a similar view in that in

understanding business enterprises it is necessary to define the “object of value” that the enterprise offers customers. If some aspect of the business (e.g. Finance) does not directly contribute to the value proposition it will be of a secondary or tactical interest to the firm (Nieto & Santamaria, 2010). Or, as Sargent (referenced in Gomm, 2010) notes “... the financial aspects of Supply Chain Management are mostly left to corporate finance and accounting, which ‘thinks’ in terms of single companies ...rather than supply chains”. Whatever rationale is used there does seem to be a consensus (for those in Supply Chain Management (SCM) who have discussed it) that Finance is a necessary, but not a primary function when compared to more strategic functions (e.g. production, product development, supplier relations, sales and marketing). Therefore, is the financial value chain truly of strategic value to the firms involved in collaborative supply chain activities?

There are however increasing suggestions and initial research identified in the academic literature (Farris & Hutchison, 2002; Spathis, 2006; Dehning, Richardson & Zmud, 2007; Blankley, 2008; Milberg, 2008; Terpend, Tyler, Krause & Handfield, 2008; Vitasek & Bhimani, 2009; Sanders & Wagner, 2011), which support investigating the financial value chain as a worthwhile research stream. Ellinger, Natarjarathinam, Adams, Gray, Hofman & O’Marah (2011) clearly observe that the impact of SC activities on cash flow performance has received minimal coverage, but in their 2011 research they actively relate it to a firm’s overall financial performance derived from superior SC activities.

SCM has been defined by Mentzer et al., (2001) as;

“...the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long term performance of the individual companies and the supply chain as a whole. (p. 18)”.

Mentzer et al., (2001) clearly identifies Finance as one of the functions upon which “inter-functional coordination” is required in order to meet the objective of long term performance of the supply chain, and in part, this will be done by means of the integration of processes across functions and enterprises. The basic premise of this thesis is that Supply Chain Finance (SCF) is one such process. The proposed research is intended to explore this line of thinking as well as accelerate the importance/relevance of such research.

The relevance of the research is further supported by practical adoption of SCF (Aberdeen, 2007; Demica, 2010/2011) outside of Canada. There is sufficient evidence documented by EDC that SCF has captured the attention of various stakeholders such as enterprises (e.g. WalMart, Nike, Kraft, Boeing), financial institutions (e.g. Hong Kong Shanghai Bank, Citibank, Wells Fargo), governments (e.g. Mexico (Nafinsa), USA (US Ex-Im Bank), Brazil (Petrobras)) and third party service providers (e.g. Global Supply Chain Finance www.gscf.com, Prime Revenue). SCF has been implemented, is being

implemented or is being considered for implementation by the entities previously identified.

Of equal relevance is that when academic financial literature is reviewed there is limited evidence of SCF or financial value chains being recognized as an issue (Tufano, 2003). One has to stretch to find references to it, principally in cash management journals (Camerinelli, 2009; San Jose, Iturralde & Maseda, 2008; Fellenz, Augustenborg, Brady, & Greene, 2009; Randall & Farris II, 2009), and survey research related to it appears to be nonexistent in Finance A and B journals (Kent & Mukherjee, 2007). Equally revealing is the fact that there has been limited empirical work (Frame & White, 2004) done on financial innovations that can be characterized as SCF related such as with new “financial production processes (e.g. electronic record keeping)” or “new organizational forms (e.g. internet only banks)”.

Therefore, this research effort is intended to be an initial step to encourage convergence of SC and Finance academic literature in a limited way, hopefully raise the profile of SCF as an innovation in both literature streams, and as well, explore a Canadian gap in contemporary global business practices.

2.2 What is Supply Chain Finance?

Traditional practice in trade finance is for suppliers or buyers to use some leverage tool (e.g. credit rating, frequency of purchases, volume of purchases, exclusivity) that is unique to their firm to obtain financial terms that are beneficial to themselves. The net

result is that the purchasing partner tries to acquire a cost of capital advantage by extending its account payable turnover, while the selling partner to the transaction tries to acquire a cost of capital advantage by reducing its account receivable turnover. Essentially both parties are working at cross purposes. This thesis originated from the observation that Canadian firms were not aware of, nor considering the adoption of innovative technology based trade finance practices, commonly referred to as SCF that overcomes this “working at cross purposes”.

The thesis proposal revolves around the lack of consideration of technology enabled (SCF) practices in Canada. For the purpose of the thesis SCF can be broadly interpreted to encompass any technology enabled financing solution that supports the buyer/supplier relationship in a supply chain. More specifically SCF:

- Provides liquidity and short-term credit facilities (e.g. reverse factoring, vendor managed inventory, pre purchase order financing) that actively leverage buyer/supplier relationships (Dyckman, 2009).
- Allows buyers and suppliers to operate a lean and agile working capital program providing flexibility and adaptability (Farris & Hutchison, 2002), while reducing overall operating costs in the supply chain.
- SCF is a supply chain centric solution, as opposed to an enterprise centric solution (Camerinelli, 2008).
- Involves the automation of data exchanges and business processes amongst buyers, suppliers and financial service providers to enable the automation of the

funding and risk management decisions and activities based on event-based triggers (e.g. purchase order creation, delivery confirmations, invoice acceptance).

- Secondary benefits that have been identified with SCF (Aberdeen, 2007/2011; Demica, 2011) are lower unit costs of procured goods, less risky supplier base, improved business continuity, enabling suppliers to keep pace with buyer's growth, greater internal alignment of SC and Finance functions, etc.

The forgoing primary attributes of SCF clearly fall into what would normally be considered cash management (i.e. short term activities) as opposed to corporate finance (i.e. long term activities). The specific form of SCF, which anchored this study and which was used for illustrative purposes with participants in Stages 1 and 2 was that of “reverse factoring”. Reverse factoring occurs when the buyer’s credit rating is used to enhance the supply chain liquidity (i.e. shorter accounts receivable for the supplier and longer accounts payable for the buyer (Farris & Hutchison, 2002)). For reference purposes a visual flow and description of events associated with reverse factoring is provided in Appendix 1.

2.3 SCF Proxy

As noted in Chapter 1, SCF is a nascent practice in Canada, and therefore cannot be directly observed given the proposed sample considered for this research (i.e. light manufacturing and information technology firms). Therefore, the propensity to consider such a practice was addressed using a proxy process, “source to pay”. This process is

quite transparent in firms and has many of the characteristics that SCF has, such as being a process that requires active interaction with suppliers and one that involves, or should involve, significant participation of both the Finance and the SC functions in the execution of the process. The precise nature of this participation has yet to be explored, and as identified in Chapter 1, there is an underlying assumption that the functions responsible for the events and processes associated with a source to pay process are more separate than they are joined or co-mingled. An illustrative example of such a process is provided in Table 1 below:

Table 1 – Events and Processes (Buyer’s Perspective) of a Source to Pay Process

a.	Identify suitable suppliers
b.	Evaluate suppliers and select approved suppliers
c.	Place order, and identify successful supplier
d.	Negotiate purchase terms with supplier
e.	Request approval of purchase order internally
f.	Send purchase order to supplier
g.	Supplier acknowledges it has received purchase order
h.	Supplier sends notification the goods have been shipped
i.	Receipt of the goods
j.	Supplier advised that the goods have been received
k.	Invoice received
l.	Purchase order matched to invoice and reconciled to goods received
m.	Supplier advised that the invoice has been accepted
n.	Payment processed
o.	Payment sent

The specific categories of the process are based principally on the Enable/ Plan/Source factors of the Supply Chain Operations Reference (SCOR) framework (Version 9.0) originated by the Supply Chain Council (www.supply-chain.org). The assumption for Stage 1 purposes was that the variables that contribute to technology consideration within

the source to pay processes that have cross-functional/ cross-enterprise applicability would also have application to SCF consideration.

Chapter 3 provides a discussion around the three categories of theory that were examined for relevancy to this research effort, addresses the strategic value of SCF, and identifies the constructs from each stream that formed the basis of discussion of variables in Chapter 4 and the subsequent discussion guide used for Stage 1 of the research effort

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3 Chapter 3 – Theoretical Grounding

Pursuant to Yin (2003/2009), exploratory research needs to be grounded in theory to the extent possible. This grounding is the initial stage of an iterative process in identifying and validating the application of the theories chosen, to the context of the issue at hand, followed by developing the constructs and variables of a proposed explanatory model. Three broad theory streams were considered applicable for initial consideration regarding the research question based on the three core characteristics of SCF. First, as SCF is dependent on cross-enterprise interaction, cross-enterprise theory was relevant. Secondly, SCF is dependent on the cross-functional relationships of both the SC and Finance functions as they both have roles in the implementation of such a process, therefore cross-functional organizational behaviour theory is relevant. Finally, as SCF will be a new process to enterprises within a supply chain, it is therefore an innovation. As such, innovation theory is relevant to the issue at hand.

The specific choice of the academic literature reviewed, was also determined in large part by a clearly identifiable part of the content of such literature being associated with traditional supply chain activities to the extent possible, principally associated with the goods and information value chains. The scope of the academic literature review did not extend to other aspects of cross-enterprise literature such as that associated with shared product development or R and D efforts.

Each of the theories streams is discussed below, and evaluated by the researcher as to their application with the very specific lens of the SCF operational process in mind. It

was also through the same lens that the constructs identified for further consideration at the end of each discussion, were chosen. Each of these constructs is further elaborated on in Chapter 4 in the context of the independent variable discussion. At the end of the each discussion in this Chapter a core question is posed, which provided broad direction to the development of the discussion guide in Stage 1.

3.1 Cross-enterprise Theory – Strategic/Environment Alignment

It has been suggested that the effectiveness of an external integrative activity (such as SCF) can be measured by the degree to which the external integration activity in question is related to the attainment of a firm's strategic drivers and objectives (Groves & Valsamakis, 1998; Vargas, Cardenas & Matarranz, 2000). By implication, it is inferred that a clear cross-functional alignment regarding the strategic values that define upstream partner relationships will ultimately bode well for active innovation consideration of technology applications that cross organizational boundaries. In the context of SCF then, the initial question is whether SCF can be considered a strategic driver/objective of a firm to achieve sustainable competitive advantage, and if so, could there be active consideration of such an innovation because it is viewed as a strategic driver. As already noted in Chapter 2, there is limited discussion in the literature as to the strategic value of the financial value chain in supply chain activities. Consequently this lack of clarity was an opportunity in its own right to consider strategic alignment questions. If it can be supported both by theory and evidence that the financial value chain is strategic, using SCF as an illustrative example of the financial value chain, then such a conclusion would

enhance the future and proactive consideration of SCF. In order to explore the suggested positioning of SCF (i.e. can it be considered strategic or not) it was deemed necessary to review a number of cross-enterprise theoretical explanations as to the “why’s, what’s and how’s” of the drivers that could lead to such cross-enterprise strategic integration.

Within supply chain literature the Transaction Cost Economics, Resource Based and Strategic Network theories appear to be the more frequently applied theories, and as such were the first ones reviewed. As will shortly be discussed, the review of these theories did not appear to provide strong support for the “strategic” perception of SCF. Therefore, in the interests of trying to be relatively comprehensive in dealing with this “strategic” question, the review was extended to Resource Dependency, Institutionalization and Contingency theories, which are less frequently used in supply chain literature, to discern if there was a strongly supported rationale in one of these theories. Once again, the same conclusion was reached in regards to these theories. Therefore, for the purposes of the research design and execution, it became far more focused on the operational reality of SCF as a process, rather than as a process of strategic value. The discussion to follow will take each of the six theories, highlight core concepts associated with each, place those concepts in a supply chain context based on the domain experience of the researcher, and then provide a suggested positioning statement for SCF within the context of each these theories. This will then be followed by a review of literature associated with the operational linkages that integrate cross-enterprise efforts, to provide a rationale for the constructs chosen for consideration.

3.1.1 Transaction Cost Economics

The basic constructs of the theory (Dyer, 1997; Williamson, 1988/2002; Mayer & Salomon, 2006) are associated with the view that the unit of analysis is the transaction (i.e. an economic exchange). By identifying and understanding the critical dimensions of the transaction costs, and the minimization of such associated with the economic exchange, a firm would be able to identify the appropriate organizational response (i.e. governance structure: market, hybrid or hierarchy) to the transaction in question. The critical dimensions that Williamson (1988, 1991) identified were the degree of uncertainty associated with such transactions (due in part to bounded rationality, imperfect information) and the type of asset specificity associated with the transaction.

Williamson (2002) referred to “uncertainty” as the central problem of any organization (i.e. how to deal with an unknown future). His definition of uncertainty is anchored in the assumption of opportunism, where opportunistic activity is a clear choice by one or another enterprise. Williamson (1988) defined asset specificity as the degree to which an asset can be redeployed to alternative uses and by alternative users without sacrifice of productive value. The greater the asset specificity (and its associated investment) the more the supplier and buyer are locked into a transaction that has limited or no value outside the transaction. Williamson (2002) also identified several types of asset specificity such as, specialized physical assets, site specificity, and human specificity. The importance of asset specificity is that it creates dependency/interdependency (Williamson, 2002) between two parties and by consequence invokes uncertainty

associated with the exchange hazards of appropriability and observability. The resulting perception of increasing risks creates increasing costs to mitigate such risks and the mitigation of such is operationalized in different governance structures. In summary then, TCE assumes opportunistic behaviour amongst partners that will be exhibited in unnecessary production and transaction costs and as such firms will define their boundaries and asset specificity in order to contain those costs (Barringer & Harrison, 2000; Johnson, Klassen, Leenders & Awaysheh, 2007) by choosing a hierarchical organizational response rather than a market based organizational response.

The reality of a SCF application based on a technology platform is that the transactions amongst partners are transparent, it is market based as it only works in a cross-enterprise environment, and as the actions are driven by well-established almost standardized practices, the concept of asset specificity as defined by TCE does not apply. Therefore the chances of opportunistic behaviour are limited, and as has been observed in practice (i.e. Mexico¹) the penalty for such opportunism could easily be exacted (i.e. removal from the platform).

In a more practical example that can be related to SCF, Howorth & Westhead (2003) provide the TCE view by stating that systems will be adopted where the benefit is perceived to exceed the cost, and firms will invest resources where they expect to achieve the greatest marginal returns. Their perception is that the marginal return on investments

¹ Nafinsa (Cadenas Productivas) platform, www.nafin.com (EDC 2006 research)

in resources in any area of working capital (e.g. SCF) will be less than other potential uses and thus firms will show little interest in investing in innovation in working capital.

Fundamentally, TCE does not seem to apply to SCF applications as a strategic driver as SCF limits the probability that opportunistic behavior will occur amongst partners using SCF, asset specificity is very low, and the benefit of SCF rests in the creation of improved marginal returns for all partners, not just one partner.

3.1.2 Resource Based View (RBV)

The core question that RBV asks, is how can a firm maximize its value? RBV's (Barney, 1991/2001) response to this question is essentially an argument for the creation of enterprise centric characteristics that will in turn provide a unique and sustainable competitive advantage to the enterprise in question. Once those characteristics have been identified and acquired, either through internal development or external acquisition, enterprise behavior will be shaped by the accumulated pool of such competencies/capabilities (Barney, 1991). The lasting competitive advantage is based on the assumption that the competencies acquired are path dependent (specific to the enterprise's activities over time). Barney identifies five characteristics of these competencies: 1) they improve the efficiency/effectiveness of the firm, 2) the competency is rare and provides a competitive advantage, 3) the competency must be difficult to replicate, 4) the competency must not be mobile, and 5) the competency must not be easily substitutable.

At initial adoption, SCF would fit items 1 and 2, but would probably be considered more of a “process” competency, rather than a “capability” competency. As time elapses and experience is gained with SCF the “process” competency, which is a cross-enterprise competency, could migrate to a sustainable “capability” competency for the partnership (Barratt, 2007) (e.g. the partners find an unintended use for the data being generated to support SCF). So item 3 is conceptually possible at a later date; yet SCF is easily replicable, and if other competitor partnerships did implement SCF as well, the value of item 2 would diminish rapidly. Additionally, as the nature of SCF is cross-enterprise, it implies mobility of application amongst new supply chain partners. It is also substitutable as there are other alternatives to SCF, most of which are currently in practice. This therefore infers that SCF would never meet the conditions of items 4 and 5, and consequently could not be considered a strategic driver.

In fact the ultimate success is that SCF as a tool will become ubiquitous; it will become a common resource (similar to letters of credit) therefore negating its rareness, and by implication negate any strategic competitive advantage. However, the advantage of RBV is that it implies a proactive approach at the enterprise level, rather than a reactive approach, and as there clearly is a perception of a temporary advantage to the adoption and practice of SCF, it may provide a partial explanation as to why firms might take an active look at SCF.

3.1.3 Strategic Network (SN)

SN (Jarillo, 1988; Barringer, 1997; Dyer, 1998) addresses essentially the same question as RBV: how can a firm maximize its value? The answer provided by SN is that it may only be able to do that by working collaboratively with other firms in a network. SN's core assumptions are that the natural capacity of firms to compete with each other can also accommodate collaborative behavior amongst firms, and in fact they can be complementary (Jarillo, 1998); and by doing so the firm can reap all the benefits of specialization, by farming out non-essential activities to other firms.

Fundamentally, this means that a firm chooses this collaborative approach in order to increase competitiveness or market power beyond its own capacity, which in turn drives value creation. Generally, there are four categories of end benefits: 1) increase market power through the erection of entry barriers, 2) increase political power, 3) increase efficiency in production, research, marketing etc., and 4) create product or service production (Barringer, 1997). It is an argument that the full maximization of enterprise value creation can only be derived through partnerships with suppliers and customers that generally allow for "specialization of activities", which in turn leads to the minimization of transaction costs amongst the participating firms. Examples of such activity are contract manufacturing, new product development, vendor managed inventory, etc. This value enhancing and transaction cost reduction logic is in many cases the corner stone rationales for many supply chain partnerships.

The more specific nature of the relationships that lead to these end benefits have specific characteristics that have been identified by Dyer (1998). The relevant ones related to SCF are: a) investments in relation specific assets b) substantial knowledge exchange and c) combining complementary but scarce, resources or capabilities. The reality of SCF however is that no relation specific assets are created, it is information that is being exchanged rather than knowledge, and the resources to manage SCF are not scarce as they already exist in existing cash management processes. Also, the value creation provided by SCF rests on the sharing of a “mutual” process that is indivisible from the relationship; therefore, it does not represent a specialization. Additionally, and as explained previously in the RBV discussion, the process is replicable by competitor networks, thus inferring limited value as a competitive advantage.

The one aspect of SN that might apply to SCF, and is somewhat divergent from the specialization line of thinking is that the network can share in benefits through leveraging one partner’s resource endowment (Dyer, 1998). This fits SCF well as one could interpret the use of the credit rating of an anchor firm in a network as a resource endowment, and as explained previously in Chapter 2, when the benefits of SCF were described, all parties can benefit by maximizing the utilization of such a credit rating. However, recognition of this opportunity has very limited exposure in academic literature, Fellenz et al., (2009) being an exception.

In summary, as SCF is fundamentally based on partner cooperation it easily fits into the conceptual framework of SN, particularly in regards to item 3 above (i.e. efficiency).

However, it does not have any of the more granular characteristics that appear to distinguish those actions that would be considered to provide the value enhancing competitive advantages that SN is expected to provide. Therefore, although there is some logic within SN for SCF to be a strategic driver, it is more a conceptualization of what could be, as opposed to other activities that are more readily and currently recognized as strategic drivers.

3.1.4 Resources Dependence (RD)

Resource Dependence (RD) (Pfeffer & Salancik, 1978; Barringer, 1997; Hillman, Withers & Collins, 2009) is essentially an argument that explains the need for organizations to engage in inter-organizational linkages (e.g. joint ventures, corporate boards, alliances) as a means to reduce or manage dependency/uncertainty associated with issues/resources that are considered to represent the vital interests of an organization. This is necessary, as a firm's success is contingent on events in the environment, and by orchestrating these linkages with other firms, the organization has the opportunity to exercise power, which they could not do without such linkages. The capacity to exercise power in these linkages is central to RD. The result of such action is a mitigation of the dependency risk that had been identified as a concern, which in turn reinforces or enhances the firm's competitive position.

More specifically organizations will enter into exchanges with other firms to 1) acquire control over critical resources in an effort to decrease dependence on other organizations and 2) acquire control over resources that increase the dependence of other organizations

(Barringer & Harrison, 2000). Firms become embedded in these webs of exchange relationships, to protect them from uncertain environments (Crook & Combs, 2007), and within these webs, which firm has power is dependent on which organization the resource is truly important to, and if the control is concentrated (i.e. enterprise specific). Two further characteristics impact the nature of the dependency as well: magnitude and criticality (Crook & Coombs, 2007). A resource is important via magnitude when firms lack other sustaining activities (i.e. substitutability) should access to the resource be severed. Criticality is defined by a firm's ability to operate without the resource. Given the forgoing, it is possible to imagine where SCF could acquire characteristics in future that would fit or approach RD parameters.

If in a financial crisis situation, access to cash liquidity became critical to the ongoing viability of a supply chain, and by consequence to the competitive sustainability of the anchor firm in that supply chain, an uncertainty would have been created. In response, a SCF platform created by the anchor firm (i.e. the firm with the power) would be ideally suited to using the financial resources of the supply chain system to sustain itself in the absence of the normal financial intermediaries. This would clearly respond to managing an uncertainty through inter-organizational linkages. Additionally, if one were to look at SCF from the perspective of the key buyer that anchors a SCF platform (refer to Appendix 1), it can be argued that SCF is one tool by which that buyer can encourage loyalty to the supply chain that supports the anchor firm's strategic interests. By doing so, the buyer has mitigated the uncertainty of disruption to its supply chain relationships. However, usually the immediate benefit of SCF, as opposed to the disruption risk

uncertainty or supplier loyalty just mentioned, is clearly more the efficiency and effectiveness of cash management, not the removal of an uncertainty. Rationalizing SCF as a response to an uncertainty in this case would only come when the buyer has reached a level of sophistication with the use of SCF and discovered its unintended consequences (e.g. loyalty of suppliers).

Unquestionably, “cash liquidity” clearly meets the test of magnitude and criticality, but SCF in the context of this thesis is not cash liquidity, but rather a technology grounded process related to cash management practices. The reality is that cash management practices are not an uncertainty in most enterprises. Fundamentally, it is an enterprise’s “process” resource already, and there are a multitude of processes that deliver cash to an enterprise. Consequently, SCF in the current economic and business environment, does not fit well into the RD parameters

3.1.5 Contingency

The underlying assumption of contingency theory (Donaldson, 2001; Fredericks, 2005) is that an organization’s operational performance and survivability is a function of the “fit” or “misfit” amongst the strategy the firm chooses to pursue (e.g. cost leadership versus product innovation), the business environment they are operating in (e.g. industry prefers on time delivery to flexible delivery) and the organizational structure (e.g. manufacturing integrated with sales (O’Leary-Kelly & Flores, 2002)). It also presumes that an organization and the management of such have the capacity to respond to environmental dynamics and by doing so the strategy and structure can be firm specific. From an

organizational perspective, these responses can be viewed to extend along a mechanistic/organic continuum. Mechanistic generally referring to organizational structures that favor standardized, simple and stable activity (i.e. low uncertainty) or organic, which refers to organizational structures that can respond to complex and quickly changing demands (i.e. high uncertainty) (Morgan, 1997). Fundamentally, the essence of contingency theory is that each firm, specific to their own situation, must establish a level of flexibility to respond to their environment. The discussion is usually associated with an issue perceived to be of significant value to the competitive position of the enterprise associated with the goods and information value chains. As such, flexibility in a supply chain context would normally be associated with such things as the ability to quickly change suppliers, have production respond rapidly to new demand conditions, or have marketing quickly respond to changes in price point strategies or new customer acquisition activities.

Therefore, given that the theory suggests that the level of uncertainty drives the level and degree of flexibility required, how does SCF fit into this dynamic? There is no question that an established SCF program provides flexibility as to when cash can be realized, due to the capacity to discount accounts receivables at any time. This appears to be a strong argument, except that there are easier ways to acquire cash at the enterprise level that gives the firm equivalent flexibility. For instance, just build up cash reserves. As a real life example, the recent global financial crisis could be used as the environmental contingency (i.e. responding to uncertainty with the financial system having sufficient liquidity) that led Canadian corporations to build up cash reserves which in turn has

provided them financial flexibility. In some ways an “organic” response, rather than a mechanistic response, such as setting up a SCF platform could be perceived to be.

Given the preceding example of actual Canadian firm behaviour, it would therefore seem unlikely that cross-enterprise cash management practices such as SCF would be perceived of sufficient strategic importance to be a response to operational uncertainty in a supply chain environment. Having noted that however, there are numerous, “existing examples” of SCF (WalMart, Nafinsa, Boeing, Lowe’s) in global supply chains, and observations that SCF adoption is considered to be leading or best practice behavior (Aberdeen, 2007; Randall & Farris II, 2009). This raises the question (in the context of this theory) as to what the “contingency” was, that led these firms to adopt such practices? In pursuit of such a question, if the contingency could be derived, it would be useful to find examples of firms where the same “contingency” was present, but not of a sufficient enough uncertainty to force a “fit” such that SCF was adopted. Then it would truly possible to define the “contingency” and understand whether it was a strategic driver or just an operational efficiency exercise.

Therefore, although SCF does respond to the “flexibility” argument of contingency theory, practice has shown that there are easier ways at the enterprise level to achieve acceptable “cash” flexibility. Consequently, in the Canadian context contingency theory does not currently appear to provide an argument for SCF as a strategic driver.

3.1.6 Institutionalization

Institutionalization (DiMaggio & Powell, 1983; Scott, 2001; Teo, Wei, & Benbasa, 2003) explains the structure of institutions, by placing the emphasis on identifying the pressures on organizations/individuals from the environment, such as conventions, routines and norms. Institutionalization theory is applied in many venues, from political science to sociology, and at many levels from individual processes to population level structures. For this discussion, the focus will be at the enterprise level. Generally when it comes to organizations the theory leans to how the organizations came to be what they are; as Scott (2001) notes the principal thrust of institutional theory is to account for "...continuity and constraint...". And when "continuity" does come under pressure for change, the theory looks at it as an extended process of change in an environment of relative stability, leading to what is referred to as organizational isomorphism. That is, as change occurs the processes that are creating that change are in fact making organizations more similar. The three core pressures (DiMaggio & Powell, 1983) that do drive such change are described as mimetic, coercive and normative pressures derived from the environment in which the organization operates.

Mimetic pressures refer to a prevalent/dominant practice in a given industry setting, and the apparent/perceived success that practice has had. The basic assumption is that organizations will be inclined to imitate/adopt these practices driven by a motivator such as the desire to avoid experimentation costs or risks borne by first movers in technology (Teo et al., 2003). In the context of SCF such circumstances could be illustrated by firms

who actively pay attention to their supply chain environment and decide to model their activities based on successful practices elsewhere (e.g. cross-enterprise sharing of point of sale data). The second category, that of coercive pressures, refers to formal or informal pressures exerted on organizations by other organizations upon which they are dependent. Teo et al., (2003) suggests that such pressures can originate from many sources, such as regulatory bodies or parent companies. EDC's own experience with SCF in observing the implementation of a SCF platform in Mexico, clearly evidenced Mexican government coercion/persuasion of firms to join the platform. In the case of the Mexican illustration, the motivation to agree to the pressure was the desire to remain an approved supplier to the Mexican government. The third category, normative pressures, refers to the direct or indirect ties that one organization has with another, where the latter has already adopted a practice and the former organization has been able to inform itself of the practice sufficiently enough to decide it would also like to adopt the same practice. In a supply chain context for instance if a major anchor name (e.g. WalMart) has adopted SCF with a limited number of suppliers, other suppliers in the same supply chain will become aware of this practice, evaluate it in their own context, and assuming a favourable evaluation, also decide to adopt the practice.

Given the forgoing, and in the context of SCF and the absence of coercive pressures, institutionalization is essentially an argument that the majority of firms will consider/adopt new practices but in effect only those practices that have become established as best practices or mainstream practices, after successful implementation by "first mover" leaders. Teo et al., (2003) refers to this as a "second mover advantage"

approach. This implies that such consideration/adoption is driven more by imitation in order to be legitimate than for other benefits (e.g. efficiency or effectiveness). DiMaggio & Powell (1983) has noted that such change actually may not make organizations more efficient. In the case of SCF, it can be argued that existing “institutionalization” is actually an enforcer of established practices, as there is no evidence yet of any of the three categories of pressures for change previously discussed.

As such, there is no apparent evidence that Institutionalization would support SCF as a strategic driver at the enterprise level, or as a way to explain why “first movers” of innovation adoption would consider such an effort. If however, SCF did become adopted by some “first movers” in Canada, there clearly is a logic to expect that the mimetic and/or normative pressures could become quite influential in accelerating its consideration/adoption by a larger number of firms.

In summary, the six theories appear to follow a continuum from being relatively enterprise centric (TCE and RBV), to being based more on bilateral partnership interests (RD and Contingency) to one of multiple partnership interests (SN and Institutional), with the impact of environmental considerations becoming increasingly recognized as more important as one moves through the continuum. However, none of the core constructs or assumptions of the theories appeared to resonate as a significant indicator of SCF being a strategic driver in the current economic environment, although some weak linkages could be conceptualized. Also, none of the academic literature researched that supported this discussion explicitly cited cash management/SCF as an illustrative

example of a strategic objective of a firm, thereby inferring that it suffers a deficiency of “strategic value”. In the current environment, the two theories that fall closest to the currently perceived value proposition of SCF at the outset of the research (i.e. those that encourage consideration, as opposed to hinder it or suggest a wait and see attitude) are: Resource Based View (a value proposition that is “temporarily” unique to a supply chain), and Strategic Network Theory (as SCF is based by necessity on a partnership model).

3.1.7 Cross-enterprise Theory – Operating Alignment

Given the previous discussion where it was assessed that SCF would not easily be perceived as a strategic driver, the focus now shifts to SCF as a potential enabler of cross-enterprise operational activities with an emphasis on the operational benefits that are derived from such relationships, and the perception of the overall nature of the relationship.

In the supply chain academic literature, the nature of the analysis of integrative operational activities falls into three general categories (i.e. products, processes and decision making) that structure cross-enterprise relationships. Product discussions impacting relationships are often articulated in the context of opposing characteristics such as functional or innovative products (Fisher, 1997; Grandori, 1997), or commodity, commoditized or customized products (Gereffi, Humphrey & Sturgeon, 2005; Sturgeon, 2002). Process discussions address the practical (both tangible and intangible) interface between two or more firms, dealing with such things as information sharing (Cannon &

Perrault, 1999), interaction frequency (Reinhart, Handfield, Page & Atkin, 2004), performance metrics (Patnayakuni & Rai, 2006) or satisfaction (Skarmas & Robson, 2008). Decision making addresses the actual issues involving joint discussions associated with such things as commonly shared rules of engagement (Min & Mentzer, 2004), the sharing of actual sales/inventory for decision making purposes (Patnayakuni & Rai, 2006) or cross training of staff (Skarmas & Robson, 2008). The nature of the latter two categories (i.e. processes and decision making) overlap somewhat in the literature, but the focus of this thesis falls primarily into the second category, specifically Supply Chain and Finance processes.

One of the outputs of the nature of these activities is that of relationship magnitude (Golicic & Mentzer, 2005) or relationship strength/intensity (O'Toole & Donaldson, 2000; Skarmas & Robson, 2008) that is derived from such activities. Implicit in "relationship intensity", is the existence of a continuum from control to cooperation to collaboration. Generally, the analysis of this relationship intensity is analysed in the context of bilateral relationships (Cannon & Perrault, 1999; Reinhart et al., 2004) or multiple relationships (Sturgeon, 2002; Harland, 2004). Of particular guiding interest to this thesis research within this stream of literature is the work of Cannon & Perrault (1999). This is because their research is based on a relationship between a buyer and a strategic supplier only, a good portion of their variable development related to the more granular concerns of information exchange such as defining the specific nature of the exchange of information, articulation of operational linkages, and the degree to which the

systems, procedures and routines of the two organizations are linked to facilitate activity. They also analyzed it from the perspective of the buyer just as this research does.

Both of these directions of inquiry (i.e. nature of process interface, and relationship strength) were chosen by the researcher as the primary guidance for exploring the respondent's relationship to the identified strategic supplier in Stage 1. The logic of relationship strength was also extended to application service providers (ASP) as a special category of supplier. As ASP's were originally the first promoters of SCF platforms and continue to be active in supporting such platforms, consideration as to how a firm responds to an ASP's intervention efforts related to technology consideration was deemed appropriate, yet uniquely separate from that of an identified strategic supplier.

The specific constructs that were chosen from the academic literature for evaluation (and which are described in Chapter 4) were: 1) External Partner (Supplier) Influence, 2) Application Service Provider Influence and 3) Perceived Effectiveness of the Relationship with the Supplier.

Therefore, Question 1 is posed in the following manner:

“What are the specific variables driven by the cross-enterprise context of the firm that would influence consideration of SCF?”

3.2 Cross-functional Integration Alignment

This area of analysis is driven by the practical experience of the researcher, as well as previous empirical work done on cross-functional integration related to SCM. As noted in the Chapter 1, the researcher had numerous opportunities to observe the level and nature of the interaction between the SC and Finance functions. This experience base ultimately led to the perception of a “separation of interests” between the functions, which formed the initial questions of this thesis. This separation was generally exhibited by hierarchical reporting relationships, supported by formally defined specific and separate responsibilities or functional/physical separation where there was no reporting relationship at all. On the other hand, the separation was sometimes minimal, evidenced by examples of informal collegial exchange of information with no transparent functional separation. Usually within the organizational structure the Finance position represented the more senior position, and was recognized as such, in each organization, although in a few situations it was the SC function that was dominate. Given this diversity, the need to more specifically define this perception of a separation of interests, or a lack of integration/alignment, was warranted, due to its anticipated impact on innovation consideration.

Kahn (1996) defines integration as “...the sharing of information and the engagement in collaborative behaviour”, while Eng (2008) defines it as “the purposive coordination of supply chain activities and information flows across business functions...” Research suggests that organizations with specialized departments perform better when they devote

resources to well defined interfaces (Van de Ven, 1979; Kahn, 1996; Kahn & Mentzer, 1998; Ellinger, 2000 (a); Ellinger et al., 2000 (b); Stank, Keller, & Daugherty, 2001; Gimenez & Ventura, 2005; van Hoek et al., 2008). The underlying assumption is that the more a firm moves to collaborative interactions within a firm, the more the firm is ready for an integrative exercise with an outside partner (Gimenez & Ventura, 2005). Therefore, in the context of integration, a high level of intra-organizational integration is generally recognized as being an antecedent variable for successful integration with outside partners. Hence, as SCF is based on external integration it is necessary to evaluate internal cross-functional integration and its antecedent impact on the potential consideration of SCF.

A multitude of alignment/integration tools that are structural (e.g. shared incentives, shared projects, nature of tasks, information sharing and direction of such) or behavioural (e.g. actively acquiring knowledge of the other function's competencies, participative culture, mutual trust/satisfaction, communication frequency) have been noted (van Hoek et al., 2008; Eng, 2006) and examined in the supply chain literature. Interestingly van Hoek et al. (2008) notes that one of the key cross-functional alignments that has not yet been investigated, but where there are obvious linkages due to logistics impact on cash flow management activities, is the SC/Finance linkage.

The cross-functional literature reviewed for this thesis invariably focused on those functions that are often considered prime to the productive value chain (e.g. production, logistics, sourcing, engineering, research and development, marketing/sales). Van de Ven

(1979) refers to these functions as those that deliver directly to the production objective. Those other functions that secure and allocate the resources (e.g. funding, personnel, training, legal, technology) that are required for the production value chain are referred to as administrative functions. However, as previous noted, none of the literature reviewed had focused on the Finance function (van Hoek et al., 2008), and as such there is no precedent for the selection of constructs that are considered to influence the relationship between the SC and Finance functions, or may indeed be unique to that relationship. This is not to overstate the challenge this presents, as there is a reasonable expectation that the variables identified in previous SCM/organizational research will be applicable, yet they still need to be evaluated.

The final selection of the constructs was based on their already established presence within the supply chain literature, and the domain knowledge of the researcher related to the SC/Finance function interface. The core objective was that the constructs would assist in evaluating the nature (e.g. intensity, priority, direction) of the processes with which the functions exchanged information, and they would permit the evaluation of the perceived level of integration in regards to these processes. All the forgoing was to be done within the context of upstream activity, rather than downstream activity, which is usually the lens through which cross-functional integration activities are viewed, as they are normally associated with a downstream performance metric as the dependent variable. The constructs selected fall into the three broad categories: information flow exchange, performance measurement tools and task difficulty.

3.2.1 Information Flow

Information flow has been a major area of focus amongst authors (Ellinger, 2000 (a); Ellinger et al., 2000 (b); Stank et al., 2001; Stank, Dittman & Autry, 2011). Ellinger describes it as a continuum from simple information exchange to cooperation followed by collaboration. Information exchange refers to formal structured documented interactions that occur between interdependent departments but do not involve personal contact. Cooperation refers to mandatory, bidirectional interactions that require personal contact between representatives from interdependent departments. Collaboration refers to predominantly informal behaviours that occur between interdependent departments based on resource and information sharing. Thompson (1967) talks of integration in a similar fashion when he refers to three approaches in a directional/flow sense. These are:

- Pooled interdependence refers to each department providing a discrete contribution to the whole organization and if one department does not perform adequately, the organization's performance may be jeopardized.
- Sequential interdependence refers to where one department makes contributions (input) to another and if the input does not perform adequately the recipient department and the organization's performance may be jeopardized.
- Reciprocal independence refers to where the outputs of each department become the inputs of the other and if either does not perform well then each department and the organization's performance may be jeopardized.

Essentially both approaches are an effort to categorize the degree of joint ownership/collective responsibility both functions have to defined activities or processes. These approaches also imply that as the integration of functions moves from an information exchange type of environment to a collaborative environment there is a higher probability of better absolute performance of the enterprise in question, as well as relative performance vis a vis competitors (Eng, 2008). Equally important in this effort was the clear definition of exactly what processes the two functions actually work on, or don't work on together, as there could be some legitimate separation of interest that would justify a cross-functional interaction that was of an information exchange nature and another one that was collaborative in nature. That form of granularity was perceived as beneficial in terms of truly understanding the more micro nature of the relationship.

3.2.2 Performance Measurement

The second category, that of the nature of supply chain performance measurement tools and how they are structured, was expected to have a significant impact on the alignment of both functions as it relates to the effectiveness of the relationship. Often, if performance measures are not properly structured they become very tangible disincentives (Ellinger, 2000 (a); van Hoek et al., 2008). Of course the reciprocal also applies; if properly structured they can greatly facilitate the alignment of functions toward achieving corporate goals. Several issues of specific interest to this thesis were considered to be of merit for exploration. First, to what degree do the corporate performance measures that are recognized by both functions, actually relate to supply

chain performance metrics themselves (e.g. resources, outputs, flexibility (Beamon, 1999))? Secondly, how closely aligned are the individual incentives of each function to those supply chain performance metrics that are identified as reflecting upstream supply chain interests, and finally, how aligned are the incentive packages of the two functions with each other? The researcher's experience related to these issues was that generally upstream supply chain measures were clearly secondary to other corporate measures. If there is misalignment or no alignment at all in upstream activities it would not bode well for consideration of an innovation affecting both functions, regardless of the nature of the upstream innovation.

3.2.3 Task Difficulty

The third category that of task difficulty refers to the efforts and challenges associated with reaching a level of interaction that is conducive to some form of measurable performance or behaviour such as customer service, financial performance, distribution performance, or as in this thesis, innovation consideration. It is normally associated with more informal measures related to perceptions of commitment to the relationship (Kahn, 1996) and the effectiveness of the relationships (Van de Ven, 1979), and has been previously investigated for example by Ellinger's et al., (2000 (b)) examination of the relationship between the logistics and marketing functions. The identification and the definition of associated collaborative nature and effectiveness perceptions may be telling in terms of the direction and importance of the relationships that exist between the two

functions, particularly when it is applied to a more precise understanding of the specific nature of the processes the two functions share.

The specific constructs that will be evaluated (and which are described in Chapter 4) are: 1) Direction of Information Flow, 2) Performance Metrics, 3) Performance Incentives, and 4) Perceived Effectiveness of Cross-functional Relationships.

Therefore, within the overall context of the forgoing discussion, Question 2 is as follows:

“What are the specific variables in the nature of the relationships between the SC and Finance functions that would influence the consideration of SCF?”

3.3 Innovation Theory

The academic literature of innovation is quite broad, but for the purposes of this discussion three key areas are highlighted. First, explaining the rationale for exploring the stage of the innovation (i.e. consideration/adoption) process being considered in this research, as it is not a common approach to innovation research. Secondly how organizational attributes may affect innovation consideration, and thirdly the nature/characteristics of an innovation. The latter two discussions provide the support for the specific constructs chosen for evaluation, and SCF will be discussed in the context of each discussion.

3.3.1 Stage of Innovation Process

In regards to the innovation consideration/adoption process itself, Rogers (2003) defined it as a:

“... process through which an individual or other decision making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.” (p. 168)

Damanpour (1991) has also defined it in a two stage manner. The initiation stage consists of all activities pertaining to problem perception, information gathering, attitude formation and evaluation, and resource attainment leading to the decision to adopt. The second stage, implementation, consists of all events and actions pertaining to modifications in both an innovation and an organization, initial utilization, and continued use of the innovation when it becomes a routine feature of the organization.

SCF is a new approach to cash management and supplier relationship management; therefore, it clearly is an innovation. However as SCF has not been adopted and disseminated within Canada, focus in this research project was on the “initiation/information gathering/evaluation” phase of the innovation continuum (as recommended by Olshavsky & Spreng, 1996; Frambach & Schillewaert, 2002), as opposed to the “adoption/utilization/diffusion” phase of the continuum.

The researcher’s experience base has evidenced an absence of applications associated with the financial value chain in Canadian supply chains, while still observing the

presence of many examples of goods and information value chain applications (e.g. logistics, sourcing). This may imply a sequential adoption of applications at play, with upstream financial applications being the last set of applications to be considered. As there have been no observed financial value chain applications, it is assumed therefore that Canadian enterprises are at the beginning of the consideration and adoption continuum when it comes to SCF. It is for that reason that the expression "...influence the consideration of SCF" as opposed to a phrase such as "...to adopt SCF" is used. If there were a "critical mass" of documented instances of SCF applications having been adopted, then enterprises would be further along the continuum related to SCF applications, and the latter phrase would be more applicable.

3.3.2 Organizational Attributes Impacting Innovation

In terms of organization attributes there is clear support for the view (Van de Ven, 1979; Damanpour, Szabat & Evan, 1989; Damanpour, 1991) that organization structure/type does create differences in innovation consideration/adoption. Various categorizations of structures have been proposed in the evaluation of this issue; goods versus service sector, profit versus non-profit, entrepreneurial versus bureaucratic, mechanical versus organic, technical versus administrative. As an example, Damanpour (1991) suggests that mechanistic organizations characterized by formal rules and centralized authority may be better at product/technical innovations while organic organizations characterized by decentralized authority and informal rules/practices may be better at process/administrative innovations. The concept of organizational complexity (e.g.

number and diversity of specialists/educational level) has also been associated with having a generally positive impact on innovation (Damanpour, 1991; Skok & Legge, 2002).

As the innovation that this thesis focuses on requires a technological interface, it appears to be unavoidably associated with the technology maturity of the firm. Based on a review of the literature (Tornatsky, Fleischer & Chakrabarti, 1990; Venkatraman, 1994; Shang & Seddon, 2002) this will ideally require a discussion around such issues as the nature of the technology applications present in the firms in question and the determination of the specific nature (e.g. function specific, cross-functional, cross-enterprise) of such applications to the firm. As well there will be an exploration as to each function's perception of technological maturity, is there a logical sequencing of application consideration/adoption in their given firm, and do they view their current state of technology maturity as complex/simple, tactical/strategic, competitive necessity/desirable, etc. Ultimately, the objective is to determine the similarity of the approaches to technology consideration/adoption of both functions and at what level of consideration/adoption each sees their function and their firm.

Venkatraman (1994) has noted:

“...systems integrators can carry out the operating tasks for ensuring technical operability, but the responsibility for business process interdependence lies squarely with the firm...lack of attention to creating interdependent business processes (with a supporting performance assessment system) weakens the

organization's ability to leverage a seamless and interoperable technical platform". (p. 76)

Consequently, the focus on the SC and Finance executives' perception of technology and the alignment of such is warranted.

The specific constructs that will be evaluated (which are described in Chapter 4) in relation to this question are: 1) Centralization/Decentralization, 2) Formalization, 3) Organizational Complexity, and 4) Technological Maturity.

Therefore, within the overall context of the forgoing discussion, Question 3 of the research is as follows:

"What are the specific organizational variables that would distinguish enterprise leaders in the consideration of SCF?"

3.3.3 The Nature/Characteristics of the Innovation

Although innovation on research is quite broad, it does not often deal with process innovation associated with the financial value chain, therefore it is first necessary to position SCF in the innovation literature associated with product characteristics.

Innovation has been defined as a product or service, a production process technology, a structure or administrative system, or a plan or program pertaining to organizational members that is new to the organization (Damanpour, 1991). Further refinement to this definition has been provided by the propositions that one needs to segment the innovation

into types such as radical versus incremental innovations (Dewar & Dutton, 1986; Nord & Tucker, 1987), administrative versus technical innovations (Daft, 1978; Damanpour et al., 1989), or product versus process innovations (Damanpour 1991) in order to properly determine the attributes of innovation consideration and adoption. Each one of these approaches is discussed briefly in the context of SCF.

Radical innovations are those that produce fundamental changes in the activities of an organization and represent clear departures from existing practices (i.e. high degree of new knowledge) whereas incremental innovations would be new but extensions of existing practices (i.e. low degree of new knowledge) (Dewar & Dutton, 1986; Nord & Tucker, 1987). As SCF comparable/related activities do actually occur in an “off line” sense (i.e. paper based), and as such are established cash management practices in all industries, SCF based on a technology platform could be considered merely as an incremental innovation, and by some observers it might be characterized as process equivalence (Morrison, 1996). Perhaps in a near term perspective at time of initial adoption it is an incremental innovation, however the definable yet untapped potential that could arise from using SCF aggressively could have a significant impact on such issues as current asset management, supplier and buyer relationships, data mining and competency development. What this discussion raises is the temporal aspect of innovation in that the obvious incremental consequences could allow migration to a litany of new consequences. SCF is not going to radicalize financial instruments/processes or revolutionize supplier relationships; but it is more than just an efficiency/effectiveness

measure. As it matures, it has the potential to be quite transformative in business practices. Esteves (2009) refers to this as a synergistic transformation.

Technical innovations refer to products, services and production process technology, while administrative innovations involve organizational structure and administrative support processes (Daft, 1978; Damanpour et al., 1989; Van de Ven, 1999). Essentially SCF as an innovation lies somewhere between the production management processes and the cash management activities to support those processes. The inclination would be to treat SCF as an internal “administrative” innovation as it is principally a cash management tool and therefore it must be an administrative management process (i.e. cash flow management). This however ignores the fact that SCF is dependent on a supplier relationship that is managed by the SC function which is contained within the production value chain of a firm (refer to Figure 3, Chapter 5). Therefore, although SCF does not have a direct impact on the production of goods and services, it can have an impact on the relationship structure that impacts that process, consequently SCF does not fit exclusively into either of these innovation type descriptors.

Product innovations are new products or services introduced to meet an external user or market need, while process innovations are new elements introduced into an organization’s production or service operations such as input materials, task specifications, work and information flow mechanisms, and equipment used to produce a product or render a service (Damanpour, 1991). These definitions are essentially a description of an externally oriented downstream (i.e._customer centric) perspective and

an internally oriented yet still downstream perspective. However, the definitions can be redefined in the following manner.

“Product innovations are new products or services introduced by an enterprise with its upstream partners to meet an externally oriented supply chain value added opportunity; while process innovations are new elements introduced into an organization’s upstream production or service operations to produce a product or a service that is beneficial to the upstream relationship.”

Following this definition, SCF would appear to fit into the process categorization of innovation terminology. This line of thinking is also supported by Tufano (2003) and Lerner & Tufano (2006), who defined financial innovation (product or process) as the act of creating and then popularizing new financial instruments, as well as new financial technologies, institutions and markets. Tufano (2003) (referencing Merton, 1992), breaks down financial systems into 6 activities, within which innovation would fall: 1) moving funds across time and space, 2) the pooling of funds, 3) the managing of risk, 4) extracting information to support decision making, 5) addressing moral hazard and asymmetric information problems, and 6) facilitating the sale of purchase of goods and services through a payment system. SCF in its simplest structure immediately addresses item 1, and following the temporal line of thinking expressed previously can be extended into items 3, 4, and 5. Consequently, it is reasonable to categorize SCF as a financial process innovation. The distinction between product and process also has relevancy in that Damanpour (1991) suggests that attributes around process innovations may be

different than that of product innovations and the consideration and adoption continuum may actually be more difficult than an externally focused product innovation.

Another perspective on the temporal aspect of innovation adoption is provided by Venkatraman (1994). He is explicit in his writing that his five levels of IT enabled business transformation (i.e. localized exploitation, internal integration, business process redesign, and business network redesign and business scope redefinition) should not be viewed as a stages model of IT adoption. However the levels as described in his paper do clearly have a temporal perspective of moving from efficiency/evolutionary activities which would fit the immediate benefits (e.g. efficiency gains with minimal changes to business processes) of considering SCF to the more capability enhancing/revolutionary benefits as articulated in Tufano's (2003) suggestions around financial innovation. Fundamentally SCF as a financial process innovation falls within Venkatraman's (1994) "localized exploitation" category but could be easily migrated to "internal integration" or even "business process redesign" if it became defined as a strategic interest of the firm.

In summary the three existent categorizations of innovation discussed appear to have been defined primarily in an enterprise centric, a downstream centric or a product centric context so it is necessary for the reader to reposition SCF to treat it as a process/innovation offering that is upstream oriented. However, it is hoped that the modifications to the product/process categorization definitions have clarified appropriately the change in mindset required to fit SCF into an innovation type "process" category.

Having defined the nature of the innovation of interest, it is necessary to identify the constructs to be evaluated that would impact on consideration of such an innovation. This particular aspect of the innovation theory is well grounded (Damanpour et al., 1989; Damanpour, 1991; Nooteboom, 1989; Rogers, 2003), with a relatively consistent set of constructs being used to investigate innovations, regardless of the specific nature of the innovation under consideration. The specific constructs to be evaluated (which are described in Chapter 4) are: 1) Relative Advantage, 2) Compatibility, 3) Complexity, 4) Observability, 5) Trialability, and 6) Level of Uncertainty.

Therefore, in the context of the forgoing discussions, Question 4 of the research is as follows:

“What are the specific variables associated with technology innovations that the SC and Finance functions share that would distinguish functional leaders in the consideration of SCF?”

As an extension of the Chapter 3 discussion, Chapter 4 takes each of the constructs suggested for consideration, discusses them in more detail and then provides suggested initial lines of inquiry associated with innovation consideration, described in a hypothesis format. A discussion of the various aspects of the dependent variable is provided, as well as presentation of the initial “line of inquiry” research model. All of which ultimately shaped the development of the discussion guide (Appendix 3) for the Stage 1 interviews.

4 Chapter 4 – Independent Variables

The ideal approach to consider the application of variables would be to use a unifying framework that had been drawn from literature reviews. Illustrative examples of these would be those associated with innovation such as Tornatsky et al., 1990; Frambach & Schillewaert, 2002; and Rogers, 2003. However as the research project is also looking at organizational integration issues, as well as cross-enterprise issues no unifying framework was identified that could be replicated. Consequently, the variables identified below, and illustrative measures of each variable, are a collection that follow closely the principal variables/measures associated with both organizational and innovation theory (Thompson, 1967; Damanpour et al., 1989; Damanpour, 1991; Morrison, 1996; Van de Ven, 1999; Frambach & Schillewaert, 2002; Rogers, 2003; Tufano, 2003; Ivens & Pardo, 2007; Blankley, 2008; Stank et al., 2001; Stank et al., 2011), and which based on the domain expertise of the researcher were considered relevant for further exploration. After each variable a suggested hypothesis (which follows the consensus in the literature) of the impact on innovation consideration (i.e. SCF) is proposed. For a fuller appreciation of the detail to which each one of these variables was actually addressed during the Stage 1 interviews, a review of Appendix 3 is warranted.

As this is exploratory research the reader is reminded that at this stage of the research, the term hypothesis is used in the context of a line of inquiry as opposed to a hypothesis describing a cause effect relationship. The descriptions and definitions of the variables presented below are based on a review of academic literature; however, this is just the

first iterative step in providing supporting arguments for their validity as further provided by the various stages of this research effort.

It should be noted that the discussion of the variables to follow, is written in a manner that predates when the actual research (2011/2012) was undertaken. Several authors (Frambach & Schillewaert, 2002; Rogers, 2003) recommend that ultimately variables/measures be developed specifically related to the question at hand, rather than utilizing existing variables/measures borrowed from previous investigations. Consequently it was anticipated that modifications, additions or deletions to variables (independent and dependent) and measures described below would occur during Stages 1 and 2, in order to bring a more refined focus (i.e. articulated variables, relevant measures and suggested hypotheses) to the activities associated with Stage 3.

4.1 Question 1

“What are the specific variables driven by the cross-enterprise context of the firm that would influence consideration of SCF?”

4.1.1 External Partner (Supplier) Influence

Evidence suggests that consideration of technology related innovations may be driven by a supplier that has already adopted the innovation in question and is now “influencing” the enterprise in question to do so themselves (de Burca, Fynes & Marshall, 2005). This variable has also been characterized in terms of competitive pressures or network externalities (Frambach & Schillewaert, 2002). The occurrence of this variable has been

measured by the nature and frequency of the communications on the subject matter, the importance or dependency of the relationship, perception of risk of termination of relationship if not adopted, or the existing level of external integration (Stevens 1989, from Gimenez & Ventura, 2005). The inference of the forgoing is that a firm would be disposed to respond positively to such an intervention from a strategic partner, therefore an initial hypothesis is provided below.

H1. Innovation consideration is positively related to high external partner influences.

4.1.2 Application Service Provider (ASP) Influence

It has been suggested that an ASP can significantly influence the probability that an innovation may be considered and adopted (Dewar & Dutton, 1986; Frambach, 1998; Frambach & Schillewaert, 2002). Therefore, as SCF is dependent on a technology platform, hence an application, the activity of ASP's in general, affecting the consideration of applications is appropriate in this research. It has been suggested that this "influence" can be determined by such things as the number of instances of specific targeting of the innovation to a given firm, the character of the service provider's marketing communications, and the activities the ASP undertakes to reduce the perceived risk of early adoption by the potential customer. Morrison (1996) shifts the emphasis from the above, focusing not so much on the intensity of the effort but the receptivity to the intensity of the effort, a variable she calls "communication receptivity". Fundamentally, the issue is that an innovation cannot have any perceived utility to the organization until it is aware of it, and awareness depends directly on the extent of the

communication and the receptivity to the communication. Therefore, for the purposes of preliminary consideration, a positive relationship between ASP activity and innovation consideration was suggested, and an initial hypothesis is provided below.

H2. Innovation consideration is positively related to the application service provider's marketing effort.

4.1.3 Perceived Effectiveness of the Relationship with the Supplier

This variable has not frequently been investigated in the supply chain literature (Ivens & Pardo, 2007 being an exception), but it is premised on the assumption that both functions have specific and unique views about the supplier relationship, and that any difference in common perspective could be a negative influence on consideration of SCF. The rationale for its inclusion was, as previously noted in Chapter 3, that the nature of inter-organizational integration is increasingly recognized as a performance factor in enterprise and supply chain success. It can be measured by many metrics: the actual degree of performance (e.g. timeliness, quality, speed, few or many exceptions/options) expected by the buyer of the supplier, the perceptions of such performance metrics, the nature of each function's interface with the supplier, the level of effectiveness (e.g. satisfaction, trust, commitment) that the supplier interface has with each function, etc. An initial hypothesis is provided below.

H3. Innovation consideration is positively related to a high perceived effectiveness of the supplier relationship.

4.2 Question 2

“What are the specific variables in the nature of the relationships between the SC and Finance functions that would influence the consideration of SCF?”

4.2.1 Direction of Information Flow

As noted in Chapter 3, this variable refers to the type and direction of information flow in the cross-functional relationship. (Thompson, 1967; Ellinger, 2000 (a); Ellinger et al., 2000 (b); Gimenez & Ventura, 2005). For the purposes of Stage 1 the conceptual framework (previously discussed) provided by Thompson (1967) was used (i.e. pooled interdependence, sequential interdependence and reciprocal interdependence), with a focus on refining what the two functions talk about. Specifically what kind of supply chain and technology processes are associated with these cross-functional relationships, how directional they are and where applicable a discussion around the past, current and planned technological applications related to cross-functional activity. An initial hypothesis is provided below.

H4. Innovation consideration is positively related to high information flow (i.e. reciprocal).

4.2.2 Performance Metrics

Discussion of upstream performance metrics is not a commonly referenced variable in intra-organizational relations and when it is, it is used in the context of the variable “organizational facilitators” (Frambach & Schillewaert, 2002). When such performance

metrics are used in a supply chain context they are usually enterprise specific (Beamon, 1999; Cassivi, Lefebvre, Lefebvre & Leger, 2004; Gunasekaran, 2007), although there is a clear recognition that it should be evaluated from a supply chain network perspective. However, the latter objective is exceedingly hard to validate through research (Cassivi et al., 2004) due to the challenges of the methodology to achieve results of value. Additionally multiple descriptive approaches have been utilized regarding performance measurement terminology: strategic/operational/financial, execution versus planning, first order effects versus second order effects, quantitative versus qualitative, etc. All of which can have the complexity of interpretation and application compounded by the unique environment a firm is in, the specific nature of the product being produced, or the differentiation strategy the enterprise is pursuing (e.g. lean versus agile, Christopher, Peck & Towill, 2006).

However, the underlying premise of SCF is that there is a cross-enterprise relationship that warrants a higher degree of collaboration than typical arm's length relationships, and for such an effort to be adopted there should be alignment on quantitative and qualitative upstream supply chain performance metrics between the two functions. To that end as an organizing structure for discussion with respondents, Beamon's (1999) suggestion regarding three broad categories of metrics (i.e. resources, outputs and flexibility) was used, with some expansion to include a more comprehensive list of financial metrics. An initial hypothesis is provided below.

H5. Innovation consideration is positively related to cross-functional alignment of performance metrics that are supply chain centric versus enterprise centric.

4.2.3 Performance Incentives

As with performance metrics, performance incentives are usually contained in the variable “organizational facilitators”. Ellinger (2000 (a)) suggests that it should be measured as a separate variable as he proposes that cross-functional collaboration and effective interdepartmental relations are influenced by an enterprise’s evaluation and reward system. In this particular research as the research design does call for the specific interviewing of two distinct functional leaders who have decision making authority, exploration as to the alignment of the individuals’ personal incentives should shed some light on what these executives will focus their attention on. This will allow a determination of alignment (or lack thereof) with each other, with corporate performance metrics, and with declared strategic intent. In the context of SC the distinction between performance metrics and performance incentives has been tested in academic and trade literature (e.g. logistics and marketing) (Mollenkopf, Gibson & Ozanne, 2000; Aberdeen, 2008), but no equivalent example could be found in the Finance literature stream, nor one that was inclusive of the Finance function, within the SCM literature stream. An initial hypothesis is provided below.

H6. Innovation consideration is positively related to cross-functional alignment of performance incentives.

4.2.4 Perceived Effectiveness of Cross-functional Relationship

This refers to the degree and nature of the uncertainty/task difficulty related to cross-functional activities (Ellinger, 2000 (a); Ellinger, et al., 2000 (b); Perrow, referenced in Donaldson, 2001; Eng, 2006). Sometimes this relationship has been characterized in terms of the degree and nature of the uncertainty related to cross-functional tasks, such as information exchange (Donaldson, 2001), or as Ellinger (2000 (a)) suggests, that the effectiveness of interpersonal relations involves the attitudinal perceptions of the personnel who then interact with the other function. This variable can be measured by the degree of contingency (e.g. timeliness, quality, speed, few or many exceptions/options) imposed by one function on another, or by attitudinal perspectives (e.g. equitable, productive, satisfying) that each function has of the other. An initial hypothesis is provided below.

H7. Innovation consideration is positively related to high perceived effectiveness of the cross-functional relationships.

4.3 Question 3

“What are the specific organizational variables that would distinguish enterprise leaders in the consideration of SCF?”

4.3.1 Centralization/Decentralization

Damanpour (1991) refers to centralization as the concentration of decision making power in an organization, and by whom. Rogers (2003) refers to it as the degree to which power

and control is concentrated in the hands of a few people. Morgan (1997) refers to it as a "...pattern of authority that serves as points of resistance...". The consensus (Damanpour, 1991; Rogers, 2003) is that such a structure limits the development of innovative ideas at the operational level, and when innovative ideas are embraced, the frequency of such activity is less than one would find in decentralized organizations. Essentially, it suggests that the nature of the dispersion of power (i.e. centralized/decentralized), establishes the propensity of an organization to innovate. The character and level of dependence/authority of an organization can be measured on such things as the actual evidence of joint/independent decision making, shared ideas, organized meetings, perceived levels of influence, formalized levels of delegation and the nature of the issues (operational versus strategic) actually discussed. An initial hypothesis is provided below.

H8. Innovation consideration is negatively related to centralization.

4.3.2 Formalization

Damanpour (1991) defines formalization as the degree to which an enterprise places an emphasis on existence of formal and explicit rules of behavior. Rogers (2003) defines it as the degree to which an organization emphasizes that its members follow rules and procedures. Morgan (1997) describes it as the exercise in compliance based on rules. Essentially all three definitions are iterations of definitions of bureaucratic structure with the degree of bureaucratization defining the capacity for innovation. The general consensus (Damanpour, 1991; Mollenkopf et al., 2000; Rogers, 2003) is that the more

formalized an organization is, the more it will inhibit innovation, while a more organic organizational structure which encourages openness and less rule following, will provide opportunities for creative innovation in response to uncertainty/opportunity. Formalization can be measured by the level of adherence to transparent mandatory/standard practices, the nature of the particular kinds of exchanges, and the discipline around formalizing/institutionalizing/measuring those processes (i.e. job descriptions, delegation of authorities, written procedures). An initial hypothesis is provided below.

H9. Innovation consideration is negatively related to formalization.

4.3.3 Organizational Complexity

Damanpour (1991) defines organizational complexity as the availability or number of distinct services that organizations and/or their sub units can provide. It is a hybrid variable made up of specialization, respondentism and differentiation. Associated with this perception is Roger's (2003) concept of interconnectedness which refers to the network of interpersonal networks in an organization. Morrison (1996) uses comparable variables of technical orientation, education, knowledge and ability as one factor (i.e. characteristics of individual buying behaviour) of her model to determine disposition to innovation. The underlying premise (Baldrige and Burnham 1975, in Damanpour, 1991) is that coalitions amongst respondents in different organizational units will have a more positive impact on changes to technical and administrative processes, due to broader knowledge, facilitation and retention of new ideas, than they would be able to achieve in

isolation of each other. The variable can be measured by the diversity of specialists in the organization (specialization); by the level of educational background or respondent training (respondentism); or the number of operational units under top management (differentiation). An initial hypothesis is provided below.

H10. Innovation consideration is positively related to high organizational complexity.

4.3.4 Technological Maturity

Technology maturity refers to the level of technology applications currently in place, and can be evidenced in several ways: the scope of innovation (Damanpour, 1991), the executive perspective on the use of technology to achieve strategic ends (Tornatsky et al., 1990; Venkatraman, 1994; Shang & Seddon, 2002; Esteves, 2009) and the level of technical knowledge resources available to a firm (Damanpour, 1991). Within the context of this research project the specific nature of the applications, that have been considered, adopted or were in existence during the time period under review, were to be documented in the context of this variable. The tangible evidence associated with technology consideration or actual use was intended to act as a “validation tool” for responses provided to questions associated with other variables (e.g. information exchange, centralization).

The variable can be measured by such factors as the number of applications, the length of time the applications have been in place, how the benefits of the applications to the firm are described (e.g. efficiency versus capability enhancement, execution versus planning),

the sequencing of the applications (e.g. enterprise applications before relationship applications, production applications before administrative applications). An initial hypothesis is provided below.

H11. Innovation consideration is positively related to high technological maturity.

4.4 Question 4

“What are the specific variables associated with technology innovations that the SC and Finance functions share that would distinguish functional leaders in the consideration of SCF?”

4.4.1 Relative Advantage

Relative advantage (Rogers, 2003) refers to the degree to which an innovation is perceived as being better than the idea, product, process that it supersedes. Morrison (1996) presents a slightly different perspective, arguing that separate variables of risk and benefits are more appropriate to be measured, with risk moderating benefits. Relative advantage in essence appears to be a merger of these two variables, and in the interests of parsimony, it will be the variable used for Stage 1. Roger (2003) notes that the nature of the innovation will define the specific examples of relative advantage and cites examples of relative advantage: economic profitability, low cost, social prestige, efficiency, immediacy of reward, etc. In the context of supply chain processes normal measurement examples would be timeliness, quality, cost, flexibility, better supplier relationships, and

reduced coordination costs (Hult, Ketchen, Cavusgil & Calantone, 2006). An initial hypothesis is provided below.

H12. Innovation consideration is positively related to high relative advantage.

4.4.2 Compatibility

Rogers (2003) refers to compatibility as the degree to which an innovation is compatible with existing practices, organizational structure, and readiness to adopt new practices and identified needs with the general consensus that the higher the compatibility the more positive the relationship is to the innovation under consideration. Perception of compatibility is essentially an evaluation of uncertainty attributed to the innovation, by those evaluating the innovation. Frambach et al., (1998) also notes that new process innovations often demand greater simplicity or understanding by the adopter, in order to ease the process to achieve compatibility, than do product innovations, consequently the degree of customization of a service/process innovation is highly desirable. Compatibility associated with processes can be measured by the identification of tangible examples of existent cross-enterprise technology or cross-functional technology adoption and usage (as innovation consideration is based on what is familiar (Rogers, 2003)), the consequent commonality of identified interests/differences between functions as a result of such adoption, and the degree of need to change these processes as an ongoing activity. An initial hypothesis is provided below.

H13. Innovation consideration is positively related to high compatibility.

4.4.3 Complexity

Complexity (Rogers, 2003) refers to the degree to which an innovation is perceived to be difficult to understand, use and implement, and it is generally accepted that the higher the complexity the more negative the relationship is to the consideration of the innovation. Rogers also notes that the timeliness of implementation is also a major determinant in successful consideration of innovations, which complements Frambach's (1998) comments about simplicity related to process innovations. The variable can be measured by such things as the number of stakeholders in the effort, the cost of implementation and consultancy needed, the integration with other enterprise functions needed, integration with other business partners, the management change required, the internal political issues, the training required etc. An initial hypothesis is provided below.

H14. Innovation consideration is negatively related to high complexity.

4.4.4 Observability

Observability (Rogers, 2003) refers to the degree to which the results of an innovation are visible and tangible with the consensus that the higher the observability the more positive the consideration of the innovation will be. The variable can be measured by the transparency of the adoption and implementation of the innovation, measured against previously defined benefits metrics (e.g. financial results, stronger supplier relationships, etc.). An initial hypothesis is provided below.

H15. Innovation consideration is positively related to high observability.

4.4.5 Trialability

Trialability (Rogers, 2003) refers to the degree to which an innovation may be piloted on a limited basis, prior to the adoption decision, with the consensus that it is conducive to innovation consideration. The capacity to trial an innovation is perceived as reducing uncertainty as the organization considering the innovation can learn by doing, without making a full commitment to the innovation. Rogers (2003) also notes that the timeliness of such pilots is also a major determinant in successful consideration of innovations. This variable can be measured by the time, resources and costs required to execute the pilot, the perceived uncertainty associated with the pilot, and given the innovation itself, whether a pilot is even feasible. An initial hypothesis is provided below.

H16. Innovation consideration is positively related to high trialability.

4.4.6 Level of Uncertainty

Nooteboom (1989) suggests as a variable, level of uncertainty. The variable can represent any number of uncertainties associated with innovations, some of which are expectations concerning whether or not cost savings or quality improvements are realistic, what unforeseen hurdles will arise in adopting the innovation to the specific conditions of the firm, or what additional investments must the firm incur to implement the new innovation. Essentially, what is the perception as to whether the returns of the innovation are significant enough to address the risks that accompany the adoption and implementation of the innovation? This variable would be measured by such things as the perceived ease of use, the amount of learning that is required, the consequence of supplier

failure or termination of relationship, the risks associated with co dependence of relationship or quantifiable measures (e.g. net present value). An initial hypothesis is provided below.

H17. Innovation consideration is positively related to low perceptions of uncertainty.

The literature clearly shows different approaches to the naming of variables as well as the granularity one can strive for. Roger's (2003) "relative advantage" contrasted with Morrison's (1996) splitting the variable into risk and benefit factors, being one example. Additionally there appear to be potential overlaps in the meanings/applications of the variables. For instance, "level of uncertainty" appears to overlap with "relative advantage", while "organizational predisposition to innovate" appears to overlap with "formalization" and "centralization". It is the intent of Stages 1 and 2 to address these types of overlap and determine the appropriate level of aggregation of variables/measures, such that by the time Stage 3 is reached, the variables/measures will have been specifically developed/designed (Rogers, 2003) to the context of the research question being investigated.

There are several other variables (e.g. size, attributes of individuals, or attributes of individual relationships) that could also be used to evaluate innovation consideration. In the case of size, as it can be ascertained in advance of Stages 1 and 2 interviews, a direct discussion of size will not be part of the interview process in Stages 1 and 2. Attributes of individuals is also a major grouping of variables often found in innovation adoption research (e.g. will an employee use the software). It is usually associated with such things

as demographics, tenure, product experience and personal values (Frambach et al., 1998). Additionally it could be hypothesized that the cross-enterprise/functional relationships based on trust and commitment (Morgan & Hunt, 1994) could facilitate innovation consideration. However, in the context of this current research, these attributes will not be focused on as it was felt necessary to first understand what activities/processes the two functions share or do not share, and whether they are aligned or not as to how well those activities or processes are being fulfilled within a cross-functional context.

4.5 Dependent Variable

The dependent variable had been initially described in Chapter 1 as the propensity of the two functions to “consider SCF”, but as noted in the previous discussion SCF does not yet exist in Canada. As such the dependent variable was reframed for the purpose of the Stage 1 case studies discussions as the propensity of the two functions “...to consider improvements to the cross-enterprise source to pay process”. This variable is derived from a number of themes that have already been discussed previously therefore this discussion is a summary of previous comments.

The phrase “...to consider improvements ...” clearly falls within the scope of innovation theory that deals with the initiation of consideration of an innovation prior to adoption and diffusion. The “consideration” perspective of innovation theory has been extensively studied in the context of consumers, but somewhat less so in the business context (Rogers, 2003). In the context of business innovations Morrison (1996) suggests the concept of “organizational predisposition to innovate” which is usually measured by

responses to attitudinal/perception issues at the organizational level. This predisposition to “consideration” is fundamentally what this thesis is exploring, but at the cross-functional level, not the organizational (i.e. enterprise) level.

Von Hippel (1986) refers to leading edges users as those who “...face needs that will be general in a marketplace - but face them months or years before the bulk of that marketplace encounters them, and lead users are positioned to benefit significantly by obtaining a solution to those needs”. Morrison (1996) provides a slight variation with a definition of firms that have leading edge status “... the degree to which organizations use and apply technology innovations in new and different ways to solve problems faced by the organization, and the degree to which they perceive the benefits of new products earlier than the rest of the marketplace”. Ideally, this research effort will provide some indication of the attributes of cross-functional relationships that would have leading edge behaviour as it relates to cross-enterprise technology consideration and adoption. This is important to SCF, as users/enterprises that are steeped in the present are unlikely to consider, generate or adopt concepts which conflict with the familiar (Von Hippel, 1986), hence the interest in deriving characteristics of leading edge behavior in this research.

The phrase “...cross-enterprise...” refers to the fact that for the type of innovation considered in this research to be successful, there must be an ongoing relationship between firms that is process oriented. The phrase “source to pay” brings a focus to the application of interest. Underlying this observation is the assumption that as there is an absence of “finance” supply chain applications, such applications would normally lag that

of other types of supply chain applications (e.g. logistics, sourcing etc.). This sequential proposition has yet to be proven, but it is implied, and provides an underlying logic that should be considered during the research project.

Fundamentally it is assumed that the narrower the difference between the two functions is regarding the dependent variable, then the sooner a SCF type application would be considered by enterprises in a supply chain, and as such targeted marketing efforts directed at such firms/supply chains would lead to accelerated consideration of such practices.

4.6 Summary

The previous discussion is captured visually in Figure 2, which proposes an outline of the lines of inquiry for Stage 1 of the research effort. In Stage 1 there were essentially four lines of inquiry focused on the cross-functional relationship: 1) cross-enterprise alignment, 2) cross-functional alignment, 3) innovation consideration alignment focusing on organizational attributes and 4) alignment on innovation attributes. The double ended arrows refer to the anticipated bidirectional impact of each function on each other which is suggested in the theory discussion in Chapter 3. The solid bracket infers the input into the lines of inquiry from the theory, and the dotted bracket represents the tentative relationships associated with the dependent variable, as suggested in this Chapter.

Figure 2 – “Lines of Inquiry” Research Model

To this point in the thesis, the primary purpose has been to frame the research framework, based on a review of relevant literature and supported by the researcher’s domain expertise, used to ground Stage 1 of the exploratory research. Chapter 5 discusses in detail the justification for the application of the case study methodology and how the research effort was operationalized. Chapter 6 will return to a discussion of the hypotheses and variables presented in this Chapter, highlighting the suggested modifications to each, based on the actual case studies executed in Stage 1.

5 Chapter 5 – Research Design for Stage 1 and 2

Stage 1 consisted of three case studies, which were used to evaluate the proposed model (Figure 2, Chapter 4) that originated from the literature review. These studies consisted of interviews with SC and Finance respondents in medium sized light manufacturing and information technology firms. The effort fell into four stages: recruitment of firms, interviewing the firms, the analysis, and finally the feedback to the firms.

Stage 2 was used to further evaluate a proposed model/variables derived from Stage 1 by undertaking another four case studies. The objective was to continue to evaluate the efficacy, reliability and validity of the research protocol, which in turn established the evaluation framework for Stage 3. The research methodology of Stage 2 was interview based, using a draft survey questionnaire as the common denominator between the two functions.

5.1 Rationale for the Case Study Approach (Stages 1 and 2)

Research design, in a case study format, is the structuring of a “logical model of proof” (Yin, 2003) that allows the researcher to 1) draw inferences about relationships across variables and 2) allows the researcher to stay focused on evidence that addresses the identified research questions. Outlined below are relevant topics related to the research design framework for this thesis, and the rationale that supports each topic.

When the subject matter in question is exploratory in nature, it deals with a contemporary issue and the behaviors of participants cannot be manipulated, the case study research

methodology is the preferred choice for this type of study (Miles & Huberman, 1994; Yin, 2003). Harland (2007) also argues that when the heterogeneity of organizations is a core feature of the issue at hand exploratory case study research is the only way to address it. Additionally, Terpend et al., (2008) argues that when the primary objective of research is to evaluate the presence or absence of something (in this case SCF), in contrast to measuring the degree to which something is present or related to something else, exploratory research is appropriate. Specific rationalizations associated with key issues (i.e. **exploratory, context, theory and replicability**) related to case study research and their application to SCF are provided below.

- The topic is **exploratory** as there is a limited comment or research on SCF, or on the integration of the SC and Finance functions at the enterprise level within the context of cross-enterprise supply chain collaboration/value creation, innovation consideration/adoption or organizational behavior literature. Yet, it is a contemporary issue as evidenced by its adoption by non-Canadian entities.
- Yin argues that if the issue cannot be separated from its **context** then the case study method is appropriate. This applies here in an unusual way as the subject matter issue cannot be separated from the context (in Canada at least), as it is not an established behavior with a temporal history in Canada; hence the context and issue are inseparable. As it does not exist yet in practice, it is not ideally suited to be studied by traditional methodologies such as survey, experiment, or historical approaches, and therefore the case study method is applicable.

- Yin argues that the research needs to be well grounded in **established theory**, to the extent possible, which has already been discussed in Chapter 3.
- Yin recommends that **replicability** in the context of similar results (e.g. all subjects' successfully implemented innovations) be sought. In this case, replicability is met in that all enterprises surveyed will have as yet to implement SCF.

Van Hoek et al., (2008) also notes that the majority of research that has been done regarding peer relationships and functional separation within a firm associated with supply chain activities has been primarily survey based. Van Hoek suggests that interview research methodology would be far more effective in understanding such phenomenon, than by generalizing inference about that phenomenon from statistical analysis.

Given the forgoing, the case study method was chosen as the research tool for Stages 1 and 2.

5.2 Research Design Credibility

Credibility of the Case Study Research Approach – The credibility of any research (Miles & Huberman, 1994; Lee, 1999; Yin, 2003) is generally derived from the quality of the effort that surrounds four key ideas; **construct validity, internal validity, external validity and reliability**. A brief discussion of each is provided below, in the context of this research proposal and case study research.

- Arguments to support **construct validity** (i.e. establishing correct operational measures for the concepts being studied) are enhanced by means of the convergence of multiple sources of information/precedents. It has already been noted that there is sufficient supply chain academic literature supporting the inclusion of the identified variables associated with cross-enterprise and innovation consideration/adoption. The organizational cross-functional variables are grounded in existing SC/Marketing literature, but it is acknowledged they were to be evaluated in the context the SC/Finance cross-functional relationship (which has yet to be studied). As such, the inclusion of key informants (i.e. domain knowledge), both as interviewees and reviewers implies enhanced reliability and initial validity of the constructs, and suggested modifications of such, as the research progresses.
- Yin advises that concern about **internal validity** (i.e. evidencing cause and effect) is not a necessary requirement of exploratory research, but is far more relevant to explanatory/predictive oriented research. Consequently, within the context of the case study research internal validity is not a prerequisite. However, this observation does not negate the commencement of explanation building. Such explanation building is being done with this research as it is grounded in theory, and it is being examined by means of a series of case studies with modifications being made based on the apparent fit between observations and theory. Once the case studies were completed, a survey directed at the SC and Finance functions continued the iterative explorative approach, but in a

quantitative manner. Such an effort was anticipated to bring suggestions for improved clarity (i.e. definition, direction, strength, relationships) around variables/measures that would contribute to the continued refinement of the model under consideration. Stage 3 should however not be construed as explanation testing.

- **External validity** usually refers to the generalizability of the results to a general population. In this particular case, the “general population” would be the SC/Finance relationship (Davis, 2000). In the case of the Stage 3 survey it should be noted that until such time as a survey is executed, using a sample that has actually been exposed to the potential use of SCF (which is not the case to date), generalizability may be implied but it should still be very guarded or reserved. For the purpose of the mixed methods methodology (Stages 1, 2 and 3) the conclusions reached/observed are generalizable to the theories used to support the research. In essence, the research should ideally show a replication or fit of results that support the theoretical variables investigated.
- **Reliability** refers to the ability of future researchers to have the capacity to repeat the same research over again, with the same results. This will be addressed by extensive documentation associated with: a) the case study objectives and research issues, b) field procedures, researcher credentials, case study selection methodology, sources of information), c) case study questions (interview discussion guide, draft survey tool, method of data analysis) and d) a consistent chain of evidence supporting the findings of the research, as well as

changes that were made to the research design as the effort migrated from Stage 1 through to the completion of Stage 2.

Ensuring the validity/accuracy of observations warrants a further expansion of discussion. Miles & Huberman (1994) identify three general forms of biases found in qualitative research:

- Interpreting events as more patterned and congruent than they really are.
- Overweighting data from articulate well informed people and underweighting data from less articulate people, and
- Losing perspective, by being co-opted into perceptions; described by Miles & Huberman (1994) as “going native”.

These biases can be exhibited by the interviewer as he/she is asking questions and processing responses, or in the respondent in expressing their views regarding the questions asked. Consequently, they must be guarded against, and were mitigated in the following manner. In this research effort most of the mitigation efforts outlined below were followed, and where circumstances did not allow such efforts, those exceptions are noted.

- An explicit effort was made to ensure the interviewees knew exactly why the research was being done, how the information would be collected and how it would be used. Refer to Appendix 2 for a sample of the information used to invite participants to participate in the research effort.

- Interviews with respondents were held independent of each other, thereby removing the capacity to influence each other during the interview.
- Interviews were held as back to back as possible in order to reduce the possibility of discussion between the two interviewees, until such time as both interviews were completed.
- A discussion guide was followed in Stage 1 (Appendix 3), while a draft survey questionnaire was used in Stage 2 (Appendix 4). Both sets of conversations were digitally recorded in order to assess the uniformity of questioning to both parties, in both Stages.
- Transcripts of interviews were made available to respondents in Stage 1 to a) ensure accuracy of comments made and b) identify any factual or contextual situations that may have led to different responses. None of the respondents agreed to the offer, and instead brief power point presentations were provided to all participants of Stage 1, summarizing their comments.
- Any outlier observations or contradictory statements/facts that were provided were followed up with respondents during the summary presentations.
- Interpretation of results by the interviewer was discussed with the respondents as well as third parties (EDC colleagues) in order to evaluate the presence of any biases.
- Both respondents in each firm were asked to respond to questions based on the same time context (post 2008) in order to remove any temporal selection difference between the two.

- Efforts were made to triangulate the data received, not only by cross reference of the two interviewees, but also by other means such as observation of technical practices and innovative practices noted during the interviews, or discussion with third parties (e.g. suppliers). Such access was not provided by the enterprises, due to time limitations, so other methodological triangulation (Lee, 1999) methods were used. These methods were the Stage 3 survey and the post Stage 3 offer of discussion with Stage 1 and 2 participants of the Stage 3 results, in the context of their own specific responses to the Stage 3 results. In regards to the final offer of discussion, none of the Stage 1 and 2 participants chose to accept the offer, or the individuals in question were no longer with the firm in question.
- The number of enterprises to be interviewed (7) should be sufficient to increase the probability of finding replicability in the observations.
- The Stage 3 survey tool was also useful as it mitigated the interviewer's ability to interpret the results in a biased way.
- The validity, accuracy and presentation of questions was mitigated, first by using a draft survey tool for the purposes of Stage 2, and then prior to the release of the final survey a review by EDC colleagues, three outside respondents, and by the PhD advisor in order to ensure the acceptability of wording, presentation and face validity.

5.3 Case Study Unit of Analysis

Fundamentally, the unit of analysis rested on the dynamics (i.e. cross-enterprise, cross-functional, innovation) that existed between the SC and Finance functions of a given enterprise. For the purposes of this research the definitions/scope of both functions were:

- The Finance function is responsible for financial planning, cash management, funding, payments and record-keeping for a company.
- The SC function is responsible for the procurement, negotiation activities with suppliers, the management of supplier alliances, inventory management, manufacturing and logistics management.

Figure 3 provides a visual of the SC/Finance relationship in the context of the production and administrative value chains within an enterprise.

Figure 3 – Enterprise Value Chain

The relationship in question is reflected in the double-headed arrow between the two value chains.

5.4 Case Studies Sample

The enterprise names that were approached to participate in Stage 1 and 2 were derived from EDC's database of identified Canadian firms that were light manufacture and information technology based and export oriented. The effort was targeted at firms with greater than 20 million in sales based on the assumption that firms above this level had the resources and requirements to have executives/respondents with distinct Finance and SC responsibilities. A broadcast note explaining the purpose of the study was provided to all firms approached (Appendix 2).

In regards to Stages 1 and 2 the objective was to have between 6 and 8 case studies, as recommended by Eisenhardt (1989) and Yin (2003). Approximately 30 enterprises were approached before the requisite number of firms was attained for the case study research portion of the effort. These selected firms had to meet three key factors to be considered.

- They had to have a global footprint (both inputs and outputs).
- They needed to agree to select a supplier that they considered of a key or strategic nature. The criteria for this selection (Hart & Saunders, 1997) could be such things as frequency of transactions, criticality (i.e. sole source), size of spend, long term relationship, difficulty in substituting etc.); but the key issue was to have both functions agree on one supplier, with whom the enterprise recognized as having some form of strategic dependency/collaboration. This was

not considered a barrier as most buyers segment their supplier base into important and less important suppliers.

- There needed to be evidence that the enterprises in question had made or were making technology associated investments, in order to screen for a minimum level of technology maturity.

Outlined below are brief descriptions of the firms that participated in the study as well as identification of the title of each respondent. Cases A, B, and C participated in Stage 1, and in Stage 2 cases B, D, E and F participated.

Case A – 50 million dollar privately held firm that manufactures high-end control modules for sophisticated “live” entertainment and sporting events. Essentially, it is a “make to order” firm, characterized by customer order driven, configurable materials, long turnaround times, and with low fill rates. The firm manufactured all products itself, with its core competency resting in its research, design and engineering team. Respondents were the Chief Financial Officer (CFO) and the Manager of SC activities.

Case B – 50 million dollar privately held firm that acted as an “on line” wholesaler of floor tiling products. Core competency rests in logistic algorithms that allow it to deliver products from Asia to the US efficiently, as well as in its continuous exchange of data flow with its supply chain partners. It a “source to stock” firm that is inventory driven, has relatively standard material orders, with high fill rates and

short turnaround times. Respondents were the Vice President (VP) of Supply Chain and the CFO. The VP of Supply Chain was also the VP of Sales.

Case C – 30 million dollar privately held firm that takes plastic pellets and extrudes them in any form or fashion as required by its clients. Core competency is its capacity to provide full service (i.e. engineering and design, not just manufacturing to specifications) to its clients. It is essentially a “make to order” firm driven by customer orders, with configurable materials and short turnaround times. Respondents were the CFO and shortly to be appointed VP of Supply Chain (currently VP of Engineering).

Case D – 45 million dollar publicly traded firm that is a participant in the international transportation system sector. Its principal product lines are associated with collection of information related to the tracking, classification and weighing of vehicles at high speeds. This information is then incorporated into traffic and safety solutions. Its core competency resides in its research, design and engineering team. It is essentially an “engineer to order” firm driven by customer orders (principally foreign governments), with long turnaround times. Respondents were the Comptroller and the Manager of Procurement.

Case E – 800 million dollar publicly traded firm that is participant in interactive technological support to the educational sector. Its core competency is its distribution and marketing capability to the educational sector. It is both a “source to order” and “make to order” firm, which uses in house manufacturing capability, third party

contract manufacturers as well as original design manufacturers to address its customer needs. Respondents were the CFO and Senior VP of Supply Chain.

Case F – 80 million dollar privately held firm that is focused on producing other firms' information communication products by means of a consignment, turnkey or combination of both. Its core competency is its best in class manufacturing capability. It is essentially a “make to order” firm driven by customer orders, emphasizing short turnaround times and high fill rates. Respondents were the Director of Supply Chain and the Comptroller. Similar to Case B the Director of Supply Chain was also responsible for Business Development.

5.5 Analytical Approach for Stages 1 and 2

The data obtained from Stages 1 and 2 was analyzed in the following manner. For each case study, there was a write up of the recorded observations from the interviews, based on NVIVO software. The write up from Stage 1 was offered to the respondents for their comments as to the accuracy of their responses and for any further clarification they wished to make. The intent of this write up/presentation was to achieve the following objectives:

- Validate that the suggested variables had relevance. There had to be at least acknowledgement that the variables under discussion were relevant, and ideally supportable evidence of the variables.
- Validate that the terminology used in the interviews resonated with the respondents. As the context of the subject matter is original (i.e. Finance and

SC), the terminology that originates from other contexts (SC and Marketing, or innovation adoption rather than innovation consideration) needed to be confirmed. This was a necessary precursor to the preparation for Stage 3.

- Identify the alignment or lack thereof between the two functions on the variables discussed. Alignment in this case meant the clear articulation/identification of similarities, as well as differences that appeared to exist between the two functions regarding the variables to be discussed.
- Identify operationalizations of the variables that resonated with the relationships that exist between SC and Finance (e.g. articulation of the type of performance measures or processes that may be common to that relationship). Again, this identification process was a precursor to the actual operationalizations used in the Stage 3 survey. Many of the variables had numerous suggested operationalizations that were derived from the literature review/SCOR manual but they needed to be validated as relevant to this research or new ones needed to be created.
- The case study records will act as a reference point for retrieval of information, and as a precedent if the research is to be replicated or extended at a later date.

In conjunction with the write up, NVIVO software was used to analyze the data obtained from each interview and across all interviews. This software provided the capability to reduce and segment the data into observable categorizations (e.g., trends, themes,

variables, operationalizations) that ultimately defined and grounded the structure of the draft survey for Stage 2.

Chapter 6 to follow (along with Appendices 3, 5, and 6) provides the core of the audit trail that documents changes to the suggested hypotheses, variables and measures. The major changes to be discussed in Chapter 6 can be briefly summarized as a reduction of hypotheses from 17 to 11, continued refinement of the dependent variable, and a revised model for further consideration in Stage 3.

6 Chapter 6 – Stages 1 and 2 Results

This Chapter discusses observations from the individual cases studies from Stage 1, how those observations impacted the choice of variables to be retained for Stage 2, how this choice of variables resulted in modifications to the model, and how the lessons learned from Stage 1 also influenced the Stage 2 interviews. Additionally, Chapter 6 discusses observations from individual cases studies from Stage 2 (with details provided in Appendix 5), with a particular emphasis on how it assisted in the determination and structure of the ultimate survey tool that was used in Stage 3.

6.1 Summary Stage 1 of the Research

Pursuant to the research methodology, interviews were held with three Canadian firms (Cases A, B and C) during the period from January to March 2011. The purpose of these meetings was to evaluate the basic conclusion reached in Chapter 3 that SCF should not be currently considered a strategic driver/objective, to examine the relevance and initial validity of the variables discussed in Chapter 4, and that the terminology used in the interview resonated with the respondents. To this end, a discussion guide (Appendix 3) was developed in advance in order to prepare the researcher for the Stage 1 discussions. Yin (2003) encourages that such discussions be open ended so for each item to be discussed, general questions/ prompts /facilitators were identified (primarily from a review of academic literature, but supported by trade literature) for use during the discussion in order to encourage the open engagement of the respondent. Yin also suggests that in addition to the open ended questions there be some high level questions

created which the researcher uses to discipline himself/herself to stay focused and ensure that he/she is acquiring information that is relevant. Such suggested questions are referenced in the “research protocol” column of Appendix 3, and were for the reference of the researcher alone. They were the researcher’s “validation” tool that the line of questioning being undertaken in the interview was addressing the core issue of interest.

In terms of the first objective regarding the assessment derived in Chapter 3 associated with whether or not SCF could be considered a strategic driver or objective for a firm, there was no evidence from the meetings to suggest any modification to the original assessment. Thus at this stage of the research effort, SCF was considered to be perceived as a non-strategic driver or objective of firms. Presented below is a discussion related to the second (i.e. variables) and third (i.e. terminology) objectives of the meetings held during Stage 1.

6.1.1 Relevance of Independent Variables

Stage 1 of the research model had 17 independent variables based on three distinct theoretical streams (i.e. cross-enterprise, cross-functional and innovation). As this research is exploratory the criteria used for evaluation of whether to keep or remove the variables was not overly stringent, and essentially came down to one issue. If there was evidence of the variables being supported (regardless of strength or direction) by at least one of the cases, then it was retained. If no support was provided the hypothesis was removed from further consideration. This approach conforms to Yin’s (2003) principle of providing a model of proof.

All three streams of thought resonated with the respondents but at least one variable within each stream was removed from further consideration, leaving 11 independent variables that were the subject of further evaluation in Stage 2 of the research effort.

The conclusions reached subsequent to the analysis of the transcripts were discussed with the representatives of the three case studies in order to ensure validity of observations. Outlined below is a summary of the conclusions reached for all independent variables: the underlying premise of the questions is provided, the core research question is summarized, a high level description of observations is provided, followed by the decision to retain or remove from further consideration, with suggested modifications to the hypothesis statement if considered appropriate.

H1 - External Partner (Supplier) Influence – The premise of this variable was that innovation consideration is positively related to high external partner influences.

- Core question: Is there any evidence of consideration/adoption of innovations driven by the designated supplier (or even a non-designated supplier)?
- There was tangible evidence of external influence, but the choice of the word “high” in the original hypothesis implied an almost direct pressure to adopt, which did not seem to be the case, and it may also be interpreted as the external partner leading the race to innovation. Clearly, in all cases the companies interviewed felt that they were the leaders in innovation rather than the external party.

- Recommendation – Retain, but rephrase in the following manner;
Administrative innovation consideration is positively related to strategic partner influences.

H2 - Application Service Provider (ASP) Influence – The premise of this variable was that innovation consideration would be positively related to an ASP's marketing efforts.

- Core question: Did the activity of the ASP encourage or accelerate the consideration or adoption of technology applications?
- There was no evidence of active ASP marketing of these firms, nor a general receptiveness by the firms in question to the approaches of these firms.
- Recommendation – Remove from further consideration.

H3 - Perceived Effectiveness of the Relationship with the Supplier – The premise for this variable was that innovation consideration is positively related to the positive perception of the effectiveness of the supplier by both the Finance and the SC functions.

- Core questions: Have you been able to determine why the respondent picked the supplier in question? What were the key drivers that made this supplier a key collaborative or dependent partner?
- Based primarily on Case B there was sufficient evidence (i.e. regularly scheduled planning meetings between both companies executives) to support retention of this variable.

- Recommendation – Retain but rephrase in the following manner; Administrative innovation consideration is positively related to the positive perception of the effectiveness of the supplier by both the Finance and the SC functions.

H4 - Direction of Information Flow – The premise of this variable was that innovation consideration is positively related to high levels of information exchanges between the functions.

- Core question: Given the instances cited by both functions, do they support/fit Thompson's (1967) typology?
- All three cases evidenced close collaboration and information exchange flow. Case B clearly evidenced current consideration of innovation consideration between functions (i.e. Thompson's "reciprocal interdependence"), while Case C exhibited expectations of such behavior.
- Recommendation – Retain but rephrase in the following manner; Administrative innovation consideration is positively related to high levels of information exchanges between functions.

H5 - Performance Metrics – The premise of this variable was that innovation consideration is positively related to the level of cross-functional understanding and alignment of the firm's performance metrics that exist between the functional groups.

- Core questions: How much of an overlap exists in perception of metrics used to measure the success of upstream supply chain activity? In the responses, was

there at least one measure from each of the three categories (i.e. output, resources, and flexibility)?

- Case B and C supported the perception of this alignment, with the common denominator being the need to address customer satisfaction in a timely manner.
- Recommendation – Retain but rephrase in the following manner; Administrative innovation consideration is positively related to the level of cross-functional understanding and alignment of the firm's performance metrics that exist between the functional groups.

H6 - Personal Incentives – The premise of this variable was that innovation consideration is positively related to the cross-functional alignment of personal and joint performance incentives.

- Core questions: Would an improved incentive structure foster better integration between functions? Is the incentive system linked closely to the performance indicators? How much common ground do they share?
- There was a complete lack of evidence for shared personal incentives directly associated with the performance of upstream supply chain activities.
- Recommendation – Remove from further consideration.

H7 - Perceived Effectiveness of Cross-functional Relationship – The premise of this variable was that innovation consideration is positively related to the perceived effectiveness of the cross-functional relationship based on the degree of observed difficulty and uncertainty associated with the relationship.

- Core question: Is there a strong sense of interaction and dependence between the two functions?
- There was sufficient evidence from all three cases to keep this variable, although there seemed to be some overlap in interpretation (i.e. frequent communication equates to effectiveness) with H4.
- Recommendation – Retain but rephrase in the following manner; Administrative innovation consideration is positively related to the perceived effectiveness based on the degree of observed difficulty and uncertainty associated with the relationship.

H8 - Centralization/Decentralization – The premise of this variable was that innovation consideration is negatively associated with centralized organizations.

- Core questions: Have you collected enough information to determine the degree of centralization or decentralization that exists with the firm and between the functions? Who has the power and do they exercise it explicitly/implicitly?
- The results of the interviews indicate that centralized decision making, when collaborative in nature (Case B and C), was positively related to innovation consideration.
- Recommendation – Retain, change to a positive relationship and rephrase in the following manner; Administrative innovation consideration is positively associated with centralized organizations.

H9 - Formalization – The premise of this variable was that innovation consideration is negatively associated with more formal organizations.

- Core question: How bureaucratic are they in following rules and processes, or is the situation more fluid and organic?
- All cases indicated that they had formal procedures (e.g. delegation of authority) but in all cases there was a clear sense they did what they had to do, which meant they worked within the rules and outside the rules when necessary. As the answer in the cases was essentially “yes, but no”, it can be argued that formalization did not appear to be a factor, but it was still not clear.
- Recommendation – Retain, but look for harder evidence, and rephrase in the following manner; Administrative innovation consideration is negatively associated with more formal organizations.

H10 - Organizational Complexity – The premise of this variable was that innovation consideration is positively related to the level of sophistication and education of representatives in each function.

- Core questions: Does the organization have enough specialization and sophistication to be in a position to consider new innovations? Do the differences between functions in organizational complexity create or hinder dialogue? Does the organizational complexity indicate whether the functions are function focused or are they process focused?

- Case B was supportive of this variable, as both functions were both highly experienced and educated in their respective fields, and were continually looking for supply chain innovations, both upstream and downstream.
- Recommendation – Retain but rephrase in the following manner; Administrative innovation consideration is positively related to the level of sophistication and education of representatives in each function.

H11 - Technological Maturity – The premise of this variable was that innovation consideration is positively related to high technological maturity (e.g. number of applications, level of technical resources, and how the benefits of such are described).

- Core questions: How much of an overlap exists in systems that integrate each function, and if there is no integration how aware are each other of the other's technology enablement? Do both functions share the same view of the benefits? Have you acquired a sense as to the nature of the decision making around technology?
- As it turned out in regards to the participants of Stage 1 it would have been a stretch to consider the firms' technologically mature by the traditional measures of number of applications and level of technological resources in place. However, in all three cases both functions had a healthy awareness of what applications were available, particularly from a Finance perspective, so technological maturity was present in terms of intangible attributes, as opposed to tangible attributes.

- Recommendation – Retain but rephrase in the following manner; Administrative innovation consideration is positively related to high technological maturity.

H12 - Relative Advantage – The premise of this variable was that innovation consideration is positively related to ideas, products, processes that are perceived to have a relative advantage over their predecessor.

- Core question: How important is “relative advantage” as a variable in the adoption of technology investments, vis a vis other variables?
- Relative advantage was recognized in all cases but was immediately associated with internal production processes or customer facing efforts. Relative advantage of administrative process innovations was not of immediate concern.
- Recommendation – Retain, but rephrase in the following manner; Administrative innovation consideration is positively related to a relative advantage over its predecessor.

H13 - Compatibility – The premise of this variable was that innovation consideration is positively related to the degree of compatibility with existing practices, organizational structure, and readiness to adopt new practices and identified needs.

- Core question: How important is “compatibility” as a variable in the adoption of technology investments, vis a vis other variables?
- In all cases this did not seem to be a significant issue, as they saw any “enhancement” of existing administrative processes as an iteration on an

existing theme. However, compatibility may have some application at the cross-functional level, as opposed to the enterprise level.

- Recommendation – Remove, but incorporate into “H14 – Complexity”.

H14 - Complexity – The premise of this variable was that innovation consideration is negatively related to complexity (i.e. ease of use, implementation and understanding).

- Core question: How important is “complexity” as a variable in the adoption of technology investments, vis a vis other variables?
- This particular variable did seem to gain traction in the context of the challenges of considering innovation, but as most respondents were thinking about enterprise and downstream process improvement, the variable warrants further examination in the context of upstream administrative processes.
- Recommendation – Retain, incorporate H13 Compatibility into the operationalizations, and rephrase in the following manner; Administrative innovation consideration is negatively related to complexity (i.e. difficult to use, implement and understand).

H15 - Observability – The premise of this variable was that innovation consideration is positively related to high observability (i.e. the results of an innovation are visible, and are measured against defined metrics).

- Core question: How important is “observability” as a variable in the adoption of technology investments, vis a vis other variables?

- Once the discussion was framed clearly in the context of an administrative process, all respondents did not see this as an issue as they are already working with their established administrative processes. Any innovation would be an extension of what was already visible.
- Recommendation – Remove from further consideration.

H16 - Trialability – The premise of this variable was that innovation consideration is positively related to high trialability (i.e. the degree to which an innovation may be experimented with on a limited basis, before adoption).

- Core question: How important is “trialability” as a variable in the adoption of technology investments, vis a vis other variables?
- Once the discussion was framed in the context of administrative process innovations, the hypothesis received no support, as the process already exists, albeit it in a primarily paper based manner.
- Recommendation – Remove from further consideration.

H17 - Level of Uncertainty – The premise of this variable was that innovation consideration is positively related to low perceptions of uncertainty (i.e. whether or not the returns of the innovation are significant enough to address the risks that accompany adoption and implementation of the innovation).

- Core question: How important is “uncertainty” as a variable in the adoption of technology investments, vis a vis other variables?

- In all cases, discussion of this variable created confusion as the difference between it and other variables such as relative advantage, compatibility and complexity (in the specific context of administrative process innovations) was hardly discernible.
- Recommendation – Remove from further consideration.

6.1.2 Dependent Variable

For the Stage 1 case studies, the dependent variable was initially described as the propensity to consider improvements to the “source to pay” process. However when the discussions in the case analyses were undertaken it was made abundantly clear through the responses that the majority of the respondent perspectives were downstream related, even amongst the supply chain respondents. As the premise of this research effort is to explore upstream propensity, any attempt to measure the dependent variable as originally defined appeared to run a high risk of confusion by the respondents as to the intent (i.e. upstream). As well it was determined that even retaining the specificity of “source to pay” in the discussions raised the risk of marginalizing the discussion; particularly the use of the word “pay”. Therefore the dependent variable question was reworded in a manner that was specific to upstream issues and provided an opening for the discussion to be more general; propensity “... to consider cross-enterprise *upstream administrative* supply chain related applications”.

A summary of the forgoing recommendations is provided in Table 2 below.

Table 2 – Summary Analysis of Stage 1 Recommendations

H1 – External Partner Influence	Retain
H2 – Application Service Provider	Remove
H3 – Perceived Effectiveness of Supplier	Retain
H4 – Direction of Flow of Information	Retain
H5 – Performance Metrics	Retain
H6 – Performance Incentives	Remove
H7 – Effectiveness of Cross-functional	Retain
H8 – Centralization / Decentralization	Retain, but change direction
H9 – Formalization	Retain
H10 – Organizational Complexity	Retain
H11 – Technological Maturity	Retain, but rework
H12 – Relative Advantage	Retain
H13 – Compatibility	Remove and incorporate into H14
H14 – Complexity	Retain but rework to capture H13
H15 – Observability	Remove
H16 – Trialability	Remove
H17 – Level of Uncertainty	Remove
Dependent Variable – propensity to consider improvements to the “source to pay” process.	Retain, but clarify that dependent variable refers to “...cross-enterprise <i>upstream administrative</i> supply chain related activities.”

6.1.3 Impact of Stage 1 on Research Design and Stage 2 Activities

As valuable as the interviews were for determining the relevance of the variables they were equally valuable in providing refinements to the descriptive language used for each variable, to identify operationalizations of each variable that resonated with respondents, and most importantly, to identify areas of confusion amongst the respondents when certain terminology was used. The following learnings were considered key, and helped frame modifications to the research design and activities for Stage 2.

- It was necessary to be explicit, and provide regular reinforcement that the subject matter of this research was an administrative process innovation, not a production process innovation or a product innovation. Respondents far too often talked about the latter categories, or reverted to the latter categories too readily during the interviews. This observation was incorporated into all the revised hypotheses.
- During the initial screening of the Stage 1 enterprises, one of the criteria used for initial screening was related to whether the companies had made or were making technology associated investments, and generally, this was described to them in the context of product and production activities. Based on the experience obtained from Stage 1 (see previous item above), when it came time to screening for the Stage 2 of the effort, far greater clarity was provided to potential respondents regarding the meaning of technology associated investments (i.e. administrative processes).
- It was necessary to be explicit, and reinforce it regularly, that the focus of this research was upstream (i.e. suppliers) related. Respondents without exception would respond to questions at the outset using a downstream (i.e. customer facing) perspective.
- Having both participants agree in advance to the name of a key supplier was a key facilitation tool to bring increased commonality of focus to the independent interviews.

- The original thesis proposal proposed that the case study discussions be evaluated using the SCOR model; specifically the Plan, Source, Enable Plan, and Enable Source factors of the SCOR model. When the transcripts of the interviews were evaluated using NVIVO and coding related to SCOR variables applied, it became clear that “Enable Plan” and “Enable Source” were dominant in the conversation. It was presumed that that was because the respondents who were interviewed, were from smaller firms. They had had neither the time nor the resources to fully execute the stage of development represented by the “Enable” factors of the SCOR model, which in essence are a precursor to the execution of the Plan and Source stages of the SCOR model. It was also clear that the respondents themselves had little, if any, awareness of the SCOR model. Consequently, the interview guide/draft questionnaire for Stage 2 was crafted to have minimal reference to SCOR model terminology in order to minimize the complexity of the Stage 2 dialogue. However, examples from SCOR continued to be used for operationalization purposes.
- There was a clear realization that the breadth of questions that could have been asked, based on the literature research prior to Stage 1, needed to be scaled down in order to avoid reaching a “respondent” saturation point. Consequently, an effort was made to limit the breadth of certain questions. For example at the outset of Stage 1 the intent had been to use as an organizing structure Beamon’s (1999) three broad categories of metrics (i.e. resources, outputs and flexibility),

with some expansion to include a more comprehensive list of financial metrics.

This list however was significantly scaled back for Stage 2.

- It became clear that further access to other means of validating statements that were enterprise centric was not going to be forthcoming as the firms in the question had neither the time, the resources, nor the hard assets to agree to that (i.e. job descriptions, delegation of authorities, written procedures, paper trail related to cross-functional projects). However, despite that shortcoming, it is felt that the research design provided sufficient triangulation of observation by means of a) the multi method methodology followed, b) the multiple feedback loops that Stage 1 and 2 provided c) the informed observer pre-test of the Stage 3 questionnaire, as well as d) the Stage 3 survey; to provide sufficient checks and balances of observations made.
- Originally Thompson's (1967) interaction framework around the past, current and planned technological applications was conceived as the tool to evaluate direction of flow of information. However as it was uncovered during the interviews that all three firms had not really invested in any substantive new form of technology application in the last 4 to 5 years, and had no current plans for near term investment, the taxonomy did not appear to have any continued application. Consequently, the application of Thompson's taxonomy was not considered viable, and metrics around frequency of cross-functional interaction and leadership role on processes were created for Stage 2 to evaluate the direction of flow of information.

- Technology maturity as generally defined in the literature refers to the level of technology applications currently in place, the level of technical knowledge resources available to a firm, and the executive perspective on the use of technology to achieve strategic ends. As noted previously although all firms were using some form of technology applications, the “currentness” was not of prime concern, so it raised the question as to whether software that may be five years old, but still adequate, represents an enterprise that is technologically mature or one that is technologically dated. Combining that observation, with the researcher’s perception that the size of the firms interviewed clearly had a limited capability to embrace new technology, and by extension those of the targeted sample that were to be interviewed in Stages 2 and 3, the question became more one of perceptual observations about maturity surrounding technology by the respondents, rather than whether the firm itself could be considered to be technologically mature. Consequently, the focus on maturity was essentially narrowed down to the third category referred to above as “the executive perspective on the use of technology”.
- There was an undertone that the two competing ideas associated with the variable of relative advantage (i.e. benefits and challenges) were indeed something that should be separated. This was particularly so in the context of administrative process improvements, where challenges appeared to take a less important weighting than did benefits, within the relative advantage variable. This separation was reflected in the questions for Stage 2.

- As noted previously the dependent variable was reworded for Stage 2 to help ensure that the respondents associated the question with upstream activities. In order to bring even greater clarity, three additional measures associated with production processes, enterprise centric administrative processes, and customer centric processes were added. By providing four options, it was felt that greater confidence in the respondents accuracy of interpretation of what the question was asking would be achieved.

Outlined below in Figure 4 is the revised model based on the previous discussion.

Figure 4 – Post Stage 1 “Lines of Inquiry” Research Model

The most significant changes represented in this model, when compared to Figure 2 (the original model prior to the Stage 1) are: a) the reduction of hypotheses considered, b) the dotted lines indicate that proposed hypotheses will be now be evaluated using the Stage 3 survey and c) modification of the dependent variable based on research completed.

For the balance of the thesis, the hypotheses have been renumbered, in order to simplify the discussion. The conversion table (Table 3) is provided below for reference.

Table 3 – Renumbered Hypotheses

“ A priori” Stage 1	“Post” Stage 1
H1 – External Partner Influence	H1 – External Partner Influence
H2 – Application Service Provider	Removed from further consideration
H3 – Perceived Effectiveness of Supplier	H2 – Perceived Effectiveness of Supplier
H4 – Direction of Flow of Information	H3 – Direction of Flow of Information
H5 – Performance Metrics	H4 – Performance Metrics
H6 – Performance Incentives	Removed from further consideration
H7 – Effectiveness of Cross-functional	H5 – Effectiveness of Cross-functional
H8 – Centralization / Decentralization	H6 – Centralization / Decentralization
H9 – Formalization	H7 – Formalization
H10 – Organizational Complexity	H8 – Organizational Complexity
H11 – Technological Maturity	H9 – Technological Maturity
H12 – Relative Advantage	H10 – Relative Advantage
H13 – Compatibility	Removed from further consideration
H14 – Complexity	H11 – Complexity
H15 – Observability	Removed from further consideration
H16 – Trialability	Removed from further consideration
H17 – Level of Uncertainty	Removed from further consideration

6.2 Summary of Stage 2 of the Research

Outlined below is a description of how the Stage 2 case study effort was executed. It is somewhat briefer than that of the Stage 1 discussion, not because it was less time

consuming, but because new significant insights to the research effort were not as prevalent. Therefore presented below are only the material highlights of this portion of the research effort, while the more granular suggestions/insights are documented in Appendix 5.

Interviews for Stage 2 were held with four Canadian exporting firms (Cases B, D, E and F) in July and August of 2011. It should be noted that Case B, which had participated in Stage 1 of the research, specifically asked to continue its participation in Stage 2. The purpose of the interviews was to continue validating the remaining variables, but as well to focus more intensively on the operationalizations of each of the variables, as well as the initial inclusion of questions related to discrete variables. This effort was operationalized in a survey tool (Appendix 4) which each of the respondents was asked to fill out in the presence of the researcher. The actual interviews were recorded and transcribed using NVIVO. The operationalizations/measures developed were based primarily on Stage 1 discussions, academic literature review, EDC experience in dealing with supply chain related issues, and illustrative examples provided in SCOR material. Subject to the feedback received from the respondents, the objective was to reduce the draft survey for Stage 2 into a manageable survey for the Stage 3 effort. More specifically the questionnaire was used to:

- evaluate different formats and content of scales
- narrow down the actual categories that would be used for illustration in the operationalization of the variables

- look for better examples of categorizations
- look for redundant operationalizations
- look for missing categories that would enhance the survey, and
- provide the opportunity for discussion on some of the more qualitative categories used in order to confirm understanding of wording and meaning.

In the case of the last reason provided, this led to some of the questions being more descriptive in content than would be the case in an actual e survey.

Although the respondents did fill out the questionnaire, they were also asked after each question as to the clarity of the question, and its continuing relevance to the cross-functional relationship. Of particular concern was to try to minimize the opportunity for confusion between the two functions. A classic example would be the use of the word “material”. Would a Finance function representative interpret such a word in an accounting context of “materiality” (i.e. if its omission or misstatement could influence the economic decision taken on the basis of the financial statements by users of such statements), while the SC function representative would interpret the same word in another context (i.e. adverse impact on supplier relationships/delivery schedules). This was an obvious example but as there are no precedents for this cross-functional comparison, the discussion was left open ended and participants encouraged to raise such nuances.

Appendix 5 provides a detailed discussion of the observations from Stage 2 and the impact on the relevant question as it applies to the Stage 3 survey tool. Appendix 5 is organized by survey question into four sections:

- Identification of the survey question posed
- Provision of comments on the salient conclusions from the interviews, regarding the question
- Where relevant, discusses the key learnings from Stage 2, that needed to be considered in the development of the Stage 3 questionnaire, and
- Provides the final question that was used in the Stage 3 survey.

It should be noted that although the vast majority of the questions posed were identical for each participant there were a number of questions (Questions 11, 12 and 16) that were framed in the context of one function's perspective of the other function's performance or role. Therefore, in Appendix 5 when the wording "Supply Chain/Finance" is used, it is meant to indicate that the question posed was specific to the interviewee's function and his/her perspective of the other function.

Also, it should be noted that pursuant to maintaining an audit trail of changes in definitions and terminology use, Appendix 6 provides the specific questions and operationalizations used in the Stage 2 draft survey and how they were continued, modified or discontinued in the Stage 3 survey. As well, Appendix 7 provides information on the various primary sources from which the operationalizations of the variables for Stage 3 were derived.

From the perspective of exploring the validity of the variables in the context of case study research, Stage 2 was the end point, as no new material information had been obtained that would suggest any significant change to the suggested variables or measures. As previously indicated the next stage of the research effort was to execute the survey derived from Stage 2, and from the results see what further insights could be derived.

Once again, it is reemphasized that the statistical analysis in Chapter 7 to follow, was intended to assist in developing an explanation, rather than seeking evidence of cause effect relationships.

7 Chapter 7 – Stage 3 Research Design and Results

Chapter 7 provides an analysis of the variables within the respondent sample using descriptive statistics, functional group differences using Manova and frequency analyses; and an exploration of the association of the hypotheses in the research model to the dependent variable using correlation, factor and multiple regression statistical analyses facilitated by SPSS Statistics 20.

The statistical analysis in Stage 3 was used with the intent of bringing greater clarity to variable definitions, operationalizations, modifications to hypotheses, insight to survey structure and provide inferences to a “line of sight” of activities/processes/ behaviors that may impact favorably on consideration of upstream administrative process innovations. It did not have the objective of testing causality and was not intended to be generalizable to a population. Rather as Yin (2003/2009) suggests, the results should be examined in the context of the variables derived from the theories that supported the research to see if those variables are supported. Such an approach, although not commonly used, is considered an acceptable use of statistical analyses as it explores data to form and sharpen variables, hypotheses and measures for future analysis (Wilkinson, 1999), and when there is a weak literature base associated with the issue at hand, it can be used as a potential tool for explanation building (Stevens, 2002). For the purposes of this research effort, the statistical analysis has been used to guide and discipline the researcher’s development of statistical inferences, but not used exclusively to define those inferences.

Rather, it has been combined with the researcher's domain expertise, to make informed inferences.

7.1 Survey Pool and Response Performance

Stage 3 was intended to evaluate the existence of relationships between/amongst key variables that appeared to have received validation from the efforts of Stage 1 and 2. When the thesis proposal was conceived and discussed with EDC (Spring/Summer 2010), it was originally planned that the data sets to be used, would be EDC data sets of clients and prospects for the light manufacturing (LM) sector (550 firms) and the information communication technology (ICT) sector (90 firms) manufacturing companies in Ontario that exported, with greater than 25 million in sales. The reason for this was that EDC had at the time one of the most comprehensive and current lists of senior level Finance professionals working for Canadian exporting companies, either customers of, or prospective clients of EDC. Additionally although not of the same calibre, EDC did collect information on SC professionals as and when the opportunity allowed. This list was primarily related to EDC's customers rather than prospects. Keeping in mind that this research project was exploratory rather than explanatory in nature, it was felt that although the lists were not of equivalent quantity or quality, a sufficient response rate would be forthcoming using EDC's brand value, and as such the quality of and size of the sample obtained would be robust for exploratory purposes. The anticipated design of the survey was that of an electronic survey as opposed to a phone or mail survey as that

conformed to the principal research design practice of EDC. Ultimately, the electronic survey was completed in two tranches.

The overall response performance of both tranches of the survey is presented in Table 4 below.

Table 4 – Response Rates for Stage 3 Survey

Source	Function	# of Potential Contacts	# of Actual Responses	Response Rate
EDC prospects and clients	SC	565	23	4.1%
	Finance	2314	55	2.3%
Third party service provider	SC	438	4	1%
	Finance	N/A	N/A	N/A
Ontario Institute of Purchasing Management Association of Canada	SC	183	28	15%

7.1.1 Tranche 1 (February 2012)

At the actual time of the Stage 3 survey preparation (November 2011 to January 2012), it was reconfirmed that an electronic survey remained the design of choice, however EDC provided direction that the survey could only be sent to prospects, due to a declared concern about “survey fatigue” with existing clients. Because of this decision, the sample pool of prospects from EDC was identified with 408 SC names and 1871 Finance names remaining available for consideration. These numbers also reflected a decision to no longer restrict the survey to Ontario firms but extend it to all LM and ICT prospect firms in EDC’s data set across Canada. Given the low potential SC respondent count a decision was also taken by EDC to purchase a third party list of SC professionals associated with

exporting firms, which resulted in an additional 438 names being added to the sample SC list.

The lists were provided by EDC to an outside market research data collection company to execute the survey. A broadcast note explaining the purpose of the study was provided to all email respondents, and three follow-up reminders were sent to all respondents of the first tranche. Both English and French versions of the questionnaire and the broadcast notes were prepared and used. Fluently bilingual supply chain and finance professionals vetted all translations from English to French for accuracy of translation.

A legal requirement of the third party list of SC professionals that was purchased by EDC was that the individuals identified on the list had to give permission for the survey to be sent to them. Up to five call-backs were made to try to reach these individuals to acquire such permission, and the final number of responses (4) was very poor. In terms of the prospect lists that were used based on the data sets of EDC, the combined responses (23) for both functions was also poor. It was determined after the fact that the EDC prospect lists had not been kept up to date, as EDC had made a decision in late 2010 to do less prospecting for new clients. This lack of attention to updating led to a 24% bounce back rate due to inaccurate or no longer valid email addresses. This portion of the survey was in the field for three weeks. Due to the limited initial response rate, EDC agreed to open the survey to non-strategic customers, which added another 157 SC names and 443 Finance names. Due to the inclusion of these names, the survey was left open for another

2 weeks. The final tally using EDC and third party data sets was 27 SC respondents and 55 Finance respondents.

Over and above the poor response rate from the third party data source and an explanation of the bounce rate, further explanations were sought for the challenges associated with the response rate. Upon further analysis, it was concluded that the brand power of EDC in reaching the SC respondents was overestimated, especially for prospects. Additionally the average time to complete the survey was 24 minutes. As such, there were probably some potential respondents that did not complete the survey, due to its length. Of the 82 submitted surveys, one (a Finance respondent) was removed as it was clearly not valid (6 minutes to complete, open commentary not favorable to the survey sponsor, and all the answers provided were uniform (i.e. 1, 1, 1, 1, 1)).

7.1.2 Tranche 2 (May 2012)

A further effort was undertaken in April 2012 to boost the SC response rate, by approaching the Ontario Institute of the Purchasing Management Association of Canada (OIPMAC) and requesting participation by means of access to their membership lists. They agreed as long as they were the ones that sent out the survey (thereby maintaining confidentiality of their members). As a result, a second tranche of the survey dedicated to SC respondents solely (LM and ICT sectors, 183 names in total), was launched on May 1, 2012 and closed on May 15, 2012. From this effort an additional 51 individuals commenced the survey of which 28 completed it. The average time of completion for Tranche 2 was 20 minutes.

7.2 Respondent Profile

Table 5 (Question 1) shows that the Finance respondents were representative of more senior levels in their organizations while the SC respondents were skewed to lower levels in their organizations. It is suggested that this was due to several reasons:

- EDC contact lists are generally associated with the most senior financial representative in a firm that can be obtained, and it is to those contacts that the survey was sent to.
- Responses from the OIPMAC portion of the survey are skewed to lower organizational levels, indicative of the membership demographics of OIPMAC.
- Generally, in smaller Canadian firms the senior SC respondent does not report directly to the President. EDC anecdotal experience is that usually the SC respondent reports through a VP of operations or the CFO to the President, therefore having representation at lower organizational levels for the SC respondents was expected.

Table 5 – Organizational Level of Respondents

Question 1	Measure	Frequency %		
		Aggregate (109)	Supply Chain (55)	Finance (54)
Please identify the level of your reporting relationship to the President/CEO of your firm.	Organizational Level			
	a) I am the President/ CEO	9.2	7.3	11.1
	b) I have a direct reporting relationship to the President/CEO	57.8	36.3	79.6
	c) My position is one level removed from a direct reporting relationship to the President/CEO	11.9	18.2	5.6
	d) My position is two levels removed from a direct reporting relationship to	9.2	16.4	1.9

Question 1	Measure	Frequency %		
	the President/CEO			
	e) My position is greater than two levels removed from a direct reporting relationship to the President/CEO	11.9	21.8	1.9

Table 6 (Question 2) indicates a further skewing of results between the two functions, with the Finance function more highly represented in smaller firms and the reciprocal for the SC function in larger firms. Again, this appears to be a function of the different samples used. In the Finance case, EDC did not allow the survey to be sent to strategic accounts, which would clearly have led to more Finance responses from larger enterprises. In regards to the SC respondents, there was no such constraint in the OIPMAC sample, and it is from that sample that the skewing towards larger firms occurred.

Table 6 – Level of Sales

Question 2	Measure	Frequency %		
What level best represents the current level of total GROSS annual sales (CDN \$) of your firm?	Sales	Aggregate (109)	Supply Chain (55)	Finance (54)
	a) Under 10 Million	27.5	16.4	38.9
	b) Between 10 and 20 Million	12.8	14.5	11.1
	c) Between 20 and 50 Million	24.9	21.7	27.7
	d) Between 50 and 100 Million	11.0	10.9	11.1
	e) Between 100 and 250 Million	4.6	7.3	1.9
	f) Between 250 and 500 Million	7.3	10.9	3.7
	g) Above 500 Million	11.9	18.2	5.6

Table 7 (Question 3) provides the breakdown by supply chain type. As the target sectors were the ICT and LM sectors, the dispersion of responses was expected and the distribution of supply chains between the two functions appears comparable. The first three types of supply chains are attributed to SCOR terminology. The final one (i.e. services) was meant to be an escape category if for whatever reason the strategic supplier chosen did not fit the first three categories, such as a logistics firm. Table 8 (Question 4) was meant to provide greater clarity as to the nature of the sourcing input. In Question 4, if a respondent identified “other” as a category, they were asked (optional response) to identify the specific nature of the firm in question. Uptake by respondents on this option was exceedingly limited; therefore, no further insights are available.

Table 7 – Type of Supply Chain

Question 3	Measure	Frequency %		
	Type of Supply Chain	Aggregate (109)	Supply Chain (55)	Finance (54)
What type of supply chain relationship most closely resembles the relationship your firm has with your “current strategic” supplier?	a) Source to Stock	51.4	54.6	48.2
	b) Make to Order	26.6	23.6	29.6
	c) Engineer to Order	12.8	14.5	11.1
	d) Services	9.2	7.3	11.1

Table 8 – Type of Input to Supply Chain

Question 4	Measure	Frequency %		
	Nature of Supplier Input	Aggregate (109)	Supply Chain (55)	Finance (54)
Having identified a “current strategic supplier” to your firm, which one of the following categories are they most closely related to?	a) They provide raw materials	29.4	30.9	27.7
	b) They provide stocked material	22.0	20.0	24.1
	c) They provide a service	6.4	1.8	11.1
	d) They provide semi-	17.4	23.7	11.1

Question 4	Measure	Frequency %		
	Nature of Supplier Input	Aggregate (109)	Supply Chain (55)	Finance (54)
	finished material that requires further value added work			
	e) They are a contract manufacturer	16.5	12.7	20.4
	f) Other	8.3	10.9	5.6

7.3 Statistical Analysis Methodology

The statistical analysis was divided into two distinct stages of analysis. The first component consisted of Manova and frequency analysis to identify differences between the two functional groups. The second stage dealt with the effort to investigate suggested associations between the variables by using correlation, factor and regression analysis. It was anticipated that such an effort would lead to inferences about improvement to the variables and the proposed model, as well as provide preliminary indication as to whether the development of the variables as suggested by Stage 1 and 2, would also find support in the analysis of association, as suggested by Yin (2003/2009).

In the discussion that follows, all comments provided should be taken in the context that in the vast majority of results associated with the continuous variables, the data was negatively skewed (i.e. relatively few low values) when dealing with scales such as importance and satisfaction. Therefore when discussing significant differences, these were not usually differences in direction, but rather in levels of intensity. Due to the negative skewness, further tests were undertaken to identify extreme cases within the context of the continuous variables. Ideally, the values of skewness should be zero in a normal distribution. The further the value is from zero, the more likely it is that the data

is not normally distributed. However in all cases (with one exception), the standard error of skewness were all < 2.0 , with vast majority < 1.0 , therefore virtually all the distributions were within acceptable levels (i.e. < 2.0), which is considered acceptable (SPSS Statistics 20).

Also, reliability of the measures of each continuous variable was assessed. Reliability refers to the consistency and stability of a score from a measurement scale (Davis, 2000). Cronbach alpha coefficient is the most widely used method of reliability in business research and is therefore utilized in this research. A coefficient of .70 is usually considered reliable for exploratory research (Davis, 2000) and as such all the values for the coefficients of the continuous variables were within acceptable exploratory guidelines. Table 9 provides the values associated with each continuous variable. As such, the variables were judged as having acceptable reliability.

Table 9 – Reliability of Continuous Variables

Variables (Number of Measures)	Cronbach Alpha Coefficient		
	Aggregate	Supply Chain	Finance
Question 5 (9)	.769	.766	.760
Question 6 (6)	.847	.830	.856
Question 7 (6)	.877	.803	.913
Question 9 (5)	.877	.864	.899
Question 10 (8)	.860	.805	.883
Question 11 (7)	.942	.939	.946
Question 12 (4)	.935	.941	.928
Question 13 (9)	.788	.818	.765
Question 16 (9)	.790	.696	.876
Question 17 (5)	.833	.798	.863
Question 18 (5)	.866	.808	.902
Question 19 (3)	.831	.826	.834
Question 20 (7)	.908	.888	.925
Question 21 (4)	.876	.873	.881
Question 22 (11)	.889	.868	.904

7.4 Functional Group Differences

Exploration of the functional group differences was done by using Manova analysis for continuous variables and frequency analysis for discrete variables, with the general objective to identify issues of significant differences between the two functions.

- The discussion to follow will comment on the aggregate (i.e. functions combined) top three or four most relevant measures, note differences that were material (e.g. top three of the SC function do not match the top three of the Finance function) and note apparent anomalies that appeared. Additionally comments will be selectively made in order to ensure that the results are interpreted correctly. For instance in one case a high mean is perceived as a positive (e.g. importance) and in another case a low mean is perceived as a positive (e.g. frequency). As this is exploratory research, a more liberal approach to significance testing was used in order to increase the power of discerning differences. Consequently, a significance level of $< .10$ was used as a guideline both at the aggregate and the functional level.
- For the purposes of the Manova discussion, the measures are presented in *order of priority* for the aggregate scores. Appendix 9 presents the same results, but in *alphabetical order* as used in the actual survey.
- In the Manova discussion, the presentation in the tables will provide (adjacent to the aggregate results), the separate results of the SC and Finance functions. Significance tests are used to illustrate differences between the functions,

however differences of significance need to be interpreted with care, as in some cases, given the nature of the measures chosen there should be a significant difference rather than no difference. For example a process should be clearly led by one function not the other, and if there is no difference in perception as to what function should lead, then the lack of a difference may be indicative of non-alignment.

- SCF will be discussed when inferences from the data suggest insights associated with that underlying theme.

7.4.1 Cross-enterprise Analysis – Group Differences

Questions 5 to 9 were designed to address the characteristics that defined the strategic/operational relationship with a supplier, and the differing or similar views that each function brought to that definition.

7.4.1.1 Question 5

Table 10 provides the relevant data for Question 5. From the aggregate mean the top four operational reasons (5 h, i, a, and f) are identified and two of them (5 h and i) showed significant differences between the functions. Of particular note is 5 e which had a very significant difference related to the value of risk sharing as a reason for selecting a supplier. Also of note is that with one exception (5 b) the SC respondents provided higher overall ratings.

Table 10 – Question 5 Group Differences (Manova)

Question 5	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
How important were each of the following factors in your decision to categorize the supplier you chose as your “current strategic supplier”?	h) Flexibility re: disruptions	3.90 (.94)	4.13 (.80)	3.67 (1.03)	6.86	.010
	i) Adaptability re: long term change	3.83 (.92)	3.98 (.81)	3.67 (1.01)	3.25	.074
	a) Knowledge/ expertise	3.81 (.91)	3.91 (.91)	3.70 (.91)	1.40	.239
	f) Share critical information	3.72 (.97)	3.87 (.76)	3.57 (1.11)	2.62	.110
	b) Reputational benefit	3.56 (1.01)	3.49 (1.00)	3.63 (1.03)	.51	.477
	g) Share of annual spend	3.38 (1.17)	3.42 (1.13)	3.33 (1.21)	.14	.707
	c) Financially supportive	3.25 (1.28)	3.29 (1.23)	3.20 (1.35)	.12	.725
	d) Shared technology platforms	3.25 (1.27)	3.42 (1.21)	3.07 (1.32)	2.02	.158
	e) Risk sharing	3.24 (1.13)	3.60 (1.05)	2.87 (1.10)	12.60	.001

7.4.1.2 Question 6

Table 11 provides the relevant data for Question 6. Again, SC respondents provided higher overall ratings than the Finance respondents did. Additionally both functions seem to be directionally aligned in choice of strategic reasons in aggregate, as the approaches that may be considered more reactive yet tangible (such as 6 e and d) received more support overall than those approaches that might be considered more proactive (such as 6 b and c). Both functions are aligned on the top three reasons (6 e, d, and a) but even here, on two of them (6 e and d), there is an indication that although directional intent is the same, equivalent level of intensity is not present, as evidenced by the significance tests. This same comment can also be made about 6 f.

Table 11 – Question 6 Group Differences (Manova)

Question 6	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
In terms of the degree of integration (i.e. the level of shared practices and information) your firm has with the "current strategic supplier", how important are the following strategic rationales in explaining that integration?	e) Security of supply	3.92 (1.01)	4.09 (.91)	3.74 (1.08)	3.34	.070
	d) Competitive cost advantage	3.72 (.99)	3.87 (.92)	3.56 (1.04)	2.84	.095
	a) Maintain competitive position	3.67 (1.07)	3.69 (1.03)	3.65 (1.12)	.04	.836
	f) Mutual competitive advantage	3.52 (1.06)	3.76 (.92)	3.28 (1.14)	6.00	.016
	b) Adoption of best practices	3.45 (.99)	3.53 (.96)	3.37 (1.02)	.69	.409
	c) First to market advantage	3.39 (1.15)	3.45 (1.18)	3.31 (1.13)	.40	.530

7.4.1.3 Question 7

Having identified the operational and strategic reasons for selecting a supplier as strategic, Question 7 was designed to determine the frequency of contact each function had with the supplier in question on a number of issues. Table 12 provides the results. It should be noted that in the case of this question, *the scale that was used resulted in a lower mean score representing "more frequent" (i.e. daily, weekly) contact than a higher mean score*. As expected the SC respondents clearly showed more frequent contact (i.e. lower means) with the supplier than did the Finance respondents as evidenced by the significance tests for 7 b, f, d, and c. Finance priorities appear to be related to cost issues (7 a). In regards to 7 a there may be some bias due to the fact that the representation of the Finance respondents within the survey (Table 6) leans more distinctly to smaller firms than that of the SC respondents. It has been EDC's experience that in smaller firms quite

often the Finance respondent is instrumental in the negotiation of commercial contracts and discussion of other activities with suppliers. This may also explain why 7 b (which would not normally be associated with the Finance function) is the second most frequent issue that a Finance person deals with in relation to the supplier.

Table 12 – Question 7 Group Differences (Manova)

Question 7	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the past 12 months what has been your personal frequency of contact with the “current strategic supplier” on the following operational issues?	a) Cost related issues	3.63 (1.42)	3.55 (1.37)	3.72 (1.48)	.42	.520
	b) Quality related issues	3.64 (1.44)	3.36 (1.30)	3.93 (1.54)	4.26	.041
	f) Flexibility re: disruptions	3.79 (1.37)	3.51 (1.21)	4.07 (1.46)	4.81	.030
	e) Adaptability re: long term change	4.23 (1.28)	4.09 (1.64)	4.37 (1.34)	1.30	.257
	d) Regular business reviews	4.25 (1.27)	4.00 (1.49)	4.50 (1.37)	4.35	.039
	c) Innovation related issues	4.30 (1.25)	4.05 (1.19)	4.56 (1.27)	4.51	.036

7.4.1.4 Question 8

Frequency results for Question 8 are presented in Table 13 below. This question should be considered discrete in nature and was an effort to determine from a governance perspective if there were differences in describing at an aggregate level, the nature of the relationship. There is clearly a leaning at an aggregate level to consider the relationship with the strategic supplier in a more coordinated or collaborative manner than

contractual, and at the functional level for the SC respondent to describe the relationship more collaborative than coordinated, than would the Finance respondent.

Table 13 – Question 8 Group Differences (Frequency)

Question 8	Measures	Governance Model: Frequency % (Supply Chain/ Finance)		
		Contractual	Coordinated	Collaborative
On a continuum of interaction between yourself and your “current strategic supplier”, where would you position the relationship over the last 12 months?	a) Cost related importance	21.8/29.6	36.4/46.3	41.8/24.1
	b) Flexibility related performance	12.7/11.1	43.7/61.1	43.6/27.8
	c) Quality related importance	18.2/25.9	40.0/46.3	41.8/27.8
	d) Innovation related performance	12.7/20.4	47.3/42.6	40.0/37.0
	e) Regularly scheduled business reviews with supplier	12.7/20.4	45.5/42.6	41.8/37.0
	f) Adaptability related performance	10.9/14.8	47.3/53.7	41.8/31.5

7.4.1.5 Question 9

Question 9 was an effort to bring more granularity to the exploration of the relationship by ascertaining where the supplier was having an influence on the respondent’s firm. Table 14 shows that both functions are in relative agreement with the order of the top three measures (9 e, d and a) although the order of the second and third reason is reversed between the functions. As in previous questions significant differences are noted in a number of the measures (9 e and a), and this is considered to be reflective of intensity rather than direction.

Table 14 – Question 9 Group Differences (Manova)

Question 9	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the past 12 months how important has the “current strategic supplier’s” contribution been to changes in the following operational practices?	e) Increasing mutual flexibility	3.50 (1.02)	3.71 (.92)	3.30 (1.08)	4.66	.033
	d) Increasing mutual adaptability	3.39 (1.16)	3.55 (1.10)	3.24 (1.20)	1.91	.170
	a) Sharing operational information	3.38 (1.23)	3.60 (1.20)	3.15 (1.24)	3.77	.055
	c) Integrating operations with each other	3.05 (1.29)	3.20 (1.30)	2.89 (1.28)	1.58	.211
	b) Developing performance metrics	2.86 (1.26)	3.02 (1.28)	2.70 (1.24)	1.69	.196

In summary, the SC and Finance respondents were in general agreement about their companies’ relationships with their strategic suppliers. The results can be summarized as follows:

- Respondents clearly recognize their supplier’s impact on operational measures.
- The SC respondents tended to have more positive views of the relationship with the supplier than did the Finance respondents.
- The two groups of respondents had distinctly different perceptions of importance in such areas as adaptability, flexibility and of sharing risks with suppliers.

7.4.2 Cross-functional Analysis – Group Differences

Questions 10 to 14 were designed to explore the nature of the cross-functional relationship, and the differing or similar views each function brought to the perception of that relationship.

7.4.2.1 Question 10

Question 10 continued the effort of Question 9 to become more granular, but principally in regards to shared financial performance metrics at a cross-functional level rather than operational practices at a cross-enterprise level. Table 15 provides the results. In terms of the top four measures (10 g, b, f, and h) both functions are aligned with the exception of 10 f. In this particular case, it appears reasonable that the SC respondents would have given greater weight to 10 f than the Finance respondents. Such a metric is clearly related to the immediate day to day efficiency of the production value chain of the firm, and the SC respondent would be much more on the front line of that issue than would the Finance respondent.

In regards to the underlying focus of this survey, that is SCF, it is interesting to note that 10 d and e, both of which are factors of the cash cycle of a firm illustrate significant differences between the two functions. In both cases, the SC function gives greater weight to the supplier's contribution to the two measures. As the cash cycle metrics are usually the domain of the Finance function, this may indicate an under appreciation by the Finance function of the value the supplier can have on such metrics, or of the SC function's interest in these factors.

Table 15 – Question 10 Group Differences (Manova)

Question 10	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
To what degree (importance) do you consider that the “current strategic supplier” has had a material impact on the following corporate measures?	g) Direct cost of goods	3.98 (1.01)	4.09 (.93)	3.87 (1.08)	1.31	.256
	b) Gross profit	3.83 (.97)	3.91 (.89)	3.74 (1.05)	.82	.368
	f) On time delivery rate	3.83 (1.08)	4.05 (.95)	3.61 (1.17)	4.71	.032
	h) Direct impact on customer satisfaction	3.73 (1.17)	3.89 (1.07)	3.57 (1.25)	2.03	.158
	c) Perfect order fill rate	3.60 (1.11)	3.87 (.92)	3.31 (1.21)	7.33	.008
	a) Gross sales	3.36 (1.24)	3.44 (1.17)	3.28 (1.31)	.45	.506
	d) Inventory turnover rate	3.16 (1.22)	3.40 (1.15)	2.91 (1.25)	4.60	.034
	e) Accounts payable turnover rate	3.12 (1.10)	3.35 (1.06)	2.89 (1.11)	4.83	.030

7.4.2.2 Question 11

Question 11 as represented in Table 16 was designed to explore the frequency of contact between the two functions. It should be noted that in the case of this question, *the scale that was used resulted in a lower mean score representing more frequent contact than a higher mean score*. Generally, the responses indicate a perception from the SC respondents that they interact with the Finance respondents more than vice versa although the differences are not significant. Having said that when one compares 11 a to 11 c there is clearly an indication of disposition to informal relationships rather than formal relationships. However, when other measures (11 g, c, e, f and g) are considered, the perception of equivalent frequency of contact may indicate collaborative decision making processes around performance and planning efforts. The implication to SCF is that as one

of the biggest arguments for it is a very tangible measure (i.e. cash-to-cash cycle); if such metrics (or equivalent performance metrics) are shared between the functions then it can be considered an organizational advantage to consideration of such processes.

Table 16 – Question 11 Group Differences (Manova)

Question 11	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the last 12 months how often did you personally engage in the following activities with the Supply chain/Finance function in your firm?	a) Informally working together	2.47 (1.31)	2.29 (1.21)	2.65 (1.39)	2.05	.155
	b) Sharing ideas information and or resources	3.00 (1.63)	2.85 (1.59)	3.15 (1.66)	.89	.349
	g) Making joint decision about the ways to improve overall cost efficiency	3.46 (1.48)	3.38 (1.54)	3.54 (1.42)	.30	.587
	c) Working together in a formal team	3.50 (1.70)	3.40 (1.70)	3.61 (1.70)	.42	.519
	e) Achieving collective goals	3.55 (1.49)	3.50 (1.55)	3.59 (1.45)	.08	.772
	f) Developing mutual understanding of responsibilities	3.56 (1.59)	3.54 (1.64)	3.57 (1.56)	.01	.926
	d) Conducting joint planning to anticipate and resolve problems	3.60 (1.58)	3.60 (1.53)	3.59 (1.64)	.01	.981

7.4.2.3 Question 12

Question 12 was directed at determining the sense of satisfaction around the matters related to governance of the relationship between the two functions. Table 17 clearly indicates that when asked about the general level of satisfaction on all measures, there appeared to be very good alignment of perspective.

Table 17 – Question 12 Group Differences (Manova)

Question 12	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the past 12 months, how satisfied have you been with your relationship with the Supply chain/Finance function in your firm?	d) With the performance of the supply chain/finance function in carrying out their responsibilities in regard to supply chain activities	3.48 (.90)	3.47 (.88)	3.48 (.93)	.01	.960
	a) With the time and effort spent in developing the relationship with the functional counterpart	3.45 (.86)	3.42 (.88)	3.48 (.84)	.15	.701
	b) With the productivity of the relationship between the finance and supply chain function	3.44 (.84)	3.42 (.90)	3.46 (.79)	.08	.783
	c) With the overall finance/supply chain relationship	3.43 (.90)	3.38 (.93)	3.48 (.86)	.34	.564

7.4.2.4 Question 13

Question 13 was designed to measure the level of involvement, based on frequency, in a series of specific processes associated with supply chain activities. It should be noted that in the case of this question, *the scale that was used resulted in a lower mean score representing more frequent contact than a higher mean score*. As noted in Table 18 the processes that had the most involvement were 13 f, d and e. The results also show that 13

a, b, g and i showed significant differences, but such differences should be interpreted as expected, as these activities should normally fall under the purview of the SC function. The same rationale applies to 13 e, which falls into the Finance function. The two processes most closely related to the cash cycle, 13 d and f, suggest the equal involvement of both functions, which infers that if and when SCF is considered by an enterprise, both functions would have a vested, and apparently relatively equal interest in being involved.

Table 18 – Question 13 Group Differences (Manova)

Question 13	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the past 12 months to what extent have you been involved in the modification of the following operational processes?	f) Inventory management processes	3.20 (1.76)	3.00 (1.76)	3.41 (1.75)	1.46	.229
	d) Purchase order authorization processes	3.23 (2.00)	3.02 (2.04)	3.44 (1.96)	1.24	.269
	e) Payment management processes	3.38 (1.80)	4.00 (1.84)	2.74 (1.53)	15.09	.000
	h) Sales and operational planning processes	3.52 (1.70)	3.53 (1.71)	3.52 (1.70)	.001	.979
	g) Compliance management processes	3.54 (1.76)	3.24 (1.71)	3.85 (1.77)	3.40	.068
	b) Supplier selection criteria processes	4.18 (1.55)	3.86 (1.47)	4.52 (1.56)	5.22	.024
	c) Creation of standardized terms and conditions with suppliers	4.28 (1.23)	4.38 (1.22)	4.17 (1.24)	.83	.364
	i) Supplier audit processes	4.68 (1.37)	4.15 (1.31)	5.22 (1.22)	19.63	.001

Question 13	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
	a) Supplier scorecards processes	4.74 (1.40)	4.36 (1.35)	5.13 (1.36)	8.69	.004

7.4.2.5 Question 14

Question 14 should be considered discrete in nature and was an effort to see which function has the leadership role in the same processes that are identified in Question 13. For ease of discussion the actual responses in the survey, which had a five level scale ((1) only supply chain, (2) supply chain led, (3) jointly led, (4) finance led and (5) only finance), have been reduced to a three level scale with (1) and (2) combined into “supply chain led the partnership”; while (4) and (5) were combined into “finance led the partnership”. As evidenced in Table 19, the respondents concurred that the only process Finance clearly led, was 14 e. The only process that seemed to have a high probability of being jointly led was 14 h, while the remainder were led by the SC function with varying degrees of participation by Finance. Interestingly, when the results for Question 14 a, b, c and i (i.e. core supply chain practices) are compared to the same categories in Question 13, one observes that although clearly these processes would be led by the SC function, the chances of these processes also being a priority process for the enterprise are minimal, given the low frequency of involvement of both functions in these processes. This suggests that the SC function’s attention to processes is less attuned to best practice supply chain activities, which have a longer term horizon to them, and more concerned and attentive to short term operational (e.g. inventory, purchase authorization) processes.

Table 19 – Question 14 Group Differences (Frequency)

Question 14	Measures	Frequencies %		
		Supply Chain led the Partnership	Jointly led	Finance led the Partnership
How would you describe the leadership/partnership roles that the Finance and Supply Chain functions exhibited in the following operational processes?	a) Supplier scorecards processes	75	19	6
	b) Supplier selection criteria processes	75	18	7
	c) Creation of standardized terms and conditions with suppliers	45	38	17
	d) Purchase order authorization processes	42	35	23
	e) Payment management processes	12	19	69
	f) Inventory management processes	49	35	16
	g) Compliance management processes	44	37	19
	h) Sales and operational planning processes	35	43	22
	i) Supplier audit processes	66	22	12

In summary, the survey reveals that the respondents are overwhelmingly satisfied with their cross-functional working relationships, with processes related to the cash cycle capturing the greatest degree of joint participation. This satisfaction appears to derive from the informal way in which the respondents deal with the issues associated with these processes. While improving process definition and clarity of responsibility would be evidence of best practices, this does not appear to be a high priority given the overall satisfaction that the two functions have with each other.

7.4.3 Organizational Attributes Impacting Innovation Consideration Analysis – Group Differences

Questions 15, 16, 24 and 25 were targeted with addressing organizational characteristics that may affect innovation consideration.

7.4.3.1 Question 15

Question 15 should be considered discrete in nature and was an effort to see what the combined and respective function's perception of technological maturity of their firms was. Table 20 indicates the two functions both have comparable responses amongst all four categories with a clear majority believing that that their firms are reasonably mature technologically (15 c and d).

Table 20 – Question 15 Group Differences (Frequency)

Question 15	Measures	Frequencies %		
		Aggregate	Supply Chain	Finance
Which statement best describes the current technological maturity between the finance and supply chain functions in your firm?	a) Each has their own excel spreadsheets and we compare manually.	21.1	20.0	22.2
	b) Each has their own Enterprise system (ERP or other) modules, but they don't talk to each other	16.5	16.4	16.7
	c) Each has their own Enterprise system (ERP or other) modules, and they tend to talk to each other	30.3	30.9	29.6
	d) Cross-functional processes were mapped out in advance, then the Enterprise system (ERP or other modules) were adapted to agreed upon processes	32.1	32.7	31.5

7.4.3.2 Question 16

Question 16 took a number of source to pay processes (from the SCOR model) and asked respondents to rate them as to how important it was that their function be involved in consideration of new applications associated with such processes. For instance in Table 21, 16 a and f indicate very significant differences between the functions which should be argued are more directional than intensity, as it would be very hard to argue that financial accounting or payment processes should be led by any other function than Finance. In fact the group difference results for 16 f, relate very closely to the message provided in 14 e (Table 19). On the other hand, for 16 d and h, significant differences are noted but in this case leaning towards the SC function, and intuitively one would expect a more dominant role for SC in these processes. The remainder of the processes (with the exception of 16 c) evidence no significant difference so it is reasonable to say that there would be an expectation of equivalent joint involvement. Therefore, the undercurrent of the responses to these questions is that in some processes, there will be integrative behavior, and in others there will not be. However, the fact that inventory management is collectively the number one process to be involved with, and that cost control is number two, both of which can be associated with the cash cycle, bodes well for SCF getting some shelf time if it is brought to the attention of both functions.

Table 21 – Question 16 Group Differences (Manova)

Question 16	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
How important is it to you that the finance/supply chain function be involved in the consideration process related to a new IT application associated with the following processes?	b) Inventory management	4.36 (.94)	4.38 (.85)	4.33 (1.03)	.072	.789
	c) Cost control	4.36 (.83)	4.22 (.76)	4.50 (.89)	3.18	.078
	a) Financial accounting	4.09 (1.13)	3.45 (1.14)	4.74 (.65)	52.42	.000
	f) Payment management	3.94 (1.05)	3.45 (1.03)	4.43 (.81)	29.63	.000
	d) Production management	3.85 (1.11)	4.09 (1.06)	3.61 (1.38)	5.27	.024
	h) Demand management	3.83 (1.17)	4.11 (.98)	3.56 (1.28)	6.44	.013
	e) E commerce	3.63 (1.25)	3.78 (1.10)	3.48 (1.38)	1.58	.212
	i) Returns management	3.53 (1.18)	3.64 (1.10)	3.43 (1.25)	.87	.352
	g) Customer relationship management	3.43 (1.11)	3.56 (1.03)	3.30 (1.18)	1.59	.210

7.4.3.3 Questions 24 and 25

Questions 24 and 25 were directed at the nature of “specialization” that the functions exhibited. These questions should be considered discrete, and were measured by means of declared experience in the function (in its entirety, not just with the firm in question) as well as the educational level of each respondent. Table 22 easily evidences the more experienced nature of the Finance function respondents than of the SC function respondents. Table 23 provides the equivalent in formal education with the three key observations being that there is a significant difference in formal education between the two groups at the undergraduate level, the number of dual educational/respondent designations is dominated by the Finance function, and the number of formally trained

respondents with supply chain designations is minimal. Therefore, in very basic terms the respondents from the SC function would appear to be younger, have less experience, and less education than the Finance respondents.

Table 22 – Question 24 Group Differences (Frequency)

Question 24	Measures	Frequencies %	
		Supply Chain N = 55	Finance N = 54
How many years of experience do you have in your current function?	0 to 5 years	12.7	7.4
	6 to 10 years	25.5	9.3
	11 to 15 years	18.2	13.0
	16 to 20 years	20.0	16.7
	Greater than 20 years	23.6	53.6

Table 23 – Question 25 Group Differences (Frequency)

Question 25	Measures	Frequencies %	
		Supply Chain N = 55	Finance N = 54
Please indicate which of the following educational or professional designations that apply to you.	Undergraduate or College degree	60.1	46.3
	Master's degree	7.3	11.1
	CA,CMA, CGA (completed or in process)	3.6	29.6
	Supply chain professional designation	3.6	0
	Other	1.8	11.1
	None	23.6	1.9

It should be noted that in the survey itself the respondents were asked (Appendix 8: Questions 26 to 28) to provide the equivalent answers concerning their immediate reports, for experience and education. The objective was to try to attain a perspective of the “depth” of education and experience in the firm. The actual results provided (e.g. limited) did not make further analysis of this direction of inquiry feasible.

7.4.4 Process Characteristics Impacting Innovation Consideration Analysis – Group Differences

Questions 17 to 21 were developed to determine the relevant advantages of new technology applications in four broad categories (operational, strategic, IT and organizational), while Question 22 was developed to examine perceived complexity of innovation consideration.

7.4.4.1 Questions 17 to 21

Questions 17 to 21 were designed to determine what measures, and how important each was, in measuring the relative advantage of a process innovation under consideration. Tables 24 to 27 show that the two functions appear to be very tightly aligned on all categories of relative advantage (operational, strategic, IT Infrastructure and organization) evidenced by the lack of significant differences, as well as the order of priority of importance in each category. The only distinguishing difference rests with 17 e, which clearly has a cross-enterprise context to it, and may be the explanation for it being the SC function's number one choice of importance. This may be indicative of the generally more collaborative approach found in the SC function towards the supplier, as indicated in the results of Question 8 (Table 13).

Table 24 – Question 17 Group Differences (Manova)

Question 17	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
When considering a new supplier related IT enabled administrative process, how important are the following operational factors?	d) Quality improvement	4.07 (.81)	3.96 (.82)	4.19 (.80)	2.04	.156
	e) Supplier relationship improvement	4.00 (.92)	4.16 (.79)	3.83 (1.02)	3.57	.061
	b) Cycle time	3.95 (.99)	3.93 (.92)	3.98 (1.07)	.08	.777
	a) Cost reduction	3.87 (.98)	3.89 (.83)	3.85 (1.12)	.04	.837
	c) Productivity improvement	3.80 (.99)	3.73 (1.01)	3.87 (.97)	.57	.452

Table 25 – Question 18 Group Differences (Manova)

Question 18	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
When considering a new supplier related IT enabled administrative process, how important are the following strategic factors?	a) Supports business growth	4.05 (.92)	3.93 (.84)	4.17 (.99)	1.88	.174
	d) Builds cost leadership	3.82 (.95)	3.75 (.86)	3.89 (1.04)	.61	.435
	c) Builds business innovations	3.70 (.96)	3.65 (.86)	3.74 (1.05)	.219	.641
	b) Supports business supplier alliance	3.65 (.90)	3.73 (.83)	3.57 (.96)	.80	.375
	e) Builds external linkages with suppliers	3.65 (.90)	3.71 (.81)	3.59 (.98)	.46	.500

Table 26 – Question 19 Group Differences (Manova)

Question 19	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
When considering a new supplier related IT enabled administrative process, how important are the following IT infrastructure factors?	a) Builds business flexibility for current and future changes	3.98 (.79)	3.91 (.75)	4.06 (.83)	.93	.337
	c) Increases IT infrastructure capability	3.90 (.80)	3.85 (.78)	3.94 (.83)	.34	.562
	b) Results in IT cost reduction	3.70 (.86)	3.62 (.80)	3.78 (.90)	.95	.332

In regards to organizational interests (Table 27) there is no disagreement between the functions as to the top three measures that are the most important. However, the overall order of importance indicates that a clear priority is given to measures that are more aligned with immediate efficiency (20 f, g and e), than those that may be considered to be more aligned with organizational resiliency (20 a, d, c and b).

Table 27 – Question 20 Group Differences (Manova)

Question 20	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
When considering a new supplier related IT enabled administrative process, how important are the following organizational factors?	f) Improved decision making and planning	4.24 (.79)	4.25 (.78)	4.22 (.82)	.04	.833
	g) Improved performance management	4.17 (.79)	4.20 (.68)	4.13 (.89)	.22	.643
	e) Better resource management	4.05 (.77)	4.04 (.82)	4.06 (.74)	.02	.898
	a) Supports organizational change	3.80 (.87)	3.82 (.82)	3.78 (.92)	.06	.810

Question 20	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
	d) Builds common vision	3.79 (.84)	3.76 (.86)	3.81 (.83)	.10	.752
	c) Facilitates empowerment	3.63 (.85)	3.64 (.89)	3.63 (.81)	.01	.967
	b) Facilitates business learnings	3.62 (.87)	3.62 (.83)	3.63 (.92)	.01	.946

Question 21 was an effort to acquire a perception of the priority of the broad categories represented by Questions 17, 18, 19 and 20. Once again a very good alignment exists between the functions and the order of importance is aligned (Table 28).

Table 28 – Question 21 Group Differences (Manova)

Question 21	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
How important are each when considering a supplier related IT enabled administrative process?	a) Operational	4.14 (.88)	4.15 (.91)	4.13 (.85)	.01	.925
	b) Strategic	3.90 (.93)	3.93 (1.00)	3.87 (.87)	.10	.752
	d) Organizational	3.78 (.91)	3.73 (.95)	3.83 (.86)	.37	.544
	c) IT Infrastructure	3.68 (.89)	3.75 (.91)	3.61 (.88)	.62	.434

7.4.4.2 Question 22

Question 22 was designed to address the perceived complexity of the implementation of an innovation that was under consideration. Again, we see (Table 29) that with the exception of the 22 k there are no significant differences between the two functions. In terms of importance of measures, although not perfectly aligned, both functions were

reasonably close. The response to 22 k is interesting and may be indicative of organizational distance from key decision making or a lack of internal influence within the organization by the SC function.

Table 29 – Question 22 Group Differences (Manova)

Question 22	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
How difficult would it be to manage the following challenges or perceptions of implementation?	f) Cost to implement is too high	3.49 (1.08)	3.56 (.94)	3.41 (1.21)	.57	.451
	g) Limited qualified staff to implement	3.49 (1.07)	3.56 (.94)	3.41 (1.19)	.58	.448
	j) Integration /compatibility with other systems is too complex	3.34 (.99)	3.42 (.99)	3.25 (.99)	.70	.403
	e) Time to implementation is too long	3.27 (1.06)	3.27 (1.01)	3.26 (1.12)	.01	.947
	h) The change management program to implement the process will be too difficult to implement	3.17 (1.00)	3.20 (.87)	3.15 (1.12)	.07	.788
	k) Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority	3.03 (.97)	3.22 (.94)	2.83 (.98)	4.37	.039
	i) It will be too difficult to get supplier to adapt	2.83 (1.04)	2.87 (.96)	2.78 (1.11)	.23	.634
	a) Resistance from internal third parties	2.81 (.96)	2.91 (.97)	2.70 (.94)	1.26	.265

Question 22	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
	other than the supply chain and finance functions					
	d) Value proposition is more qualitative than quantitative	2.80 (1.00)	2.89 (.99)	2.70 (1.00)	.96	.330
	c) Lack of support from within the supply chain function	2.58 (1.19)	2.47 (1.14)	2.69 (1.24)	.87	.353
	b) Lack of support from within the finance function	2.44 (1.33)	2.58 (1.27)	2.30 (1.38)	1.26	.264

In summary, the SC and Finance respondents were in general agreement about their perceptions of the relative merits and complexities associated with innovation consideration.

7.4.5 Dependent Variable (Process Priority)

As noted in Chapter 6 it was determined to be advantageous for clarity purposes in the survey question dealing with the dependent variable to include additional processes, specifically customer centric (Question 23 a), production centric (Question 23 b) and enterprise centric administrative processes (Question 23 c), in addition to supplier oriented processes (Question 23 d). By providing these additional three options, it was felt that greater confidence in the respondents accuracy of interpretation of what the question was asking would be achieved. Clearly in aggregate both functions agree that

the customer is more important, but when split between functions some clear distinctions show up with Finance giving more priority to customers and enterprise administrative processes than do the SC respondents (Table 30). The underlying expectation would therefore be that there if there were conflicting priorities at any given time amongst these four options then there would be a significant misalignment between the two functions both from an intensity perspective as well as from a directional perspective.

Table 30 – Question 23 Group Differences (Manova)

Question 23	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
Please describe the level of priority your firm would assign to the following “administrative process integration” investments in the next 3 years.	a) Changes to customer centric activities.	3.33 (1.02)	3.15 (1.08)	3.52 (.925)	3.75	.056
	b) Changes to enterprise centric production activities	3.24 (1.09)	3.25 (1.04)	3.22 (1.14)	.02	.874
	d) Changes to supplier oriented activities	3.18 (.99)	3.22 (1.03)	3.15 (.96)	.14	.714
	c) Changes to enterprise centric support activities	3.14 (.98)	2.98 (.95)	3.30 (.98)	2.88	.093

7.4.6 Impact of Group Differences

The forgoing analysis showed some significant differences between the two functions, more often in intensity than in direction. The importance of the identification of these differences in the context of SCF rests primarily with how a financial intermediary would communicate (market/sell) with an enterprise that it had identified as a SCF candidate. The group difference analysis clearly infers that to make such an approach without any

consideration of the differences in functions would be challenging. As well without knowing the differences, the financial institution may underestimate the time and effort required for its engagement strategy with that firm. These issues are discussed in detail in Chapter 8.

7.5 Relationship of the Independent Variables to the Dependent Variable

In addition to determining differences between the two functional groups this research was also structured to evaluate various suggested associations (Table 3) with a function's propensity to consider upstream cross-enterprise administrative applications. To that end correlation, factor and multiple regression statistical analyses were undertaken in order to evaluate the nature of the association between the independent variables and the dependent variable. In summary, the hypotheses generally showed marginal association with the dependent variable, although those variables related to cross-enterprise variables evidenced a stronger association. Several anomalies were noted that appeared to be counter intuitive, the most significant of which is that the Finance function appears to have a more discernible relation to the dependent variable than does the SC function. The following discussion will provide the statistical support, as well as further refinement of these summary observations.

7.5.1 Correlation

Review of the Pearson's correlations of the variables (Questions 5 to 22) to the dependent variable (Question 23 d) was used to ascertain the apparent nature of the hypothesized

relationships, as well as to develop expectations as to the impact of the variables within a multiple regression analysis. For multiple regression purposes, the ideal would be to have high correlation to the dependent variable. For the purposes of the discussion to follow, low correlation was considered to be that under .3, medium correlation was considered to be greater than .3 and less than .7, while high correlation was considered to be greater than .7. Appendix 10 provides the full correlation results between all the independent variables and the dependent variable. The degree of correlation identified in the discussion to follow was determined principally by a review of the aggregate, rather than the functional scores from Appendix 10. In the discussion to follow, the emphasis will be focused on those components of Appendix 10 that have an apparent association with the dependent variable.

7.5.1.1 Correlation Analysis – Results

In terms of cross-enterprise relationships (Questions 5 to 9), the results appear to indicate that Question 6 (strategic reasons) and Question 9 (operational impact) have low to medium correlation with the dependent variable. On the other hand, Question 5 (operational reasons), Question 7 (frequency of contact) and Question 8 (governance model) have limited correlation with the dependent variable. Tables 31 and 32 present the results for Questions 6 and 9. The stronger correlation of the Finance function's results, than the SC function's results, with the dependent variable is readily identifiable.

Table 31 – Question 6 (Correlation)

Question 6	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate	Supply Chain	Finance
In terms of the degree of integration (i.e. the level of shared practices and information) your firm has with the "current strategic supplier", how important are the following rationales in explaining that integration?	a) Maintain competitive position	.214*	.169	.260
	b) Adoption of best practices	.256**	.219	.291*
	c) First to market advantage	.261**	.175	.356**
	d) Competitive cost advantage	.345**	.263	.426**
	e) Security of supply	.265**	.236	.291*
	f) Mutual competitive advantage	.216*	.172	.255

Table 32 – Question 9 (Correlation)

Question 9	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate	Supply Chain	Finance
During the last 12 months how important has the "current strategic supplier's" contribution been to changes in the following operational practices?	a) Sharing operational information	.170	.177	.156
	b) Developing performance metrics	.367**	.277*	.466**
	c) Integrating operations with each other	.282**	.133	.442**
	d) Increasing mutual adaptability	.146	.089	.198
	e) Increasing mutual flexibility	.257**	.186	.322*

In terms of cross-functional relationships (Questions 10 to 14), all the questions with the exception of Question 10 had minimal correlation with the dependent variable. Table 33 presents the results for Question 10.

Table 33 – Question 10 (Correlation)

Question 10	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate	Supply Chain	Finance
To what degree do you consider that the "current strategic supplier" has had a material impact on the following corporate measures?	a) Gross sales	.120	-.019	.252
	b) Gross profit	.264**	.245	.282*
	c) Perfect order fill rate	.313**	.341*	.300*
	d) Inventory turnover rate	.282**	.238	.327*
	e) Accounts payable turnover	.327**	.337*	.317*
	f) On time delivery rate	.330**	.384**	.287*
	g) Direct cost of goods	.244*	.230	.255
	h) Direct impact on customer satisfaction	.202*	.224	.179

In terms of organizational factors (Questions 15, 16, 24 and 25), only Question 16 provided some low to medium correlation with cross-enterprise applications, as indicated in Table 34.

Table 34 – Question 16 (Correlation)

Question 16	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate	Supply Chain	Finance
How important is it to you that the finance/supply chain function be involved in the consideration process?	a) Financial accounting	.126	.167	.214
	b) Inventory management	.267**	.136	.389*
	c) Cost control	.155	.103	.222
	d) Production management	.226*	.236	.212
	e) E commerce	.278*	.353**	.215
	f) Payment management	.201*	.269*	.231
	g) Customer relationship management	.146	.074	.211
	h) Demand management	.178	.197	.162
	i) Returns management	.344**	.301*	.386**

In terms of process characteristics having a correlation with the dependent variable it appears that Questions 17 to 21 have a low to medium correlation (Table 35) while Question 22 has minimal correlation. This could be inferred to mean that when it comes to consideration of an upstream supply chain administrative process, an evaluation would

place more weight on the relative merits of an innovation than on the challenges associated with the implementation of such an innovation.

Table 35 – Questions 17 to 21 (Correlation)

Questions 17 to 21	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate	Supply Chain	Finance
Question 17: When considering a new supplier related IT enabled administrative process, how important are the following OPERATIONAL factors?	a) Cost reduction	.366**	.244	.476**
	b) Cycle time	.243*	.232	.259
	c) Productivity improvement	.265**	.290*	.243
	d) Quality improvement	.270**	.340*	.209
	e) Supplier relationship improvement	.263**	.229	.295*
Question 18: When considering a new supplier related IT enabled administrative process, how important are the following STRATEGIC factors?	a) Supports business growth	.296**	.212	.392**
	b) Supports business supplier alliance	.395**	.267*	.518**
	c) Builds business innovations	.342**	.252	.432**
	d) Builds cost leadership	.280**	.105	.452**
	e) Builds external linkages with suppliers	.270**	-.011	.526**
Question 19: When considering a new supplier related IT enabled administrative process, how important are the following IT INFRASTRUCTURE factors?	a) Builds business flexibility for current and future changes	.287**	.122	.461**
	b) Results in IT cost reduction	.230*	.080	.387**
	c) Increases IT infrastructure capability	.232*	.178	.293
Question 20: When considering a new supplier related IT enabled administrative process, how important are the following ORGANIZATIONAL factors?	a) Supports organizational change	.204*	.180	.229
	b) Facilitates business learnings	.296**	.273*	.321*
	c) Facilitates empowerment	.324**	.290*	.364**
	d) Builds common vision	.258**	.122	.416**
	e) Better resource management	.194*	.123	.281*
	f) Improved decision making and planning	.191*	.068	.318*
	g) Improved performance management	.221*	.201	.242
Question 21: How important are each when	a) Operational	.173	.084	.277*
	b) Strategic	.190*	.052	.363**

Questions 17 to 21	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate	Supply Chain	Finance
considering a supplier related IT enabled administrative process	c) IT Infrastructure	.193*	-.039	.450**
	d) Organizational	.210*	.156	.281**
Question 22: How difficult would it be to manage the following challenges/perceptions of implementation?	a) Resistance from internal third parties other than the supply chain and finance functions	.047	-.017	.112
	b) Lack of support from within the finance function	.086	.127	.037
	c) Lack of support from within the supply chain function	.239*	.258	.230
	d) Value proposition is more qualitative than quantitative	.113	-.049	.282*
	e) Time to implementation is too long	.059	-.201	.315*
	f) Cost to implement is too high	.124	-.206	.403**
	g) Limited qualified staff to implement	.064	-.264	.343*
	h) The change management program to implement the process will be too difficult to implement	.070	-.194	.294*
	i) It will be too difficult to get supplier adoption	.122	.140	.102
	j) Integration /compatibility with other systems is too complex	.087	.090	.078
	k) Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority	.043	-.127	.206

7.5.1.2 Correlation Analysis – Discussion

The correlation results do appear to be supportive of a number of the hypotheses particularly H1 (External Partner Influence), H2 (Perceived Effectiveness of Supplier), and H10 (Relative Advantage). However, the correlation analysis also raises some issues about the strength (i.e. instead of medium to high correlations, primarily weak

correlations were observed) of association that certain hypotheses related to cross-functional variables (i.e. H3 to H5) and innovation variables (i.e. H6 to H9 and H11) appear to have with the dependent variable. Several other observations are of note.

Of interest is Question 22 (H11 - complexity challenges) which showed limited correlation to the dependent variable. Innovation theory generally associates H10 (relative advantage) and H11 (complexity) as balancing and equivalent forces related to innovation consideration and adoption. These results could be inferred to mean that when it comes to consideration of an upstream supply chain administrative process, an evaluation would place significantly more weight on the relative advantages of such an innovation than on the challenges associated with the implementation of such an innovation. The results also give the first indication of an observed theme associated with the apparent importance of the Finance function affecting the aggregate correlation results, and the diminished role of the SC function in influencing aggregate results; as evidenced by the results from Questions 5, 9, 18, 19 and 20. This theme clearly infers that both functions do not share the same degree of interest in upstream cross-enterprise application consideration.

Although the presence of low to medium correlation results tempers the expectation as to the robustness of the multiple regression analysis, this is exploratory research and as such the robustness of the statistical analysis is better measured by the capacity of the analysis to define/refine the variables used to examine the hypotheses. Additionally the early indications of a more significant role for the Finance function than the SC function

clearly is an interesting insight to be further examined in the factor and regression analyses to follow.

In summary, the correlation analysis indicated a positive yet relatively benign influence on the dependent variable, and as such, expectations of deriving a robust regression model at the aggregate level were restrained.

7.5.2 Exploratory Factor Analysis

The measures used to evaluate the constructs were derived from multiple sources (e.g. previous empirical studies, SCOR measures or newly created ones based on EDC experience). Consequently, it remained an open question as to how well the chosen measures were evaluating the same construct, or were there multiple factors (i.e. dimensions or underlying “latent” variables). To evaluate this, exploratory factor analysis (i.e. principal axis analysis) was used to investigate the continuous variables to see if identifiable factors could be discerned that would assist in explanation building. In the context of this research, factor analysis was used with the following initial considerations in mind:

- Identify clusters of variables (i.e. factors) that indicate similarities between the functions or suggest the presence of differences, and then consider evaluation of these factors via regression analysis.
- Identify measures that load poorly and determine if they should be retained for regression analysis.

- Use these clusters in future research for structuring an discussion guide with both functions, similar as to what was done at the outset of this research (e.g. Appendix 3), but with the benefit of all the analysis now included.

Principal axis analysis (PAA) procedures used were the oblique Promax (Kappa 4) and Oblim (Delta 0) rotations to determine from the pattern matrix coefficients if there are any underlying and interpretable factors to be considered for further examination. Promax and Oblim rotations were used rather than Varimax rotation as the latter rotation can create larger discrepancies in factor loadings, when compared to the other two rotations, which is a less desirable outcome (Preacher & MacCallum, 2003). Appendix 11 provides the full results for both rotations. The actual results discussed in the body of this thesis used the Promax results only. Determination and interpretation of the results was achieved by the following process.

- Step 1 (Screening) – Eigen value cut-offs of 1.0 were used to make a preliminary determination of the number of factors to be considered as eligible. Although Stevens (2002) has suggested the following guideline (otherwise known as the Scree test) “...retain all Eigen values (hence factors) in the sharp descent before the first one on the line where they start to level off”; all factors derived from the PAA regardless of the foregoing guidance were reviewed for consideration. This was felt to be appropriate given that this is exploratory research, and in exploratory research, caution should be used in applying universal cut off values (Preacher & MacCallum, 2003;

Kwan, 2011). Additionally it was observed that by comparing the two types of rotations, although the interpretable factors that arose were comparable, the sequencing of them was often in reverse order when the results of the rotations were matched, thereby creating the possibility that if the Scree test was used strictly, the choice of rotations would have affected the results. This further reinforces the decision not to use the Scree test for this exploratory research. As a general cut off point for defining the components of a factor a loading of around or above .4 was used, as recommended by (Stevens, 2002).

- Step 2 (Retention) – When only one factor was identified (i.e. all the measures associated with a variable loaded on one factor) these measures were all retained; and where multiple factors were identified and some measures did not load into an interpretable cluster, the latter category were considered for removal from further consideration.
- Step 3 (Interpretation) – In cases where only one factor loaded at each of the aggregate and functional levels, it was interpreted to be supportive of the interpretation that the measures in that particular question were a reasonable representation of the underlying variable. In terms of the tables that are used to represent those interpretations for a given variable, if only one factor was identified at the aggregate or a functional level (i.e. all the measures reflect the variable represented by the question), then no interpretation was done, and the table identified such action as “not applicable”. In cases where multiple factors were identified, then interpretation of such factors was by means of the

application of the substantive knowledge base of the researcher, in order to make decisions on the presence, relevancy and interpretation of the factors identified. In the discussion to follow, the emphasis was placed on interpreting the multiple factors, regardless of their location (aggregate or functional). The logic for this underlying form of presentation was as follows. If one function loads multiple factors, and neither the other function nor the aggregate show multiple factors, the assumption was that the original questioning was not granular or specific enough to extract the differences in both functions. It is precisely the identification of such nuances that prepares the groundwork for future exploration and identification; therefore, the emphasis of interpretation within the tables associated with PAA was on the multiple factors. In situations where an interpretation was not possible, the factor was identified as “uninterpretable”.

Full “pattern matrix” results of the analysis are presented in Appendix 11, and summary conclusions based on the results for each measure are discussed below. As factor analysis is not applicable to discrete variables, no discussion of Questions 8, 14, 15, 24 and 25 is provided in this section.

7.5.2.1 Cross-enterprise – Principal Axis Analysis (Questions 5, 6, 7 and 9)

Question 5

At the aggregate and both functional levels, three factors were identified. The results are provided below in Table 36, along with an effort to characterize what factors the analysis was suggesting, where interpretable.

Table 36 – Question 5 (Factor Analysis)

	Factor 1	Factor 2	Factor 3
Aggregate	5 a (share knowledge), d (tech platforms), e (risk) and f (transparency) = <i>sharing information</i>	5 h (flexibility) and i (adaptability) = <i>responsiveness</i>	5 c (financially supportive) and g (annual spend) = <i>financial impact</i>
Supply Chain	5 a (knowledge), d (tech platforms), e (risk) and f (transparency) = <i>sharing information</i>	5 h (flexibility) and i (adaptability) = <i>responsiveness</i>	5 f (critical information) and g (annual spend) = <i>uninterpretable</i>
Finance	5 h (flexibility) and i (adaptability) = <i>responsiveness</i>	5 d (tech platform) and e (risk) = <i>sharing information</i>	5 c (financially supportive) and g (annual spend) = <i>financial impact</i>

Based principally on the loadings at the functional level a decision was taken to retain 5 a, c, d, e, f, g, h and i. As 5 b (reputation) did not have any application to those factors identified (interpretable or not) it was removed from further consideration.

Question 6

At the aggregate and Finance level, only one factor was identified while at the SC level two factors were identified (Table 37).

Table 37 – Question 6 (Factor Analysis)

	Factor 1	Factor 2
Aggregate	Not applicable	Not applicable
Supply Chain	6 d (cost advantage), e (security of supply) and f (mutual advantage) = <i>reactive supplier relationship management</i>	6 b (best practices) and c (first to market) = <i>proactive supplier relationship management</i>
Finance	Not applicable	Not applicable

The capacity to identify the underlying constructs that influence 6 d, e, and f in factor 1, and 6 b and c in factor 2 was particularly difficult in this case. Each one of these measures is based on a specific theory associated with cross-enterprise relationships; therefore, to try to identify an underlying theme that explains the relationships was challenging. However the fact that the SC did identify two factors, and the aggregate and Finance did not, suggests that the measures chosen were not granular enough to pull out distinctions that may be there in regards to the Finance function. Therefore in the absence of other substantiating information all the measures for Question 6 were retained, including 6 a (maintain competitive position) which did not load on either factor at the SC level.

Questions 7 and 9

At the aggregate as well as the functional levels only one factor loaded in each case, therefore all measures were retained.

Summary

The conclusions for the factor analysis of Questions 5, 6, 7 and 9 appear to be:

- Functional similarities – two factors were identified (sharing information and responsiveness) where both functions shared in the identified factors.
- Functional differences – three factors were identified (financial impact, reactive supplier relationship management, proactive relationship management) which were not shared between the functions.
- Measures removed – all retained except for 5 b (reputation).

7.5.2.2 Cross-functional – Principal Axis Analysis (Questions 10 to 13)

Question 10

At both the aggregate and SC levels, two interpretable factors were identified. The results are presented in Table 38 below. At the Finance level, only one factor loaded suggesting that Finance does not see the short/long term distinction between the two functions.

Table 38 – Question10 (Factor Analysis)

	Factor 1	Factor 2
Aggregate	10 d (inventory turnover), e (accounts payable turnover) and f (delivery rate) = <i>short term metrics</i>	10 a (gross sales) and b (gross profit) = <i>long term metrics</i>
Supply Chain	10 d (inventory turnover), e (accounts payable turnover) and f (delivery rate) = <i>short term metrics</i>	10 a (gross sales) and b (gross profit) = <i>long term metrics</i>
Finance	Not applicable	Not applicable

With the exception of 10 h, all of these measures are derived from measureable operational activities, and are well recognized as distinct measures from an accounting methodology perspective. As such although it was tempting to derive a factor from the

analysis as done in Table 38 one must be cautious, given the tangibility and measurability each measure.

Therefore, with one exception all measures, including 10 g (cost of goods)) as it is a defined accounting measure, were retained for further analysis. The exception was 10 h (customer satisfaction). While it can be measured, there is no accepted standard; and as such, it was removed from further consideration.

Questions 11 and 12

At the aggregate and functional levels, only one factor in each occurred, therefore all measures were retained.

Question 13

At the aggregate level, two interpretable factors were identified and they are represented in Table 39. At the SC and Finance levels, three factors appeared in each. It was challenging to arrive at interpretable results for factors associated with the SC function, however, it was achievable for two of the three factors for the Finance function.

Table 39 – Question 13 (Factor Analysis)

	Factor 1	Factor 2	Factor 3
Aggregate	13 d (purchase order), e (payment mgmt.) and f (inventory mgmt.) = <i>cash cycle</i>	13 a (scorecards), b (supplier criteria), c (terms and conditions) and i (supplier audit) = <i>supplier management</i>	Not applicable
Supply Chain	13 d (purchase order), e (payment mgmt.) f,	13 h (planning) and i (supplier audit) =	13 a (scorecards) and h (planning) =

	Factor 1	Factor 2	Factor 3
	(inventory mgmt.) and g (compliance management) = <i>cash cycle</i>	<i>uninterpretable</i>	<i>uninterpretable</i>
Finance	13 d (purchase order), e (payment mgmt.) and h (planning) = <i>uninterpretable</i>	13 a (scorecards), c (terms and conditions) and i (supplier audit) = <i>supplier management</i>	13 b (selection), f (inventory mgmt.) and g (compliance mgmt.) = <i>uninterpretable</i>

Although some factors were identifiable, the make-up of the other factors made interpretation difficult. However as all measures did load onto at least one factor, all measures were retained.

Summary

The summary conclusions for the factor analysis of Questions 10, 11, 12, and 13 appear to be:

- Functional similarities – no factors were shared between the two functions.
- Functional differences – four factors were suggested (short-term metrics, long term metrics, cash cycle and supplier management), none of which were shared between the two functions.
- Measures removed – all retained except for 10 h (customer satisfaction).

7.5.2.3 Organizational Attributes – Principal Axis Analysis (Question 16)

Question 16

At both the aggregate level and SC level three factors were identified, while at the Finance level only two were identified. All factors were interpretable, and the results are provided in Table 40 below.

Table 40 – Question 16 (Factor Analysis)

	Factor 1	Factor 2	Factor 3
Aggregate	16 b (inventory mgmt.), c (cost control), and d (production mgmt.) = <i>work in process management</i>	16 g (customer mgmt.), h (demand management), and i (return mgmt.) = <i>delivery management</i>	16 a (financial accounting) and f (payment) = <i>financial flow management</i>
Supply Chain	16 g (customer mgmt.), h (demand management), and i (return mgmt.) = <i>delivery management</i>	16 b (inventory mgmt.), c (cost control) and d (production mgmt.) = <i>work in process management</i>	16 a (financial accounting) and f (payment) = <i>financial flow management</i>
Finance	16 b (inventory mgmt.) and c (cost control) = <i>work in process management</i>	16 g (customer mgmt.), h (demand management), i (return mgmt.) = <i>delivery management</i>	Not applicable

All measures were retained except for 16 e (e commerce) which failed to load on any of the factors.

Summary

The summary conclusions for the factor analysis of Question 16 appear to be:

- Functional similarities – two factors (delivery management and work in process management) were shared by both functions.

- Functional differences – one factor (financial flow management) was identified and it was not shared between the functions.
- Measures removed – all retained except for 16 e (e commerce).

7.5.2.4 Process Characteristics – Principal Axis Analysis (Questions 17 to 22)

Questions 17, 18, 19 and 21

At the aggregate as well as the functional level, only one factor loaded in each case, therefore all measures were retained for Questions 17, 18, 19 and 21.

Question 20

At the aggregate and the SC level two factors loaded, while at the Finance level one factor loaded. Table 41 provides the interpretation of the factors.

Table 41 – Question 20 (Factor Analysis)

	Factor 1	Factor 2
Aggregate	20 a (organizational change), b (learnings), c (empowerment), d (vision), e (resource mgmt.) = <i>propensity to change</i>	20 f (decision making) and g (performance management) = <i>decision management</i>
Supply Chain	20 a (organizational change), b (learnings), c (empowerment), d (vision), and e (resource mgmt.) = <i>propensity to change</i>	20 f (decision making) and g (performance management) = <i>decision management</i>
Finance	Not applicable	Not applicable

As all measures loaded onto a factor, they were all retained.

Question 22

At the aggregate and functional levels, two factors loaded at each level. Table 42 provides the interpretation.

Table 42 – Question 22 (Factor Analysis)

	Factor 1	Factor 2
Aggregate	22 e (time), f (cost), g (limited staff) and h (change management) = <i>internal operational challenges</i>	22 b (Finance ambivalence) and c (Supply Chain ambivalence) = <i>internal partner support</i>
Supply Chain	22 e (time), f (cost), g (limited staff) and h (change management) = <i>internal operational challenges</i>	22 b (Finance ambivalence), c (Supply Chain ambivalence) and i (supplier adoption) = <i>internal and external partner support</i>
Finance	22 e (time), g (limited staff), i (supplier adoption) and k (other priorities) = <i>uninterpretable</i>	22 b (Finance ambivalence) and c (Supply Chain ambivalence) = <i>internal partner support</i>

Based on the loadings, the measures 22 a and d which did not load, were removed from further consideration. It is interesting to note that 22 j which is the measure associated with “compatibility with other systems make it too complex to integrate” is a core concept in innovation theory; however it also did not load. Yet, it was identified as the third most important challenge in the Manova analysis (Table 29). When this observation is combined with the marginal support it received in Stage 1 a confusing picture of support appears, particularly as in the innovation literature stream there is relatively strong support of this concept. However, it continues to be a concept that is marginalized in this research effort. This may reflect its limited application to administrative processes that are well established, as opposed to the introduction of some innovation, which would bring substantial change (e.g. a new product line). For the purposes of this research, it was retained for the regression analysis.

Summary

The summary conclusions for the factor analysis of Question 17 to 22 are:

- Functional similarities – no factors were shared between the two functions.
- Functional differences – five factors were suggested (internal operational challenges, internal partner support, internal and external partner support, propensity to change, decision management) none of which were shared between the functions.
- Measures removed – all retained except for 22 a (internal resistance) and d (quantitative versus quality).

7.5.2.5 Discussion of Factor Analyses

Outlined below in Table 43 is a summary of the suggested interpretation of the multiple factors derived from the PAA, segmented at the aggregate and functional levels. More often than not, the two functions did not load in an equivalent manner, or when factors were identified with a comparable label, the measures that were loaded were not exactly comparable between the aggregate and the functions, or between the functions themselves. This lack of congruence is interpreted as further evidence to support the Manova analysis that differences do exist between the two functions and that those differences need improved articulation, and certain anomalies need greater explanation. As an example in Question 13 (Table 39) cash cycle is interpreted as a factor for the SC function but not the Finance function, while supplier management is interpreted as a

factor for the Finance function but not the SC function; the exact opposite in both cases that would be expected. Given these inconsistencies and the challenges to interpretation, there is a degree of concern that must be attributed to the accuracy of the interpretations provided; hence it was determined that it would be premature to use such factors for regression analysis.

The principal benefit of the PAA appears to be that if this research is to continue at a later date, the underlying themes or clusters that were identified clearly provided insight for future refinement to the survey tool design (i.e. categories, choice of language used). This will help to more specifically define and categorize the interaction between two functions such that anomalies, as evidenced by Question 13 for example, can be better explained or minimized dramatically

Table 43 – Summary of Factor Analyses

Theoretical stream	Question	Factors	Application		
			Aggregate	Supply Chain	Finance
Cross-enterprise	Q5	Sharing information	Yes	Yes	Yes
		Responsiveness	Yes	Yes	Yes
		Financial impact	Yes	No	Yes
	Q6	Reactive supplier management	No	Yes	No
		Proactive supplier management	No	Yes	No
Cross-functional	Q10	Short term metrics	Yes	Yes	No
		Long term metrics	Yes	Yes	No
	Q13	Cash cycle	Yes	Yes	No
		Supplier management	Yes	No	Yes
Organizational characteristic (innovation)	Q16	Work in progress management	Yes	Yes	Yes
		Delivery management	Yes	Yes	Yes
		Financial flow	Yes	Yes	No
Process characteristic	Q20	Propensity to change	Yes	Yes	No
		Decision management	Yes	Yes	No

Theoretical stream (innovation)	Question	Factors	Application		
			Aggregate	Supply Chain	Finance
	Q22	Internal operational challenges	Yes	Yes	No
		Internal partner support	Yes	No	Yes
		Internal and external partner support	No	Yes	No

7.5.3 Multiple Regression

Results from multiple regression analysis of the various metrics for the continuous variables previously identified for each theoretical stream (following the factor analysis) will now be discussed. Each question that had been retained from the factor analysis was regressed against the dependent variable (Question 23 d), and within each variable, individual measures were identified that had a significance level of $< .10$. As with the Manova analysis, because this is exploratory research, the more liberal approach to significance testing was used in order to increase the power of discerning significant associations. Finally, the significant measures from each continuous variable that were derived from the previous regression analyses, were then regressed to determine the most robust adjusted R^2 (which provides the degree of variation in the dependent variable explained by the regression equation) model attainable at both the aggregate and functional levels. Once this had been achieved, the various variables that were explored in the questionnaire using discrete measures were introduced into the regression model to determine their impact, if any.

As noted previously in the correlation discussion the ideal for multiple regression analyses would be to have high correlation between the independent and the dependent

variables. Equally important is that the correlations between independent variables within a proposed regression model do not have a strong correlation with each other. This is referred to as multicollinearity, and can be measured by determining the variance inflation factor (VIF). A VIF of 10 or greater is cause for concern (O'Brien, 2007). In the final regression models presented in the following discussions, none of the models had a level of multicollinearity that would be cause for concern. Also, the Beta's in the Tables to follow, represent standardized coefficients.

To reiterate, this research effort was structured as an exploratory effort rather than an explanatory effort. The intent of the analyses associated with correlation, factor, and multiple regression analysis was to provide guidance/inference with the objective of narrowing down those variables (plus refining the variables) that would infer a "line of sight" of activities to processes or behaviors that may impact favorably on consideration of upstream administrative process innovations.

7.5.3.1 Cross-enterprise – Multiple Regression Analysis

Questions 5, 6, 7 and 9

Multiple regressions were run at the aggregate level for the measures retained and the results are summarized below in Table 44, with any measures that evidenced a significance level of $<.10$, being identified.

Table 44 – Questions 5, 6, 7 and 9 (Multiple Regression)

Question	Measures Retained Based on Factor Analysis	Adjusted R ²	Significant Measures
Question 5	5 all measures but 5 b	.023	none
Question 6	All measures	.113	6 d
Question 7	All measures	.000	7 e
Question 9	All measures	.148	9 b, d and e

The measures that were identified as significant were then regressed against the dependent variable. Any variable that was not significant was then removed (7 e) and the regression was run again. The resulting model indicated high correlations amongst 9 b, d and e. Consequently each of the measures was removed independent of the others to determine which measure (which was 9 b) provided the most robust adjusted R². The resulting regression model is provided below at the aggregate level (Table 45) and the functional level (Table 46 and 47).

Table 45 – Questions 5, 6, 7 and 9 (Significant Measures: Aggregate)

Aggregate	Measures	Beta	t	Sig.
Adj. R ² : .176 F:12.513	6d: Integration provides our firm with competitive cost advantage	.252	2.718	.008
	9b: Developing performance metrics that are shared and extended across our supply chain relationships	.284	3.067	.003

Table 46 – Questions 5, 6, 7 and 9 (Significant Measures: Supply Chain)

Supply Chain	Measures	Beta	t	Sig.
Adj. R ² : .084 F: 3.478	6d: Integration provides our firm with competitive cost advantage	.209	1.561	.124
	9b: Developing performance metrics that are shared and extended across our supply chain relationships	.227	1.697	.096

Table 47 – Questions 5, 6, 7 and 9 (Significant Measures: Finance)

Finance	Measures	Beta	t	Sig.
Adj. R ² : .259 F:10.272	6d: Integration provides our firm with competitive cost advantage	.287	2.233	.030
	9b: Developing performance metrics that are shared and extended across our supply chain relationships	.353	2.746	.008

The model does appear to indicate some moderate association between two measures of cross-enterprise activity and the dependent variable. However most significantly it also appears to infer that the Finance function is “carrying” the significant results (based on the adjusted R² of each function) associating cross-enterprise activities with consideration of upstream supply chain innovations. Although this was anticipated based on the correlation analysis, and the group difference analysis where the SC respondents were clearly providing higher overall ratings (Table 10 and 11) to supplier relationship issues, one would still have been inclined to have expected that the SC respondents would have evidenced a stronger association than these results indicate.

7.5.3.2 Cross-functional – Multiple Regression Analysis

Questions 10 to 13

Multiple regressions were run at the aggregate level for the measures retained and the results are summarized below in Table 48.

Table 48 – Questions 10 to 13 (Multiple Regression)

Question	Measures Retained Based on Factor Analysis	Adjusted R ²	Significant measures
Question 10	All measures but 10 h	.112	none
Question 11	All measures	-.013	none
Question 12	All measures	-.004	none
Question 13	All measures	.002	none

As none of the continuous measures evidenced a significance level of $<.10$, the cross-functional component of the research model appears to have received weak support.

7.5.3.3 Organizational Attributes – Multiple Regression Analysis

Questions 15, 16, 24 and 25 were associated with organizational attributes impacting innovation consideration. Only Question 16 was continuous in nature, as such it is the only one analyzed at this stage of the discussion.

Question 16

A multiple regression was run at the aggregate level for the measures retained for 16 (all but 16 e), with any measures that evidenced a significance level of $<.10$ being identified. 16 i was the only significant measure identified, and as such, it was regressed at the aggregate and functional levels. The results are summarized below in Table 49.

Table 49 – Question 16 (Significant Measures: Aggregate, Supply Chain and Finance)

Aggregate	Measures	Beta	t	Sig.
Adj. R ² : .110 F: 14.390	16i: Returns management	.344	3.793	.000
Supply Chain	16i: Returns management	.301	2.301	.025
Adj. R ² : .074 F: 5.293				
Finance	16i: Returns management	.386	3.016	.004
Adj. R ² : .133 F: 9.098				

Question 16 dealt with the level of importance that each function associated with its need to be involved in consideration of a new information technology application for a given process. Table 21 clearly identified returns management as one of the least important processes, so it is somewhat counterintuitive that returns management should have such a high association with the dependent variable. Given that the results associated with the adjusted R² and significance level are stronger for the Finance function than for the SC function there is a possibility that the Finance function respondents may have interpreted the question in the context of the customer, rather than the supplier. To use SCOR terminology there are two types of returns: “deliver” returns (i.e. from the customer) and “source” returns (i.e. returns back to the supplier). As this research is concerned with upstream activities, the intended use of returns management in the electronic survey was in reference to “source” returns. Although significant, the results need to be considered with care given the suggested explanation. However, pursuant to the underlying logic of the statistical analysis, 16 i will be retained for further analysis, but treated with caution.

7.5.3.4 Process Characteristics – Multiple Regression Analysis

Questions 17 to 22

Multiple regressions were run at the aggregate level for the measures retained and the results are summarized below in Table 50, with any measures that evidenced a significance level of $<.10$, being identified.

Table 50 – Questions 17 to 22 (Multiple Regression)

Question	Measures Retained based on Factor Analysis	Adjusted R^2	Significant measures
Question 17	All measures	.114	17 a
Question 18	All measures	.142	18 b
Question 19	All measures	.064	19 a
Question 20	All measures	.065	none
Question 21	All measures	.015	none
Question 22	All measures but a and d	-.008	22 c

The measures that were identified as significant were then regressed against the dependent variable. Any variable that was not significant was then removed (19 a) and the regression was run again with the following results at both the aggregate level (Table 51) and the functional level (Table 52 and 53).

Table 51 – Questions 17 to 22 Significant Measures (Multiple Regression: Aggregate)

Aggregate	Measures	Beta	t	Sig.
Adj. R^2 : .201 F: 10.074	17 a: Cost reduction	.202	2.060	.042
	18 b: Supports business supplier alliance	.286	2.981	.004
	22 c: Lack of support from within the supply chain function	.152	1.711	.090

Table 52 – Questions 17 to 22 Significant Measures (Multiple Regression: Supply Chain)

Supply Chain	Measures	Beta	t	Sig.
Adj. R ² : .097 F: 2.934	17 a: Cost Reduction	.155	1.147	.257
	18 b: Supports business supplier alliance	.216	1.633	.109
	22 c: Lack of support from within the supply chain function	.201	1.506	.138

Table 53 – Questions 17 to 22 Significant Measures (Multiple Regression: Finance)

Finance	Measures	Beta	t	Sig.
Adj. R ² : .281 F: 7.898	17 a: Cost reduction	.229	1.536	.131
	18 b: Supports business supplier alliance	.362	2.477	.017
	22 c: Lack of support from within the supply chain function	.108	.895	.375

At the functional level, the beta and significance results associated with 18 b are surprising. Intuitively it would be expected that the SC function would have a higher association with 18 b as a rationale for supporting the dependent variable than the Finance function would have, but the results indicate the reverse. In addition, the results associated with 22 c are perplexing. It seems counterintuitive that a positive beta (for the SC function) associated with a negative behavior (lack of SC support) would have a positive impact on upstream innovation concern. Despite the forgoing comments on the SC function, but consistent with the underlying logic of the statistical analysis, all three measures were retained, for the aggregate regression analysis.

7.5.3.5 Aggregate Multiple Regression Analysis

The objective of this section of the analysis was intended to derive the most “robust” regression model, based on all the measures associated with the continuous measures

that provided significant results previously discussed, and then incorporate the results of the discrete variables in the analysis to determine how they impacted the results.

Presented below are the results of the initial analysis for the significant continuous variables in Table 54 (Aggregate), Table 55 (Supply Chain) and Table 56 (Finance).

Table 54 – Questions 5 to 22 Significant Measures (Multiple Regression: Aggregate)

Aggregate	Measures	Beta	t	Sig.
Adj. R ² : .264 F: 7.450	6d: Integration provides our firm with competitive cost advantage	.214	2.210	.029
	9b: Developing performance metrics that are shared and extended across our supply chain relationships	.145	1.462	.147
	16i: Returns management	.146	1.536	.128
	17a: Cost reduction	-.008	-.074	.941
	18b: Supports business supplier alliance	.215	2.262	.026
	22c: Lack of support from within the supply chain function	.191	2.181	.031

Table 55 – Questions 5 to 22 Significant Measures (Multiple Regression: Supply Chain)

Supply Chain	Measures	Beta	t	Sig.
Adj. R ² : .182 F: 3.006	6d: Integration provides our firm with competitive cost advantage	.252	1.865	.068
	9b: Developing performance metrics that are shared and extended across our supply chain relationships	.094	.658	.514
	16i: Returns management	.220	1.677	.102
	17a: Cost reduction	-.042	-.284	.778
	18b: Supports business supplier alliance	.214	1.671	.101
	22c: Lack of support from within the supply chain function	.263	2.031	.048

Table 56 – Questions 5 to 22 Significant Measures (Multiple Regression: Finance)

Finance	Measures	Beta	t	Sig.
Adj. R ² : .294 F: 4.691	6d: Integration provides our firm with competitive cost advantage	.172	1.161	.252
	9b: Developing performance metrics that are shared and extended across our supply chain relationships	.197	1.346	.185
	16i: Returns management	.078	.538	.593
	17a: Cost reduction	.053	.299	.766
	18b: Supports business supplier alliance	.239	1.513	.137
	22c: Lack of support from within the supply chain function	.131	1.052	.298

The regression model was further reduced in the interests of parsimony to only those variables that were found to be significant at the aggregate or the functional level (6 d, 18 b, 22 c) with the following results in Table 57 (Aggregate), Table 58 (Supply Chain) and Table 59 (Finance).

Table 57 – “Robust” Significant Measures (Multiple Regression: Aggregate)

Aggregate	Measures	Beta	t	Sig.
Adj. R ² : .239 F: 12.329	6d: Integration provides our firm with competitive cost advantage	.275	3.116	.002
	18b: Supports business supplier alliance	.286	3.218	.002
	22c: Lack of support from within the supply chain function	.219	2.575	.011

Table 58 – “Robust” Significant Measures (Multiple Regression: Supply Chain)

Supply Chain	Measures	Beta	t	Sig.
Adj. R ² : .165 F: 4.553	6d: Integration provides our firm with competitive cost advantage	.295	2.359	.022
	18b: Supports business supplier alliance	.247	1.974	.054
	22c: Lack of support from within the supply chain function	.263	2.094	.041

Table 59 – “Robust” Significant Measures (Multiple Regression: Finance)

Finance	Measures	Beta	t	Sig.
Adj. R ² : .289 F: 8.192	6d: Integration provides our firm with competitive cost advantage	.236	1.728	.090
	18b: Supports business supplier alliance	.336	2.637	.011
	22c: Lack of support from within the supply chain function	.170	1.435	.157

The foregoing combination of variables appears to provide the most robust results based on significant continuous variables. 6 d clearly represents a strategic engagement with the supplier, and if 18 b (which was a measure of innovation advantage) is treated as a cross-enterprise “advantage” then there would be support for the cross-enterprise stream of thought (H1 and H2) as the theoretical stream that provides the greatest association to the dependent variable. As previously discussed 22 c remains perplexing, as it appears to be counterintuitive.

The next step was to consider the impact of the various discrete variables: Question 1 (organizational level of respondent), Question 2 (size of firm based on sales), Question 3 (type of supply chain), Question 8 (governance), Question 14 (leadership), Question 15 (technology maturity), Question 24 (experience) and Question 25 (education). When the discrete variables were regressed in conjunction with the “robust model” above, only Question 15 appeared to have a significant and unexpected impact. Table 60 (Aggregate), Table 61 (Supply Chain) and Table 62 (Finance) below provide the results when Question 15 (technology maturity) was included within the “robust” model.

Table 60 – “Robust (Revised)” Model (Multiple Regression: Aggregate)

Aggregate	Measures	Beta	t	Sig.
Adj. R ² : .236 F: 9.355	6d: Integration provides our firm with competitive cost advantage	.273	3.079	.003
	15: Technology maturity	-.066	-.763	.447
	18b: Supports business supplier alliance	.295	3.024	.001
	22c: Lack of support from within the supply chain function	.206	2.371	.020

Table 61 – “Robust (Revised)” Model (Multiple Regression: Supply Chain)

Supply Chain	Measures	Beta	t	Sig.
Adj. R ² : .169 F: 3.743	6d: Integration provides our firm with competitive cost advantage	.281	2.244	.029
	15: Technology maturity	.144	1.117	.269
	18b: Supports business supplier alliance	.225	1.779	.081
	22c: Lack of support from within the supply chain function	.295	2.295	.026

Table 62 – “Robust (Revised)” Model (Multiple Regression: Finance)

Finance	Measures	Beta	t	Sig.
Adj. R ² : .369 F: 8.569	6d: Integration provides our firm with competitive cost advantage	.186	1.423	.161
	15: Technology maturity	-.293	-2.314	.012
	18b: Supports business supplier alliance	.407	3.075	.003
	22c: Lack of support from within the supply chain function	.119	1.051	.298

As the actual tool of SCF itself is based on a technology platform, it is intuitively appealing to include technology maturity as a variable in the regression model. Contrary to expectations in the case of the aggregate and SC levels, the impact is inconsequential. What is perplexing is the negative beta results associated with the Finance function; which appears to be counterintuitive. It would be expected that the higher the technological maturity the more positive the relationship would be to the dependent variable, rather than negative. Perhaps, the logic in the case of the Finance function may

be the interpretation that if a supplier is considered strategic, and efforts are made or planned to share performance metrics or move into joint short and long term planning, and the technological maturity is immature; it will therefore become a pain point and accelerate the consideration of process innovation consideration with that supplier. This is clearly an area for exploration at a later date.

7.5.3.6 Summary of Multiple Regression Results

Based on the regression analyses previously discussed the following key ideas are noted. The results did provide some limited support at the aggregate level for cross-enterprise variables influencing the dependent variable, while at the same time finding very limited association between dependent variable and cross-functional and innovation variables. The results reinforce the existence of differences between the functions that was evidenced in the Manova analysis, and additionally reinforced the theme that the Finance function appears to have an unexpected affinity for upstream process innovation. Also, the analysis provided counterintuitive results in a number of areas, which would suggest that in future research on this subject there are definite areas for refinements to bring greater clarity to such issues.

The forgoing analysis of the results will be extended in Chapter 8 with a more detailed discussion as to the impact of the results on the original questions and hypotheses that grounded the research, an extension of the results into an example of practical application, a description of a revised research model (reflecting the insights acquired for this research effort) and suggested research activities going forward.

8 Chapter 8 – Discussion

As this is exploratory research, the effort that is being pursued as to how to accelerate consideration of upstream administrative process improvements (i.e. SCF) associated with the financial value chain is an iterative one leading to continuous learning and improvement to the various components of the proposed model, and to the practical application of the research results. This Chapter will take each of the three theoretical streams and based on the results presented in Chapter 7 provide observations as to how the results appear to have or have not supported the post Stage 1 hypotheses (Table 3). As well, it will discuss how the same results have provided suggestions for further refinements of the hypotheses, variables and measures. Additionally there will also be suggestions as to how the original four questions (Chapter 1) that grounded the initiation of this research could be modified to reflect the research results. In terms of practical application, the lens that will be used will be from the perspective of a financial institution promoting its SCF program and the interface required to do so with their client base. The Chapter will conclude with the presentation of a revised research model as well as suggested methodological avenues of further research that would be logical extensions of the research to date.

8.1 SCF Proxy

In future research the determination of the propensity to consider SCF would remain the underlying dependent variable, however as noted in Chapter 2 the practice remains nascent in Canada, although internationally it continues to have traction. As such, it

continues to be something that must be investigated indirectly in the Canadian environment. At the outset of this research project the “source to pay” process was used as means to bring “common ground” to a discussion between the SC and Finance functions and then this discussion evolved to one associated with upstream administrative processes. This evolution was very useful in the case studies and in highlighting differences between the functions in the group analysis. Because of this research, one of the major benefits is that it is now possible to entertain a new proxy.

It is suggested that the new proxy be that of the financial value chain with a specific focus on activities associated with the cash cycle. It is self-evident that the Finance function will be actively involved in cash cycle activities, but the research provided clear evidence that the SC function was equally engaged in cash cycle activities. The research actually inferred that the SC function led the management of some components of the cash cycle. Because of the analysis, there is a high confidence that both functions will share the common ground of the new proxy being important to each function as well as engaging both functions actively and frequently. This refinement in focus related to the proxy, should bring clear advantages to the efficiency and effectiveness of any future research effort.

This suggested shift in proxy brings with it a shift in language, which will be evidenced in the discussion to follow. For example a term such as “upstream supplier oriented applications” will have greater focus brought to it by the addition of such a phrase as

“associated with the financial value chain” or references to specific cash cycle attributes (e.g. turnover ratios).

8.2 Cross-enterprise

Chapter 1 of the research project posed the following question: “What are the specific variables driven by the cross-enterprise context of the firm that would influence consideration of SCF?” The following hypotheses (post Stage 1: H1, H2) were suggested as a means to explore this question.

H1: Administrative innovation consideration is positively related to strategic partner influences.

H2: Administrative innovation consideration is positively related to the positive perception of the effectiveness of the supplier by both the Finance and the SC functions.

These hypotheses were addressed by first identifying activities and behaviors that would shape perceptions around the influences a supplier would have on a firm (Questions 5, 6, and 9). This was then followed by examining the nature of the relationship from the perspective of the firm, based on the frequency of engagement on such activities and the governance approach to the relationship (Questions 7 and 8).

From the perspective of the results, it is clear that there are a number of areas of differences between the two functions. As previously noted these differences were primarily that of intensity not direction. Overall, there was a clear sense that the strategic

partnership in question was making a positive contribution to performance and that the relationship was generally managed on a cooperative or collaborative basis, rather than a contractual basis. However, it was also possible to infer from the results that the Finance function is clearly more distant from the supplier than the SC function, based on the higher importance that the SC function provided to most of the questions. Additionally, when the most important measures (top three or four in Questions 5, 6, 7 and 9) were identified, it was this group of measures that also generally exhibited a higher occurrence of significant differences. The inference being that on those issues that are top of mind (i.e. most important) there remain differences that suggest that the two functions are not optimally aligned, especially as in most cases they apply the same priority ranking to the measures, with the notable exception of “risk” in Question 5.

When one attempts to take these variables and infer relationships to the dependent variable, there appeared to be a marginal relationship associated with Questions 6 d and 9 b. Of particular note is that this association appears to be dependent on the Finance function rather than the SC function, even if the Finance function is more distant from the supplier as indicated in the group analysis. As such, there appears to be some support for continued examination H1 and H2 in future research. It remains intuitive that the supplier must have an impact on such innovation consideration because by definition it will be a partner in such an effort, and presumably not a passive one. Although the cross-enterprise results were positive, they were not as robust as expected. It is therefore suggested that the current research design did not provide sufficient granularity in the questioning to distinguish those suppliers that are strategic (e.g. have significant cross-enterprise process

interaction), and those that are not. It is further suggested that rather than having respondents only categorize the cross-enterprise processes with the supplier into one of three categories (i.e. contractual, cooperative, and collaborative) as was done in the current research effort, that in future efforts the respondents should also assign a level of technological maturity to each of the cross-enterprise processes identified. The assessment of this technological maturity could be similar to Question 15 except at a cross-enterprise level. Therefore, a strategic relationship may then be defined by those collaborative processes that also exhibit positive responses to a statement such as “our cross-enterprise systems evidence technical interconnectivity as well as business process interdependence”. Granted the current research gave very mixed results as to the impact of technology maturity on innovation consideration, but intuitively it remains a line of investigation that cannot yet be discounted. This is also where such concepts as trust and commitment impacting cross-enterprise relationships can be introduced (Morgan & Hunt, 1991; Hart & Saunders, 1997). Donaldson & Toole (2000) and Barratt & Oke (2007) make similar suggestions regarding relationship strength and commitment. It then becomes a question of defining at what point of intensity of impact or influence the relationship becomes mature at a cross-enterprise process level.

As such, it is suggested that going forward the first step in future research will be to have more granular measurement criteria around the impact of an interactive effect between cross-enterprise technological maturity and the governance relationship between firms. It would act as a “gating” tool, or a condition precedent, after which consideration of cross-

functional and innovation variables can then be applied. The suggestions for a revised H1 are provided below.

H1a (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to an established collaborative cross-enterprise relationship.

H1b (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to an established technologically supported cross-enterprise relationship.

It is also suggested that H2 remain relatively unchanged, as there was sufficient support (Question 9 b) to indicate that “meeting/developing operational performance metrics” appears to be associated with the dependent variable. At the current stage of this exploratory research, this is considered sufficient reason to retain H2 in a revised research model. The suggested hypothesis is provided below.

H2 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to a positive perception of the operational effectiveness of the supplier by both the Finance and the SC functions.

It is also suggested that Question 1 in Chapter 1 could be rewritten in the following manner.

Question 1 (revised): “What are the specific variables of a supply chain partnership between two enterprises that would influence the consideration of SCF?”

The relevance of the results to the practical pursuit of SCF can be illustrated by several examples. As noted previously the research suggested that both functions are not significantly aligned on such a topic as “risk” associated with the supply chain. Placing this example in the context of SCF, “risk” can be associated with cash flow risk between members in a supply chain, but if the Finance function is not looking at it in that context, then consideration of SCF loses some of its inherent value (e.g. mitigation of cost of capital and security of cash flow). Granted the current research did not pose the question in such a manner, but given the difference identified even with the examples used (i.e. product development, warranty costs), this avenue of inquiry warrants further attention. Another example resides in the observation that there was no identifiable reason to explain why the Finance function appears to be more aligned with new supplier oriented administrative process consideration, than the SC function appears to be. One of the premises of SCF is the significant role that the SC function would play in consideration of such an innovation, but if it cedes (actively or passively) that role to Finance, is this an indication that placing reliance on the SC function to facilitate SCF consideration is misplaced? Answers to such questions would have a significant impact on financial institution activities. For instance, the targeting of marketing efforts both at the enterprise level and at the functional level, the development of expectations around timing of sales cycles, or the nature of facilitation activities a financial institution would have to engage

in to on board a client and its supplier base to a SCF platform. All time, resources and investment return questions.

8.3 Cross-functional

Chapter 1 of the research project posed the following question: “What are the specific variables in the nature of the relationships between the SC and Finance functions that would influence the consideration of SCF?” The following hypotheses (post Stage 1: H3, H4, H5) were suggested as a means to explore this question.

H3: Administrative innovation consideration is positively related to high levels of information exchanges between functions.

This hypothesis attempted to evidence the “information exchange” through a “leadership” question (Question 14), complemented by a “frequency of involvement” question (Question 13). If “joint leadership of a process” (Question 14) is interpreted as indicative of a “high level of information exchange” then the research results (i.e. SC leadership was predominant) would suggest that the relationship model suggested by the hypothesis may not be supported. Having noted that, there was still clear evidence that the two most important processes (i.e. inventory and accounts payable) kept both functions engaged extensively. Consequently, the trade-off between the responses associated with leadership roles in processes and the frequency of involvement in processes does not give a clear cut inference, but does suggest that greater emphasis be given to the nature of the information exchange, and therefore this hypothesis warrants further consideration. It is

therefore suggested that as inventory and account payables are amongst the most important processes that both functions pay attention to, and where joint leadership is not clear-cut; that H3 be reworded in the following manner.

H3 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to high levels of information exchange between the functions related to inventory and accounts payables process management.

H4: Administrative innovation consideration is positively related to the level of cross-functional understanding and alignment of the firm's performance metrics that exist between the functional groups.

The results (Question 10) did indicate reasonable alignment amongst performance metrics between the functions however they also raised some issues. For instance if inventory and accounts payable take up so much time of each function, then why would accounts payable and inventory turnover ratios be given limited importance vis a vis other measures, as indicated by the research (Table 15)? Perhaps the implication is that such metrics reflect a more structured, formal approach to measurement better suited for larger firms whereas the activities of the day to day for smaller firms are spent dealing with immediate problems that informally are considered best measured by aggregate year-end balance sheet type metrics rather than performance measures related to specific asset/liabilities. Or the current manner in which these assets are managed (e.g. vendor managed inventory, or the firm has a positive cash cycle) negates concern about turnover rates. However as the accounts payable turnover rate is pivotal to the selling proposition

of SCF, further exploration needs to be undertaken to determine in what situations such metrics are critical to a firm, and are jointly measured/managed by both functions. This is important, as a financial institution needs to know what financial arguments can be provided to an enterprise and the context in which they will be received, in order to give more importance to such metrics, which in turn would increase the consideration of SCF. A suggestion for a revised H4 is provided below.

H4 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to a high level of importance assigned to financial value chain “turnover” metrics at the enterprise level.

H5: Administrative innovation consideration is positively related to the perceived effectiveness based on the degree of observed difficulty and uncertainty associated with the relationship.

Although throughout the research numerous differences were noted between the functions, which might imply “observed difficulty and uncertainty” associated with the relationship, the responses to Question 12 clearly showed a high level of satisfaction between the two functions. This observation supports the underlying trend that where differences occur they are normally a function of intensity not direction and that characterizing them in the context of “observed difficulty and uncertainty” may not be appropriate. However, even with a positive interpretation of the working relationship there appeared to be little to no association with the dependent variable within the current research framework, which still appears counterintuitive to innovation, in that satisfied

relatively informal relationships should be conducive to innovation consideration. Given the forgoing, it is therefore suggested that the hypothesis retains its continued presence in future research, but in a more refined manner as presented below.

H5 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to the shared perception of the effectiveness of the functions in shaping responses to challenges to financial value chain assets and liabilities.

The forgoing discussion was almost entirely around the results from the Manova analysis and not the regression analysis, which showed no association between the independent cross-functional variables and dependent variable. As evidenced by the Manova discussion there remains significant areas of clarification and refinement that could be undertaken in future research, therefore the lack of significant regression results is not interpreted as a reason to discount the original H3, H4 and H5 hypotheses. Rather the insights acquired from the group differences discussion should be applied to refine the measures used to explore the revised hypotheses in future research.

It should be noted that the results from the leadership, satisfaction and information exchange measures that were used to measure these hypotheses were also used to evaluate the hypotheses related to the next section “innovation – organizational attributes” which raises an obvious question of overlap, duplication or redundancy in the research design, associated with such variables as formalization and centralization. For instance how easy is it for respondents to distinguish the differences between questions

that are targeted at centralization versus leadership, or information exchange versus formalization/informal, particularly when neither stream of questioning gave a clear association to the dependent variable. This observation is explored further within the discussion associated with “innovation-organizational attributes” below.

8.4 Innovation – Organizational Attributes

Chapter 1 of the research project posed the following question; “What are the specific organizational variables that would distinguish enterprise leaders in the consideration of SCF?” The following hypotheses (post Stage 1: H6, H7, H8, H9) were suggested as a means to explore this question.

H6: Administrative innovation consideration is positively associated with centralized organizations.

Centralization/decentralization is fundamentally associated with where the decision making takes place in an organization. To gain a perspective on this Question 14 served double duty not only as an indicator of information exchange (H3) but also of decision making. In the context of this research, decentralized decision making was suggested by “joint leadership” responses while those that were SC or Finance led were considered centralized at the functional level, on the assumption that whichever function led, would also have the final say in a decision. Obviously, this interpretation is open to challenge, but without actually following the process of decision making and looking at actual documentation, delegation of authorities etc. to evidence that observation, it is considered

sufficient for this exploratory research to infer that primary responsibility for a process also infers primary decision making, and the results clearly provided valuable insight, leading to further refinement of terminology. Therefore, these observations lead to the suggestion that this hypothesis should be retained, with revisions to H6 as noted below.

H6 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to joint decision making related to financial assets and liabilities.

H7: Administrative innovation consideration is negatively associated with more formal organizations.

This hypothesis was evaluated through the effort in Question 11 to combine frequency of contact between the functions, with various categories of activities that can loosely be characterized as moving from informal to formal (objective oriented) behavior. The results supported the observation that generally the relationship is first and foremost informal in nature, however the results showed no significant association to the dependent variable. When these observations are combined with the high satisfaction that was evidenced in Question 12, concerning the informal relationship, there appeared to be little incentive to change behavior to consider new process innovation. This variable is reasonably well grounded in innovation theory, so it is hard to dismiss it. Therefore if one were to migrate from the concept of a formal organization, to one of a formal (rules based) process, within the context of a predominantly informal organization, and confine the discussion to the financial value chain activities it is suggested that there may be a

positive association with the dependent variable. This may be particularly so, if the “gating concept” previously discussed is used to select target enterprises for future research. Therefore it is suggested that the hypothesis be retained but in the revised format below.

H7 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively associated with formal (rules based) cross-functional process relationships.

H8: Administrative innovation consideration is positively related to the level of sophistication and education of representatives in each function.

As indicated in the results of Chapter 7 there is a difference between the two functions on experience (Question 24) and particularly related to education (Question 25). The underlying premise of the organizational complexity variable is that experience plus education of each function when combined creates a sum greater than the two functions. It is premised on a reasonably high educational level, or perhaps in this context professional certification level of the functions. As evidenced by the results the level of certification/education by the SC function pales in comparison to that of the Finance function. Until the SC function acquires an equivalent level of certification and education it is suggested that this construct would not have any application. However if as suggested future research incorporates a gating exercise that identifies firms of high potential based on the technical and governance maturity of the cross-enterprise relationship then there is reason to believe that such an interaction effect of

organizational complexity would exist. Anecdotally there is support for this view in the Stage 1 and 2 results associated with Cases B and E, in which both functions were highly educated/certified. Therefore it is recommended that the hypothesis remain but in a revised form as identified below.

H8 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to the experience and educational/certification level of representatives in each function.

H9: Administrative innovation consideration is positively related to high technological maturity.

Based on the Stage 1 results it was determined that the best manner to gauge technological maturity, was to measure technological maturity in terms of perception, as opposed to tangible measures (e.g. number of applications and level of technological resources in place). To that end, Question 15 was developed, and the expectation was that there would be support for a positive relationship. However, as the analysis showed the results were neutral at the aggregate and SC function level, while at the Finance function level a counterintuitive negative beta was observed. This is perplexing as the Finance respondents should have a greater propensity to technology consideration and adoption based on their training and familiarity with financial reporting systems. In essence, it is suggested that a disposition to technology solutions is inherent in the professional training of Finance professionals; it is institutionalized in the profession, not necessarily in the organization they represent. However as this suggestion was not examined in the

research design, it remains that, just a suggestion. Consequently, the negative beta remains perplexing.

Despite the lack of an explanation for the above referenced apparent inconsistency, it still remains intuitive to recognize the apparent importance of technology maturity both at the cross-functional and cross-enterprise level, and the apparent need for leadership on this issue from both functions. Therefore, it is recommended that the hypothesis be retained with the following revisions.

H9 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to the degree of direct involvement of each function in managing the technological maturity of cross-functional and upstream cross-enterprise relationships.

In terms of implications to the application of theory as it applies to the purpose of this research, the forgoing discussion suggested marginal distinctions between organizational variables that impact cross-functional behavior (H3, 4 and 5) and those that impact innovation consideration (H6, 7, 8 and 9) as separate lines of inquiry. It is therefore suggested that for the purpose of the revised model no distinction be made. As such, Questions 2 and 3 from Chapter 1 could be merged into one, and be rewritten in the following manner:

Questions 2 and 3 (combined): “What are the specific organizational variables in the nature of the relationships between the SC and Finance functions that would distinguish functional leaders in the consideration of SCF?”

The implications of the discussion associated with H3 to H9 for financial institutions are multiple. For example, it is significant that the balance of distribution of leadership roles in favor of the SC function appears to be in contradiction with the Finance function that has the most association with the dependent variable. Further compounding that is the skewing of that leadership role on processes (i.e. inventory and accounts payable) closely associated with SCF, away from the Finance function (Table 19). Without understanding this “contradiction”, financial institutions may be a) starting the dialogue with the less interested function, or b) spending too much time on one function as opposed to the other.

Another insight is that as most financial firms can be considered bureaucratic, formal and centralized in their behavior as organizations, it will be a challenge for them to move beyond their primary “formal” interface with the Finance function of their client to reach into that firm’s informal “cross-functional” structure. In simple terms, it is easier for one formal organization to deal with another than it is for a formal organization to deal with an informal one. Therefore rather than trying to do that they should focus their attention on a substrata of the informal relationships, where specific processes (i.e. inventory/ accounts payable) within an organization have been codified/standardized, and where there is a more natural fit for the normal behavior of a financial institution.

At the same time as there would be a preference to target specific actions to specific codified processes, the implication cannot be avoided that financial institutions need to acquire increased competence and capability to be able to talk and relate to the SC function. As evidenced in the results from other questions, the SC function clearly has a significant role in issues (i.e. inventory, accounts payable), that have normally been perceived by financial institutions as the domain of the Finance professional in a given enterprise. Additionally as the research also suggests the supplier relationship management role that the SC function has, it is incumbent upon the financial institutions to enhance their knowledge base of the SC function, if they wish to extend their business opportunities into their clients' supply chain partners. This need will be even more relevant if and when support is found for H8 (organizational complexity). As and when this occurs, it is suggested that it will be the financial institution that has the competency to reach both functions with credibility and trust, which will truly be able to use the "organizational complexity" variable as a leverage tool to accelerate the consideration of new process innovations in a cross-enterprise fashion.

The research also indicated that the Finance function has the predominant role in payment mechanisms. To that end, it should be noted that these payment processes are usually based on the technology practices and processes of the enterprise's principal financial institution partner. This places the enterprise's Finance function and the financial institution in a strong and collaborative relationship, which may constrain the value proposition that both parties would see the SC function bringing to the table around the technical, process, and decision making mechanisms associated with the financial

value chain. However, until such time as the exact nature of the role that the SC function currently plays associated with the decision making related to management of the financial value chain is defined, it would appear to be counterproductive for a financial institution to assume the SC function does not have a role, and not explore that aspect. At the same time, it leverages one of its own strongest competencies, technology maturity in the pursuit of upstream process innovation.

The last comment about the financial institution's technology maturity leads to a revisiting of a hypothesis that was removed because of the Stage 1 results related to application service providers (ASP's). The original hypothesis stated, "Innovation consideration is positively related to the application service provider's marketing effort". It was removed from further consideration because the participants of Stage 1 provided no evidence of active ASP marketing to their firms, and their firms indicated that even if they were targeted for marketing efforts by ASP's there would be a lack of general receptiveness by the firms in question to the approaches of these firms.

This is where financial institutions have a significant leverage advantage. In fact through the payment systems, and various other financial support mechanisms they provide to enterprises (these support services are practically ubiquitous to all firms) they are in fact "embedded". This means that if a financial institution wishes to promote a new application or iteration of an existing application, their clients in question will have to pay attention. Consequently, it is suggested that the following hypothesis be considered for inclusion in the revised model.

H(New): New supplier oriented administrative process consideration associated with the financial value chain is positively related to financial institution marketing efforts.

8.5 Innovation – Process Characteristics

Chapter 1 of the research project posed the following question; “What are the specific variables associated with technology innovations that the SC and Finance functions share that would distinguish functional leaders in the consideration of SCF?” The following hypotheses (post Stage 1: H10, H11) were suggested as a means to explore this question.

H10: Administrative innovation consideration is positively related to a relative advantage over its predecessor.

H11: Administrative innovation consideration is negatively related to complexity (i.e. difficulty of use, implementation and understanding).

As indicated in the discussion in Chapter 7 both functions were very aligned concerning the appropriate levels of importance of the metrics used (Questions 17, 18, 19, and 20) related to the “relative advantages” argument. Consequently, if and when SCF did become a process for consideration, the measures that would be used appear to be transparent and well aligned between the functions. This also bodes well for any financial institution planning an interaction with a client, on a cross-functional basis, in that the metrics around the description of the value proposition would be equally applicable to both functions. In regards to the challenges and barriers to implementation of a process improvement (Question 21), the results inferred (due to the correlation analysis) that they

would be less important than the relative advantages, in their association to the dependent variable. As well, any firm or function will still have to deal with the results of Question 23, which clearly showed that the Finance function was inclined to give priority to customer focused and enterprise centric process integration efforts while the SC function gave priority to production focused and supplier oriented efforts. This implies that the Finance function has an even stronger orientation to those types of innovations, and as such, an upstream supply chain process innovation has very little opportunity for success unless there is functional leadership from the SC function, which appears to be lacking. This observation would also tend to support the perspective that there may be a “natural” sequencing of technology priorities within a firm. This would be based more on a default position that Finance function is inclined to such efforts but not the SC function, and as the Finance function is clearly downstream and internally oriented that is where “first” investments in supply chain related activities will occur.

It is therefore suggested that the hypotheses be retained but modified slightly, and the original question remain unchanged, as indicated below.

H10 (revised): New supplier oriented administrative process consideration associated with the financial value chain is positively related to a shared perception of high “relative advantage” over existing processes.

H11 (revised): New supplier oriented administrative process consideration associated with the financial value chain is negatively related to a shared perception of high “complexity” of migrating from an existing process to a new process.

Question 4 (un-revised): “What are the specific variables associated with technology innovations that the SC and Finance functions share that would distinguish functional leaders in the consideration of SCF?”

As noted previously the research results did not evidence an association of process characteristics to the dependent variable, and therefore it could be inferred that the research provides limited support for the use of these constructs as lines of inquiry as a basis for innovation research. However, given that this is exploratory research, and there is such a strong literature base in support of these constructs (Rogers, 2003) it is felt that such a conclusion would be premature. In fact from the perspective of alignment between functions on issues being a contributing factor to innovation consideration, this theoretical stream was the only one that had significant alignment between the functions, as such, it would seem counterproductive at this time to remove it.

8.6 Revised Research Model

The previous discussion provided suggestions as to a revised model, which is represented in Figure 5 below. The research suggested the advantages of a screening or gating effort to identify strategic suppliers, subsequent to which the cross-functional and innovation lines of inquiries could be pursued. Specifically the gating refers to a decision point at which the research effort would determine whether or not an identified supplier was truly strategic, and therefore eligible to continue as part of the proposed research effort. If the decision is made that a given supplier is strategic pursuant to the gating criteria, then the exploration could move to the lines of inquiry model. All post Stage 1 hypotheses remain,

but in revised format based on the findings of this research effort. Additionally a new variable associated with “Financial Institution Intermediation” related to the marketing efforts of financial institutions has been added. The bidirectional arrows in the model associated with this variable indicate that nature and definition of the suggested impact of this variable still needs to be explored. The dependent variable becomes the “propensity to consider new supplier oriented administrative process consideration associated with the financial value chain”. The dotted lines from the various lines of inquiry continue to indicate that the effort remains exploratory but with a higher degree of confidence in the suggested association with the dependent variable.

Figure 5 – Post Stage 3 “Lines of Inquiry” Research Model

All of the forgoing would still rest on a continued examination of the differences between the two functions, but because of the suggested refinements, a better “line of sight” to the dependent variable due to more refined lines of inquiry would be anticipated. The research model should still be considered to be exploratory in nature, but in a much more focused and directed manner when compared to the model identified in Figure 4 in Chapter 6.

The research methodology that could be used to pursue the suggested model would be defined in large part by the nature of the research partnership model pursued and the primary objective of the research. If the objective was to continue the pursuit of the “line of sight” to the SCF objective, then the preferred model would be to partner with a financial institution that is 1) interfacing with its clients regarding the on boarding of its client’s suppliers to a SCF platform and 2) explore the interface between a SCF client and several of its client's suppliers. Both of these approaches would be ideally suited to a case study methodology using the anticipated results of this current effort to refine the research protocol and interview process.

If the primary objective is the continued exploration of the difference between the two functions and the impact of such on strategic supplier relationships, then this could be pursued in partnership with professional supply chain organizations as the principal access point to companies. A survey tool would be well suited for this line of inquiry (i.e. determination of a strategic cross-enterprise relationship). Then assuming the research design allowed for it, the enterprises that were identified as having strategic relationships

could be engaged in a case study format at which time the cross-functional and innovation lines of inquiry based on this research could be pursued.

Chapter 9 will provide a discussion of the significant contributions of the research to academia, identify a number of limitations and shortfalls of the study, and suggest future research issues that may be informed extensions of the results of the research or were derived from this research. Chapter 9 will conclude with a general assessment of the achievements of the research when compared to those originally established in Chapter 1.

9 Chapter 9 – Conclusion

9.1 Contribution to Academic Discussion

There are number of academic contributions to be noted. From a subject matter perspective, a discussion of SCF has been undertaken for the first time in academic literature, within a multidisciplinary theoretical framework. The discussion was related to financial innovation consideration and in the context of a cross-functional relationship that has been previously unexplored. The focus on the cross-functional relationship responded to calls for such efforts in the academic supply chain literature stream, while the focus on innovation consideration was defined by a specific challenge facing Export Development Canada, thereby imparting a very practical benefit to such research. From a methodological perspective, the research represents an example of complex three stage multi-method approach to exploratory research, combining both case study analysis and a survey tool as the core research tools.

In regards to the contribution to the cross-enterprise theory, a number of key observations/inferences are worth noting. It was suggested that the effectiveness of an external integrative activity could be measured by the degree to which external integration is related to the attainment of a firm's strategic drivers and objectives. As previously assessed in Chapter 3.1, there did not appear to be theoretical support for SCF as a strategic driver. To the knowledge of the researcher this is an original contribution as it is the first “strategic” positioning discussion of SCF in a theoretical context. Reinforcing this perception were the actual research results associated with the cross-

enterprise and cross-functional variables as they appeared to indicate general support for cross-enterprise and cross-functional relationships that are focused on short-term efficiency efforts, not strategic matters. As well, Stage 1 clearly evidenced the downstream perspective of the enterprises related to “process innovation”, so not only does an upstream process innovation such as SCF not appear to be transparently or theoretically linked to strategic intent, it also is transparently lower in priority in relation to downstream activities.

Consequently, there appeared to be limited association with new supplier oriented administrative process innovation and the theories discussed in Chapter 3. However, in the opinion of the researcher it is still premature to discount the application of such theories to upstream strategic interests. For instance, Case B in Stage 1 and 2 is a very clear example where the firm perceived its upstream activities as its strategic lever. Therefore, it is suggested that if the research continues and the “gating” principle is applied to suppliers as suggested in Chapter 8, it still may be possible to determine a stronger association with strategic intent, than was observed from the current research. This is important, as the issue of the strategic equivalence or not of the financial value chain to the goods and information value chains still needs further evaluation.

In the context of the cross-enterprise variables and SCF consideration, insight was brought to the ASP variable. Originally, it was a generic definition provided to respondents, however with the benefit of the inferences derived from the statistical analysis, a suggested improvement would be to bring greater clarity as to the specific

nature of the ASP provider (e.g. financial) prior to examining it with respondents, which may in turn derive a different response. Another small nuance that may be of use to future researchers who are considering inclusion of this “revised” variable in their research design, is that in many ways financial institutions can also be considered as “strategic suppliers” thereby falling within the construct of external partner influence; as well as the ASP construct. Depending on the circumstances of future research, the alternative position may be warranted.

Direction of information flow, was a challenging cross-functional variable to deal with. First, there were no previous precedents in academic literature that had evaluated the SC/ Finance cross-functional relationship and identified common processes between the two functions, against which direction and intensity of information flow could be measured. This research has made significant progress in identifying those processes that are shared and are a priority for each function. The other challenge however as indicated in the analysis was the inability to truly evaluate the direction and intensity of the flow of information between the two functions. This inability was a function of the limited time and willingness by respondents to participate in such an activity, which led to the creation of the leadership question (Question14). When the results of this question were combined with the involvement in modifying processes (Question 13), a number of unexpected insights were derived. The suggestion is that in future research when the opportunity to evaluate information exchange arises, and there is an identified or anticipated difficulty in accurately measuring intensity and direction, these types of questions may be a satisfactory approach to deal with those difficulties.

This research's contribution to innovation theory is that it addressed an area of the innovation continuum (i.e. consideration) that is under represented in the business to business innovation literature stream, and it did it in the context of administrative process improvement (Frambach & Schillewaert, 2002), which is also underrepresented in innovation literature. The discussion of how SCF as a process fits within the various definitions of innovation (Chapter 3.3.3) should provide guidance to future researchers of process innovation as to how to characterize their particular administrative process within innovation theory. It should also be recognized as an original contribution, as to the knowledge of the researcher it is the first such effort to position a financial process in the innovation literature, associated with product/process attributes. The research also suggested that another key construct in innovation theory, that of compatibility, received conflicting suggestions as to its application regarding process innovation. An explanation for the diminished values of this construct was previously suggested in that the processes that are subject to innovation consideration within the context of this research already exist and are being executed (i. e. from a paper based approach to technological mature basis). Therefore, there is no apparent concern at the "consideration" stage of an improved process for such things as compatibility, and additionally for the other innovation constructs of trialability and observability. There is already a familiarity and understanding with these processes, therefore such consideration is not warranted. This interpretation would be well suited to further validation with other administrative process innovations.

Another contribution to innovation theory rests with the concept of “propensity to innovate” or “attitude to innovate”, which has been cited in the academic literature (Morrison, 1996; Damanpour & Schneider, 2006). Usually this is associated with an enterprise’s propensity, as evidenced by clear and defined examples of innovation, most often in the context of best practice or first mover activity. The research results, which inferred the Finance function’s disposition to innovation consideration, suggest that there may be a “professional” propensity to innovate that is directly related to the training by professionals, be they Finance professionals or other professionals such as engineers, scientists and even supply chain professionals. Perhaps it may even be an extension of the organizational complexity construct (i.e. work experience, educational level plus professional certification). If validated through future research it would clearly add to the existing literature associated with propensity to innovate.

The final contribution to be noted is that the research has developed a proposed model associated with consideration of a cross-enterprise financial administrative process, which has not previously been done. As well, with some modifications the researcher is of the opinion that the proposed exploratory model could be adapted to a number of other cross-enterprise administrative process issues that both functions might be engaged in, such as risk management, demand information exchange, or inventory management.

9.2 Limitations of Research and Lessons Learned

A discussion associated with limitations is encouraged for the purpose of qualifying results and to avoid identified shortcomings in future related or comparable research

(Wilkinson, 1999). This research, not only because it is exploratory but also because it is “first” in the context of the cross-functional relationship studied, had its share of limitations; some expected and some not. Outlined below is a list of issues that the researcher considers to be of a significant nature, particularly as they apply to executing an exploratory research project.

- **Broad or Narrow Theoretical Focus** – A constructive critique of this research is that the breadth of the theories chosen at the outset that grounded Stage 1, may have actually restrained the capacity of the research to derive some tangible progress on the main issues at hand (i.e. cross-functional alignment and innovation consideration). The counterpoint to that observation, and which was followed by the researcher, was that the breadth was justified because in the absence of previous efforts related to the issue at hand, and supported by the researcher’s domain knowledge, an effort that was multidisciplinary had the highest probability of discerning a “line of sight” that would begin to address the issue. Additionally the breadth was also dictated by EDC’s own perception of what was desirable in terms of research scope. However, the critique is a legitimate comment for consideration from an academic perspective, and in future research, significant consideration should be paid to this core issue, as it clearly affects the choices that are made concerning the design of exploratory research.
- **Survey Sample** – In the planning of the research design there was clear recognition that a convenience sample, based on EDC’s client list, would be utilized. This was considered acceptable as the intent of the effort was not to

generalize the results to a population but rather to build a model. However, in the context of Stage 3, there were numerous challenges in collecting a sufficient number of responses for statistical analysis purposes. These challenges were only resolved by accessing a third party membership list. The root problem appears to have been a lack of a formal protocol with all interested parties within EDC. It is therefore recommended that if a similar Academic/Crown corporation effort were to be replicated, that a formal research protocol agreement be designed to create high confidence that sample size targets are agreed upon and that the methodology to achieve those targets is supported internally.

- SCF – At the time the research was being conceptualized (2009/2010), there was sufficient traction related to the SCF idea in SC/Finance trade journals and through anecdotal information EDC was accumulating, and as such, it was anticipated SCF would be an easily recognizable issue by industry sector respondents in the near term. However, the poor response rate related to the survey results clearly belied that notion. Therefore, it can be said that perhaps the research project was launched too late (i.e. should have been done in 2009/10), or it was premature in its timing. In either case, it is the researcher's view that the results are not as robust as they could have been, given better timing. Fundamentally the point therefore for future researchers is to very specifically determine if the opportune timing for the research question is at hand, particularly when a concept/product/process is only at its nascent stage in terms of consideration or acceptance.

- Return on Effort (Use of a Proxy) – The proxy that was used was well grounded in SCOR literature, and equally grounded in definition due to the feedback from respondents in Stage 1 and 2. However there is a concern that it was too “distant” from the core issue of “propensity to consider SCF” to provide an efficient and timely path from explanation building (the current effort) to explanation testing (a future effort). The point is that the use of a proxy is a challenging and risky effort, so if one is to be used for explanation building, as was the case in this research, then there should also be well considered confidence that moving from explanation building to testing is not that far removed in time. It should be key criteria for consideration of execution of exploratory research on a given subject.
- Interviewer Bias – In terms of future replication of these results, the researcher is reasonably comfortable that similar results would be obtained in Stage 1 and 2 if it were to be replicated with a similar sample. However, the survey results clearly evidenced a significant gap in education and experience between the Finance and SC respondents. This raises the question as to whether not during the Stage 1 and 2 efforts, there was an overweighting by the researcher to the information provided by the Finance respondents (i.e. from more experienced and educated people) and underweighting from the SC respondents (i.e. from less experienced and educated people). This type of issue is a concern that Miles & Huberman (1994) have highlighted as an issue in case study research, and now that the gap has been suggested by the evidence of this research, it should be given more attention in similar research.

- **Size of Firms** – The results of this survey did not provide evidence that size of the firms involved had an impact on the dependent variable. That may be because the majority of the firms were small to medium size and therefore had limited resources, or in innovation terms these firms did not exhibit organizational slack (i.e. uncommitted resources). However, size is well recognized as being positively related to innovativeness (Rogers, 2003) due in part to such organizational slack. The implication of this is that when planning innovation research, greater attention should be made to acquire in the respondent base, a sufficient number of firms in all categories of sizes, in order to evaluate the impact of firm size on the specific innovation under consideration.
- **Inclusion/Exclusion of Key Variables** – The major result of Stage 1 was the removal of a number of variables. These decisions are consistent with exploratory research in this case as the researcher was looking for patterns or commonalities of practice between the two functions which would provide a common structure of dialogue and which resonated as valid variables based on the research results. However, it should not be construed as dismissive of them in other contexts. If for instance the sample in question was associated with much larger firms or firms that did indeed already have significant cross information exchange activities, these variables should not be discounted for consideration by the results of this research.
- **Survey Questions/Structure** – Although a significant effort was made in developing and validating the Stage 3 questionnaire, there clearly is room for

continued improvement. Specifically there remains room to continue to a) improve definitions (e.g. risk and return management) of measures, b) frame operationalizations to evaluate only one variable, and avoid overlap of such operationalizations as cross-functional leadership and satisfaction that were used to measure several variables in this research and c) improve measurement/scaling terminology by moving away from “extremes” in labeling the scale selections available to respondents.

9.3 Future Research Issues

In addition, to pursuing the suggested research tracks noted in Chapter 8, associated with working with financial institutions or professional associations in pursuit of further refinement of the model proposed in Figure 5, there are a number of other avenues of research that would be excellent opportunities for exploration. These are presented below.

- In the researcher’s opinion, the results evidenced a strong cross-functional undercurrent of interest in the supplier relationship from the perspective of operational efficiency and effectiveness of the firm, rather than strategic or structural positioning at the cross-enterprise level. There is very little in the research that would support the often stated observation that global competition is now between supply chains (Crook & Combs, 2007) not between enterprises, is supportable. Such declarations are associated with concepts such as Integrative Trade and Global Value Chains (GVC). This research was not intended to address

those issues directly. However, the results raise questions as to whether or not: a) Canadian enterprises are strategically missing opportunities for greater integration, b) Canadian enterprises are missing an opportunity as the firms are not positioned to participate in those supply chains that embrace Integrative Trade and GVC characteristics, or c) the benefits of Integrative Trade and GVC's in the Canadian context are overrated. Consequently, until such time as cross-enterprise interaction is evidenced to extend beyond short term operational issues, or arm's length approaches to governance, the forgoing questions will remain unanswered, and as such they infer a significant challenge to such concepts as GVC and Integrative Trade, in a Canadian context.

- It is suggested that a future research project be undertaken to explore the cross-functional relationship between the Finance and Business Development function, illustrated in Figure 3 (Enterprise Value Chains). Such an effort would clearly extend the understanding of the Finance function's contribution to the Business Development function's success (either from an operational or financial performance perspective) and it would address the call for further cross-functional analysis in the Supply Chain literature stream (Mentzer et al., 2001).
- It would be useful to evaluate the relationship between enterprises and their principal financial institution regarding the manner in which cash management and liquidity practices are promoted, adopted and executed. The research would be based on existent or currently promoted practices as opposed to a future state type of product/process such as SCF. Such research could be an excellent

precursor to preparing for consideration of the new variable (i.e. Financial Institution Intermediation) suggested in Figure 5.

- There is a clear opportunity for a review of Supply Chain academic literature associated with content related to the Finance function, and the activities and attributes this function can have on other functions associated with SCM activities. Given the research that was undertaken for this thesis in regards to the Finance function, the researcher is of the opinion that the Finance function is a significantly underutilized asset in the pursuit of SCM excellence. Such a literature review could act as a catalyst for significant research to validate this opinion.
- The observation that there could be a “professional” inclination to innovation consideration and adoption, in addition to already established observations that there are organizational and individual dispositions to innovation consideration (Morrison, 1996; Rogers, 2003), seems worthy of further research. If it were validated it could have practical implications as to how and with whom new process innovations are promoted, as well as perhaps even having some impact on curriculum development of professional designation accreditation organizations.
- Finally, one of the biggest disconnects between the two functions related to the perception as to how important it was that the strategic supplier shared risks. A significant component of both function’s mandate in any organization is risk management, and to have such a disconnect as suggested by the research, clearly

opens up a significant line of inquiry as to the validity of the observation, as well as in what areas of risk management this disconnect may exist.

9.4 Summary Comments

At the outset of this research effort success was defined in part as:

“...the ability to provide preliminary evidence, either in support of or against the proposition that there is a separation of interests between the Supply Chain and Finance functions in Canadian export oriented enterprises and more clearly define the nature of that separation if it exists. Second, to provide a preliminary indication of a model that can be considered for the evaluation of the capacity of Canadian exporters to consider the adoption of SCF...”

Specifically this “separation of interests” was characterized by the following observations.

- The SC function is not closely integrated with the Finance function, and generally does not consider the Finance function a strategic partner in ensuring the enterprise’s supply chain performance success.
- The Finance function is not closely integrated with the SC function, and generally does not consider the SC function a strategic partner in ensuring the enterprise’s financial performance success.
- The SC and Finance functions have different perspectives regarding consideration of innovative technology integration efforts.

The first two points have been supported through the discussion of the results of the group difference research, although generally the separation is one of intensity not direction. Examples of these “intensity” separations would be the lack of joint leadership of financial value chain processes, the lack of shared decision making on performance objectives, the lack of a shared value associated with the risk mitigation that a supplier provides, and a lack of importance of financial turnover metrics. Having noted these separations however it must also be noted that both functions have a common direction on many issues that bode well for consideration of SCF. Examples of these would be the common interest in inventory and accounts payable matters (if not the associated turnover metrics associated with such), and the shared recognition that the supplier does impact the enterprise’s performance significantly (if not on the risk side). Overall, based on the results of the research it is reasonable to assume that the integration of the two functions is one primarily associated with operational issues, not strategic. As to the third point the results indicated that the two functions are aligned as to the variables that would be used in the evaluation of new technology applications, however each function provides quite distinct views as to what applications should have priority.

As to the development of a proposed model, that has been accomplished. The model is now grounded on significant research such that there is reasonable confidence, that within the theoretical framework of this research, refinements have been provided (i.e. variables, hypotheses), that will allow a more refined focus on specific issues. Appendix 12 provides a simplified audit trail of how far the research has taken the discussion. As well refinement to operationalizations focused on the financial value chain have been

suggested, that would not have been possible prior to this research. Consequently, sufficient information was provided by the research to suggest a proposed yet supportable, line of sight model; which as a first effort in exploring a previously unexplored issue is considered an important step, and in the opinion of the researcher validates the exploratory approach of this research.

In addition to contributions to academia previously discussed in this Chapter, and to practitioners which was discussed in Chapter 8; it was also suggested in Chapter 1 that the research would also provide insights into the application of national structural initiatives that could facilitate SCF, and insights around the collaboration of academic institutions and government entities on doctoral research.

In terms of structural initiatives being initiated (e.g. federal government or provincial governments act as the anchor institutions in a SCF platform) and by consequence, such efforts having a positive impact on Canadian firms and financial institution practices; the opportunity appears to be limited. As indicated in the limitations section above there appears to be an issue of timing that may have diminished (at least currently) the opportunity for consideration of SCF in Canada. Most consideration and adoption of innovations comes from either an environment that embraces opportunity and sees the relative advantage in it or from an environmental uncertainty (Damanpour & Schneider, 2006) where the relative advantage of responding to the uncertainty (e.g. access to liquidity in a financial market crash) becomes paramount. In the context of SCF, Canada would not appear to be in either category given the current strength of the Canadian

economy, the strength of its financial institutions, and the relatively comfortable liquidity positions of many Canadian firms.

In regards to insights around the collaboration of academic institutions and government entities on doctoral research, the researcher having “lived” the experience through this research effort has identified many insights, with the most important insight being the unexpected challenge that had to be addressed internally within EDC. The original genesis of this research partnership was to explore the realities of the potential synergy that may exist between Crown corporations and the academic community, related to research that would meet the standards of doctoral research but would take advantage of the unique assets of Crown corporations (i.e. brand, trusted relationships with clients, patient capital, longer time horizons). The “assets” of EDC clearly facilitated many aspects of this research with an emphasis on access to enterprises particularly in the Stage 1 and 2 portions of the research, financial support, and patient capital. However, a “soft spot” in the dynamics of this partner relationship was uncovered.

Doctoral research is in many ways similar to innovative product or service creation, at the earliest stage of development, when it is at its most exposed. Innovative behaviour at this stage is best supported if it is “incubated”, such as having an executive champion. This was clearly the case at the outset in this research within EDC. However as the research evolved, organizational changes also occurred which created an environment where innovation was no longer “incubated” with the same intensity, and where an executive champion was no longer present. This type of organizational evolution occurs in the

normal course of the evolution of a bureaucracy, but what it clearly evidenced is that such research efforts can over time face “structural and cultural” differences/distances in the organization (or a sub unit of such) that host the effort. In this particular case, the research effort required three different “sales” efforts as the organizational changes evolved in order to keep the research project “sold”. This continuing “sales” effort turned out to be the most unexpected “extra effort” required in this collaborative effort. As difficult and time consuming as it was, the effort was completed and because of that partnership some unique research was accomplished which would not have occurred if comparable research had been attempted under the sole governance of either an academic institution or a Crown corporation.

Therefore, in the spirit of supporting future such efforts, a preliminary structure of what a PhD fellowship partnership between a Crown corporation and academia might look like is provided in Appendix 13. It is only a starting point as any such structure will have to be driven by the specific nature and interests of the Crown corporation (municipal, provincial or federal). However, it is based on “real life” experience of at least one case study (this thesis effort) so it should have credibility as a starting point for discussion of future collaborative efforts that may arise.

As noted in Chapter 1 exploratory research on an issue is actually just the beginning of a journey, and as evidenced in the previous research and limitations sections, the journey is yet incomplete. However, the researcher is of the opinion that the core achievements that have been attained by this research effort are:

- The research has clearly moved the boundaries concerning any discussion associated with the cross-functional relationship between the SC and Finance functions in Canadian export oriented enterprises.
- Although SCF in 2013 appears to have limited application in Canada, a framework for discussion has been suggested that has application to both enterprises as well as financial institutions, if and when SCF becomes more topical either at a structural or a specific supply chain level, and
- A complex exploratory research methodology merging academic and government agency interests was executed.

Hopefully in some form or another all three achievements will be replicated or extended in the future, either by the current researcher or by other researchers, as the journey continues.

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Appendix 1 – Reverse Factoring

Source: Global Business Intelligence, Quadrem.ca, Prime Revenue, EDC

1. A SCF program is set up (usually initiated by a large buyer or financial Institution (FI)).
2. A platform for data exchange is implemented (can be hosted by a buyer, FI or third party).
3. Suppliers/sellers register to transact on the platform and negotiate standard payment terms (e.g. net 60).
4. Buyer issues a purchase order on the platform.
5. Supplier performs the work and submits an invoice through the platform.
6. Goods are received, the invoice accepted
7. The supplier notified through the platform, and a payment trigger occurs.
8. At this point the supplier has three options.
 - a. Immediately discount the invoice at rates based on the buyer's credit risk
 - b. Discount any time until maturity of the receivable
 - c. Wait until maturity for payment (e.g. net 60 from acceptance)
9. Upon discount, the buyer's credit limit with the FI is reduced.
10. Based on the action in step 8, funds are remitted to the supplier net of fees and discounts as applicable through the FI.
11. The buyer makes payment to the FI based on the payment terms negotiated in step 3.

Appendix 2 – Explanatory Note to Prospective Participants of Stage 1

Cross-functional Gap Analysis

Purpose

To seek the participation of mid-sized Canadian firms in a research effort to better understand the relationship between the Finance and Supply Chain management functions in firms as it relates to supplier relationships. EDC believes that with such understanding we will be in a better position to accelerate our capacity to support Canadian firms in their upstream activities.

Why Does EDC Consider This Important?

The last decade has clearly evidenced an increase in the complexity of supplier relationships as firms chose to move to extended supply chains that are geographically dispersed. These relationships are generally managed by the supply chain function in a firm and range from arm's length (i.e. price point driven only) to fully collaborative (e.g. joint objective setting/collaboration) in character.

EDC is increasingly being asked to consider supporting supplier related activities, and we have begun to do so. However, we are fully aware that there are some gaps in our knowledge about how supplier relationships are managed/perceived by firms. EDC would like to accelerate our understanding of a number of key issues. Of particular interest is the relationship between the Finance and the Supply Chain management functions. EDC understands the former function very well and the latter function reasonably well, but not the relationship between the two. EDC's "natural" first point of contact is the Finance function, but if we do not improve our understanding of how the relationship works between the two functions, we believe we will be limiting our capacity to be a proactive partner in the support of supplier related activities. Topical areas where we believe this research will be of benefit to Canadian firms would be:

- Improving the efficiency/effectiveness of the financial flow of funds amongst supply chain partners
- Providing opportunities for operational cost reductions
- Facilitating the adoption of new innovative practices (enterprise centric or supply chain partner centric) that would improve their competitiveness
- Facilitating the "matchmaking" between Canadian enterprises and suppliers, and by extension of the lessons learned related to supplier relationships, also facilitate the matchmaking of foreign buyers with Canadian goods and services.

Nature of Commitment Requested

Briefly, the methodology of the research involves separate interviews with representatives of each of the Finance and Supply Chain functions in your firm. The actual interview process is grounded in the EDC's own observations around this issue, and an exhaustive review of trade and applied research literature (e.g. SCOR Model (www.supply-chain.org), Journal of Business Logistics) associated with this subject matter. The estimated time for each interview is approximately 3 hours for each representative. Each interview would be done in person, at a location of your preference.

The results of these interviews will be used to create a web survey that will be sent to Canadian firms in the light manufacturing and information technology sectors in Canada. The objective is to establish a "benchmark" study that can be used as a tool for discussion with Canadian firms.

Direct Benefit to Participants

As a result of participation in the analysis, participant firms will receive:

- A written assessment of the nature of relationship between the Finance and Supply Chain functions in your firm, and its application to supplier relationship activities.
- A benchmarking assessment of your firm's "status", based on the results of the web survey referred to previously. This benchmarking assessment will only be offered to the firms that participate in the interview process.

Research Lead

The initiative is led by EDC's Global Trade Management Innovation Centre (GTM), which is staffed by a group of professionals with extensive Finance and Supply chain experience. Since its inception over 4 years ago, the GTM has conducted meetings with over 700 firms and third party service providers ranging from information gathering, to extensive industry specific SC analyses, specific SC analysis of Canadian firms, and presentations/ workshops on the impact of SC activity on the risk/ cash management practices of enterprises and their SC partners. In doing so, it has established an internationally recognized reputation for knowledge and expertise amongst SC and Finance respondents, principally by the merging of SC and Finance knowledge and practices.

The lead researcher on the project from GTM will be Peter Cowan. Peter has been with EDC for over 30 years and has diverse experience and knowledge in such areas as SMEs, international financial institutions, financial product development, business development, market research methodologies and supply chain management practices. Additionally he is currently completing his PhD thesis in supply chain management at the Sprott School

of Business at Carleton University. As this research is also associated with Peter's completion of his PhD, the involvement of Sprott brings an added rigor and insight into the research effort that we feel will only provide added benefit and insight to the analysis.

The Interview Process

Underlying the questions to be posed is the common denominator of the "Source to Pay" process. For illustrative and explanatory purposes this is grounded in the SCOR Model (Supply Chain Operations Reference Model) (www.supply-chain.org).

There are several characteristics of the interviews that need to be mentioned:

- The discussion will be anchored by the pre-selection of a "strategic" supplier that will be common to the discussion for both individuals interviewed.
- Each respondent will be interviewed independent of the other interviewee.
- It is estimated that each interview will last up to 3 hours.
- The interviews will be digitally recorded.
- Interviewees will be asked to sign a "letter of consent" indicating that you are voluntarily participating in the interview.

The interviews will have the following format;

- 30 minutes on the external environment that each function perceives, dealing with motivations and strategic intent as well as relations with third parties.
- 30 to 45 minutes on cross-functional discussion around the nature of collaboration between functions looking for similarities/differences (e.g. flow of information, type of information, direction of information, frequency of information), corporate performance metrics, individual performance metrics, and perceptions of the effectiveness (e.g. roles well defined, tasks clear, frequency of contact) of relations between functions.
- 30 to 45 minutes on organizational issues that affect consideration of new processes/ products etc. (e.g. organizational complexity, tech maturity (an inventory of IT enabled processes within the firm will be created), business culture (bureaucratic, entrepreneurial)).
- 30 to 45 minutes on characteristics of new processes/products that affect consideration of these new processes/products (e.g. clearly defined advantage, compatibility with other processes/products, trialability, and level of risk).

Following the interviews the recordings will be transcribed, compared, and then a summary report will be created that will a) highlight key observations from the interviews and b) identify "best practice" opportunities related to the observations. This report will be delivered to you within three weeks of the interviews, and a follow up interview will be offered if further discussion is desired.

Appendix 3 – Stage 1 Discussion Guide

Theory - Transaction Cost Economics (Dyer, 1997; Williamson, 2002)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Can you please discuss your perception of the benefits/disadvantages of outsourcing factors of your upstream supply chain? Are there any instances of asset specific investments that you have made to a relationship?	Coordination costs Costs of capital Dependence Timeliness Product costs Relationship Synergy	Can you observe evidence of any behaviour that would be considered opportunistic, and which would impact detrimentally on the strategic interest of the firm being interviewed to such an extent that outsourcing was not/is not considered a viable option? Is the enterprise singularly cost driven?
Theory - Contingency (Donaldson, 2001; Fredericks, 2005)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Are there different business models in your particular sector? If so how do they differ, and are the differences of a fundamental nature? What drives these differences? Explain and give examples.	Outsourcing or not. Off shore production or not. High volume low volume. Different distribution.	How important is it that the firms in a given sector (with homogeneity) follow the same business model?
Theory - Institutionalization (DiMaggio & Powell, 1983; Scott, 1995; Teo et al., 2003)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
In your industry what do you consider to be examples of best practices in the upstream supply chain? How do you believe your firm measures up to those	Vendor Managed Inventory Joint product development Joint design facilities Supply chain collaboration	Have you been able to observe any best practices in the firm, where they have clearly followed others' practices, because the practice has or is becoming the standard?

best practices? Provide examples.		Are they a leader or follower of best practice?
Theory - Resource Based View (Barney, 1991/2001; Lavie, 2006; Locket & Thompson, 2001)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Can you please describe the competitive competencies/assets that form the core of your business model? Do you believe you have a significant advantage vis a vis your competition related to the competencies/ assets you have identified?	Technology Patents Service Licenses Competencies Physical assets	Is there a perception/reality that the firm in question has a unique and sustainable advantage (competency/asset) vis a vis its competition? Is capability in Finance perceived as a unique and sustainable advantage?" How does this firm see itself competing?
Theory - Resource Dependence (Pfeffer & Salancik, 1978)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Have you ever entered into a partnership where the principle driver was in response to a competitive situation, or to create a competitive advantage? The partner had some form of competency/asset or other advantage which complemented your own asset/resources. Can you cite examples?	Key supplier leaves. New competitive product is major threat and firm did not have a quick response. Loss of major downstream contract. Desire to prevent someone else from acquiring an asset of value	How important to the firm in question is the use of partners to respond/react/create to a competitive situation of strategic importance?
Theory - Strategic Choice (Jarillo, 1988; Barringer, 1997)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Have you ever entered into a partnership in order to create a competitive advantage? Can you cite examples?	Competitive advantage would be to create a barrier to entry, increase political power, greater efficiencies, new product/service development	Does the firm have the capability to be an industry leader: a proactive agent of its own destiny?

QUESTION 1 - What are the specific variables driven by the cross-enterprise context of the firm that would distinguish enterprise leaders or laggards in the consideration of SCF?"

Variable - External Partner (supplier) Influence (Gimenez & Ventura, 2005 ; de Burca et al., 2005)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
<p>Has the adoption by a business partner (supplier) influenced the adoption of or consideration of the innovation?</p> <p>How was awareness of the adoption brought to your attention?</p> <p>What type of application was it?</p> <p>Was the initiative driven by the designated supplier?</p>	<p>Communication method (observation, ask, demand)</p> <p>Frequency and level of dialogue</p> <p>Timing of critical influence</p> <p>Level of dependency with this partner (supplier/buyer)</p> <p>ERP, new product development, shared warehouse</p>	<p>Is there any evidence of consideration/adoption of innovations driven by the designated supplier (or a non-designated supplier)?</p>
Variable - Application Service Provider Influence (Dewar & Dutton, 1986; Morrison, 1996; Frambach, 1998; Frambach & Schillewaert, 2002)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
<p>Has the promotion/adoption efforts by a third party service provider led you to actively consider the adoption of an innovation?</p> <p>What was the ability of the ASP to customize the innovation to your needs?</p> <p>What was the nature of the communication effort?</p> <p>Did they provide assistance in reducing the risk of adoption?</p> <p>What was the reputation of the third party provider?</p>	<p>Application service provider could be logistics, finance, and application provider.</p> <p>Engaged in personal selling</p> <p>Explicit communication re product features, price points, integration issues with other systems, user interface</p> <p>Trial period offered</p>	<p>Did the activity of the application provider encourage or accelerate the consideration or adoption of technology applications?</p>

Variable - Perceived Effectiveness of the Relationship with Supplier (Stank et al., 2001; Barratt & Oke, 2007; Ivens & Pardo, 2007)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
<p>Have you been satisfied with the overall relationship between your firm and the supplier?</p> <p>Who do you talk to at the supplier and what is the frequency of the discussion?</p> <p>How do you measure the success of your relationship with the supplier?</p> <p>Has the time and effort spent in developing and maintaining the relationship with the supplier been worthwhile?</p>	<p>Do you share operational information?</p> <p>Price</p> <p>Delivery</p> <p>Flexibility</p> <p>Adaptability</p> <p>Quality</p> <p>New product development</p> <p>Do you jointly share performance measurements?</p> <p>Do you believe you share risks and rewards with your supplier?</p>	<p>Have you been able to determine why the respondent picked the supplier in question? What were the key drivers that made this supplier a key collaborative or dependent partner?</p>

QUESTION 2 - What are the specific variables in the nature of the relationships between the Supply Chain and Finance functions that would distinguish functional leaders and laggards in the consideration of SCF?"

Variable - Direction of Information Flow (Thompson, 1967; Ellinger, 2000 (a); Ellinger et al., 2000 (b))		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
<p>Describe the activities that you undertake that require information flow between the two functions?</p> <p>Describe instances where work or information have flowed or are flowing between the two functions. Are they unidirectional or bidirectional?</p>	<p>What are the implications of failure of the flows to deliver?</p> <p>Decisions required, or after the fact reporting?</p>	<p>Given the instances cited by both functions, do they support/fit Thompson's typology?</p>

Variable - Performance Metrics (Venkatraman, 1994; Beamon, 1999; Gunasekaran & Kobu, 2007; Aberdeen, 2009)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
<p>What metrics are used to measure the success of upstream supply chain performance?</p> <p>What processes do you have in place to measure the metrics?</p>	<p>Resources (generally cost items): Distribution, manufacturing and inventory costs, etc. Output (generally customer responsiveness items; actual performance): Sales, Profit, Fill rate, On time deliveries, etc.</p> <p>Flexibility (how well the system reacts to uncertainty; potential behaviour) : fluctuating demand, poor delivery, respond to new products</p>	<p>How much of an overlap exists in perception of metrics used to measure the success of upstream supply chain activity?</p> <p>In the responses was there at least one measure from each of Beamon's three categories?</p> <p>Do the responses appear to line up with the responses that were provided in the strategic discussion (e.g. performance metrics match upstream strategy drivers)?</p>
Variable - Performance Incentives (Venkatraman, 1994; Ellinger, 2000 (a); Mollenkopf, et al., 2000)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
<p>How you are individually/jointly incented?</p> <p>Name categories.</p> <p>Is there value in being jointly incented, why and if so where?</p>	<p>Strategic, operational, tactical?</p> <p>Rewards for working together with joint goals?</p> <p>Pay is based on joint results?</p> <p>Personal incentive bonuses based on joint events</p> <p>What is the nature of the joint events?</p>	<p>Would an improved incentive structure foster better integration between the functions?</p> <p>Is the incentive system linked closely to the performance indicators?</p> <p>How much common ground do they share?</p>
Variable - Perceived Effectiveness of Cross-functional Relationships (Van de Ven, 1999; Ellinger, 2000 (a); Ellinger et al., 2000 (b); Eng, 2006)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
<p>How would you describe the general characteristics of the relationship?</p> <p>Has the time and effort spent in developing and maintaining the relationship</p>	<p>Describe the cooperative norms of the relationship?</p> <p>Is their mutual trust, as evidenced by what?</p> <p>How are decisions made?</p> <p>Give examples.</p>	<p>Is there a strong sense of interaction and dependence between the two functions?</p>

with Finance/SC been worthwhile? Are the human resources in each function sufficient to meet the expectations of the other function?		
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QUESTION 3 - What are the specific organizational variables that would distinguish enterprise leaders and laggards in the consideration of SCF?

Variable - Centralization/Decentralization (Damanpour, 1991; Ellinger, 2000 (a); Ellinger et al., 2000 (b); Donaldson, 2001; Stank et al., 2001)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
In the last year describe the nature/level of informal teamwork. In the last year describe the nature/level of formal team work.	Decisions taken Shared ideas Organized meetings Specific delegation of authority Shared information Shared resources Decisions taken	Have you collected enough information to determine the degree of centralization or decentralization that exists with the firm and between the functions? Who has the power and do they exercise it explicitly/implicitly?
Variable - Formalization (Damanpour, 1991; Eng, 2006)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Describe the nature and level of explicit rules of behaviour? How is adherence to these rules measured?	Are these rules associated with particular kinds of exchanges (e.g. order approval, payment approval)? Look for standard approaches/mandatory behaviour that provide tangible evidence.	How bureaucratic are they in following rules and processes, or is the situation more fluid and organic?
Variable - Organizational Complexity (Damanpour, 1991; Morrison, 1996)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Within the context of your specific direct reports can you please discuss span of control, nature of competencies	Number of job titles in an organization Diversity of specialists on staff Educational level of staff	Does the organization have enough specialization and sophistication to be in a position to consider new innovations?

evidenced, general level of education.	Number of operational units reporting to executives. Access to job descriptions/org charts	Do the differences between the functions in organizational complexity create or hinder dialogue? Does the organizational complexity indicate whether the functions are function focused or are they process focused?
Variable - Technological Maturity (Tornatsky et al., 1990; Venkatraman, 1994; Shang & Seddon, 2002; Cassivi et al., 2004)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Please describe the nature of information technology that you are currently using. What has been the rate of adoption? What do you see as the principal benefits? What criteria do you use? What type of use do you see for applications?	Materials requirement planning Distribution requirement planning Transportation management Warehouse management Number of applications in existence Level of maturity (e.g. efficiency versus capability) Type of use operational, managerial, strategic, IT infrastructure,	How much of an overlap exists in systems that integrate the functions, and if there is no integration how aware are each other of the other's technology enablement? Do both functions share the same view of the benefits? How do the answers re technological maturity relate to the answers in other sections (e.g. relative advantage)? Have you acquired a sense as to the nature of the decision making around technology?

QUESTION 4 - What are the specific variables associated with technology innovations that the Supply Chain and Finance functions share, that would distinguish functional leaders and laggards in the consideration of SCF?

Variable - Relative Advantage (Morrison, 1996; Rogers, 2003; Hong & Jeong, 2006; Spathis, 2006; Laukkanen, Sarpola & Hallikainen 2007)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
What are the perceived benefits that you look for when considering an innovation?	Reduction in cost of capital Better relationships Cost Revenue focused	How important is "relative advantage" as a variable in the adoption of technology investments,

Can you use an example of a recent innovation that you considered and the perception of value that you thought you would derive from it? Are some benefits usually more important than others?	Efficiency Product advantage Demand of real time information Replacement of legacy systems Reliability Ease of use Ease of maintenance Ease of integration	vis a vis other variables?
Variable - Compatibility (Rogers, 2003)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
Have the innovations you have considered or adopted created any perception of compatibility issues with other systems, organizations, or other applications?	Organizational structure Corporate culture Existing practices Legacy IT issues	How important is "compatibility" as a variable in the adoption of technology investments, vis a vis other variables?
Variable - Complexity (Rogers, 2003)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
How has the complexity of innovations you have considered or adopted in the past affected your evaluation?	Cost of implementation (not dollars, but time and resources) Required integration with other internal business functions Change management required Required integration with other external business functions	How important is "complexity" as a variable in the adoption of technology investments, vis a vis other variables?
Variable - Observability (Rogers, 2003)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
What is the importance to having a potential or existent innovation being transparent and measurable to you in your evaluation?	Were benefits defined in advance - financial benefits, asset specificity benefits, better supplier relationships? Other quantitative	How important is "observability" as a variable in the adoption of technology investments, vis a vis other variables?

	realized? Other qualitative realized?	
Variable - Trialability (Rogers, 2003)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
When looking at an innovation is the ability to run a pilot and test it for applicability/effectiveness of importance to you?	Time required to do a pilot Resources required to do a pilot When is a pilot not feasible?	How important is “Trialability” as a variable in the adoption of technology investments, vis a vis other variables?
Variable - Level of Uncertainty (Nooteboom, 1989; Hong & Jeong, 2006)		
Generic Questions	Facilitation, Prompts, Expected Responses	Research Protocol Questions
How would you describe the level of uncertainty that was perceived re the innovation idea?	How long was the learning curve? How much time did it take? Ease of use? Any defined consequences if the innovation failed?	How important is “uncertainty” as a construct in the adoption of technology investments, vis a vis other constructs? Compare answers to task uncertainty in organization section.

Appendix 4 – Stage 2 Draft Questionnaire²

- 1) Within your organization please identify the level of your reporting relationship to the President/ CEO of your firm.**
 - a) I am the President/CEO.
 - b) I have a direct reporting relationship to the President/CEO.
 - c) My position is one level removed from a direct reporting relationship to the President/CEO.
 - d) My position is two levels removed from a direct reporting relationship to the President/CEO.
 - e) My position is greater than two levels removed from a direct reporting relationship to the President/CEO.

- 2) Please identify an existing supplier that you believe is of strategic importance to your company. This survey will refer to that supplier as your company's "current strategic supplier".**

- 3) Having identified a "current strategic supplier" to your firm, in what category does this supplier fall within?**
 - a) They provide raw materials (e.g. commodities).
 - b) They provide stocked material (e.g. light bulbs/small engines for incorporation into a finished product).
 - c) They provide a service (e.g. logistics provider).
 - d) They provide semi-finished material that requires further value added work (e.g. assembly and painting) for incorporation into a finished product.
 - e) Other (please identify).

² When the phrase "supply chain/finance" or finance/supply chain is used in this Appendix it is indicative that depending on the function being interviewed, the question was phrased to reflect their specific function's view of the question. Same question however was asked of both functions in all the case studies.

- 4) How important were each of the following operational factors in your decision to categorize the supplier you chose as your "current strategic supplier"?
- a) They are willing to share their knowledge and expertise in product and process development.
 - b) They have shown adaptability in the face of changing external circumstances.
 - c) They have an excellent reputation and we benefit by being associated with them.
 - d) They have been financially supportive of our operations during times of difficulty.
 - e) We share critical information across shared technology platforms.
 - f) They are willing to share risks that our industry encounters.
 - g) We have a long standing relationship based on mutual trust.
 - h) They represent a major share of our annual spend.
- 5) How important were these strategic rationales for identifying your "current strategic supplier" as a strategic supplier?
- a) It is important that our firm's dealings with the supplier be executed in a transparent, almost standardized manner in order to minimize the possibility of opportunistic behaviour.
 - b) It is important for our firm to be integrated with the strategic supplier, in order to maintain our competitive position vis a vis our competition.
 - c) It is important for our firm to be integrated with the strategic supplier as it is considered a best practice in our sector.
 - d) It is important that our firm be integrated with the strategic supplier, as it provides our firm with first mover advantage (e.g. competency/capability) vis a vis our competition.
 - e) It is important for our firm to be integrated with the strategic supplier as it provides our firm with security of supply.
 - f) It is important for our firm to be integrated with the strategic supplier as it provides mutual competitive advantage vis a vis other competitive supply chain partnerships.
- 6) During the past 12 months, what has been your function's frequency of contact with the "current strategic supplier" on the following issues?
- a) Cost related importance (e.g. initial price, back charges, claims).
 - b) Time related importance (e.g. schedule product deliveries cycle time, receive/verify cycle time, authorize supplier payment cycle time).
 - c) Responsiveness/Flexibility related importance (e.g. ability to respond to unplanned demand for inputs).
 - d) Operational quality related importance (e.g. perfect order fulfillment).
 - e) Innovation related performance (e.g. new product development).
 - f) Other (please identify).

7) On a continuum of interaction (i.e. Contractual > Coordination > Mutually Adaptive) between your firm and your "current strategic supplier" where would you position the relationship over the last 12 months on the following activities? Three broad categories apply:

- i) Contractual/Market based/Transaction Specific - usually structured around contractual language to provide protection to the buyer in order to mitigate the risks associated with the partnership. Characterized by limited informal relationships and limited non transactional exchange of information between both parties.
 - ii) Coordination/Collaboration - Characterized by growing informal relationships that focus on the efficiency of processes that bind the transaction flow between both firms.
 - iii) Mutually Adaptive - Characterized by a commitment to a long term relationship. usually evidenced by sharing of forecast, market or product development information/knowledge that is of value add to both partners.
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- a) Cost Related importance (e.g. initial price, back charges, claims).
 - b) Time Related Importance (e.g. schedule product deliveries cycle time, receive/verify cycle time, authorize supplier payment cycle time).
 - c) Responsiveness/Flexibility related importance (e.g. ability to respond to unplanned demand for inputs).
 - d) Operational quality related importance (e.g. perfect order fulfillment).
 - e) Innovation related performance (e.g. new product development).
 - f) Other (please identify).

8) How do you believe your "current strategic supplier" would describe their relationship with your firm?

- a) The supplier defines us as a key account.
- b) We are an important customer but not a key account.
- c) We are an average customer with this supplier.
- d) We are a rather small customer with this supplier.

9) During the last 12 months how has the "current strategic supplier" influenced the following operational practices?

- a) Our firms have developed performance metrics (e.g. claims to sales ratio) that are shared and extended across our supply relationship.
- b) Our firms effectively share operational information (e.g. forecast information, inventory levels).
- c) Our firms have improved our individual performances (e.g. ROI, cash to cash cycle time) by integrating operations with each other.
- d) Our firms have identified risk issues (e.g. cross border compliance, environmental) that are shared and extended across our supply relationship.
- e) Our firms have increased our operational flexibility (e.g. meet cycle times) through the increased collaboration.
- f) Our firms have increased our operational adaptability (e.g. respond to unexpected demand) through increased collaboration.

10) During the past 12 months, how often did the Finance/Supply Chain function engage in the following activities with the Supply Chain/Finance function?

- a) Informally working together
- b) Sharing ideas, information and/or resources
- c) Working together in a formal team
- d) Conducting joint planning to anticipate and resolve operational problems
- e) Achieving collective goals
- f) Developing mutual understanding of responsibilities
- g) Making joint decisions about the ways to improve overall cost efficiency

11) During the past 12 months, how satisfied have you been with the relationship between both functions in relation to the following activities?

- a) Has the time and effort spent in developing the relationship with the Finance/Supply Chain function been worthwhile?
- b) How satisfied are you with the productivity of the relationship between the Finance and Supply Chain functions?
- c) How satisfied are you with the overall Finance/Supply Chain relationship?
- d) How satisfied are you with the performance of the Finance function in carrying out their responsibilities in regard to supply chain activities?

12) During the past 12 months to what extent has your function been involved in the following activities?

- a) Supplier scorecards
- b) Supplier selection criteria
- c) Back charges
- d) Creation of standardized terms and conditions with suppliers
- e) Authorization of purchase orders
- f) Payment processes
- g) Inventory management practices.
- h) Compliance management practices.
- i) Transportation management practices

13) During the last 12 months how would you describe the Supply Chain/Finance function's leadership in the following areas of partnership with the Finance/Supply Chain function?

- a) Supplier scorecards
- b) Supplier selection criteria
- c) Back charges
- d) Creation of standardized terms and conditions with suppliers
- e) Authorization of purchase orders
- f) Payment processes
- g) Inventory management practices
- h) Compliance management practices
- i) Transportation management practices

14) To what degree do you consider that the "current strategic supplier" has had a material impact on the following corporate measures?

- a) Sales
- b) Profit
- c) Fill rate
- d) Inventory turnover
- e) AP turnover
- f) On time delivery
- g) Responsiveness
- h) Adaptability
- i) Distribution costs
- j) Total cost of goods
- k) Manufacturing costs

15) Which statement best describes the current technological maturity between the Finance and Supply Chain functions?

- a) Our current systems are principally spread sheet based with manual interfaces connecting the two functions.
- b) Our current systems (i.e. technology based) are decentralized to meet specific efficiency opportunities of the two functions, but with minimal changes to established business processes.
- c) Our current systems evidence technical interconnectivity of different systems and applications through a common IT platform, but with minimal changes to established business processes.
- d) Our current systems evidence both technical interconnectivity as well as business process interdependence, which imply substantive changes to established business processes.

16) How would you describe the Supply Chain/Finance function's future participation level (e.g. in the next 12 months), with each of the applications identified below?

- a) Financial accounting (e.g. AP/AR)
- b) Asset accounting (Fixed assets/Depreciation)
- c) Inventory (Raw, Work in Process, Finished Goods)
- d) Sales and distribution
- e) Cost control
- f) Production management (e.g. Manufacturing Resource Planning)
- g) Transportation management system
- h) E commerce (e.g. supplier /buyer portal)
- i) Payment (ETF/EIPP)
- j) Customer management relationships (CRM)
- k) Demand management
- l) Order fulfillment
- m) Returns management

17) How much experience do you have in your current function? Please consider all previous positions including your current one, as long as they relate to the Supply Chain/Finance function.

- a) 0 to 5 years
- b) 6 to 10 years
- c) 11 to 15 years
- d) 16 to 20 years
- e) > than 20 years

18) Please indicate which of the following educational/respondent designation(s) apply to you?

- a) Undergraduate
- b) College
- c) Masters
- d) Doctoral
- e) CA, CMA, CGA (completed or in process)
- f) P. Eng.
- g) CISA (Certified Information Systems Auditor)
- h) Master Scheduler
- i) SCOR - P (Supply Chain Council)
- j) SCMP - Supply Chain Management Respondent (PMAC)
- k) CPSM - Certified Respondent in Supply Chain Management (Institute for Supply Management)
- l) MCIPS - Member Chartered Institute of Purchasing & Supply (CIPS)
- m) Other (please identify)

19) How many direct reports do you have?

- a) 1 to 3
- b) 4 to 6
- c) > than 6

20) Of the direct reports (up to 6) to your position what is the level of their education or respondent designations?

- a) Undergraduate
- b) College
- c) Masters
- d) Doctoral
- e) CA, CMA, CGA (completed or in process)
- f) P. Eng.
- g) CISA (Certified Information Systems Auditor)
- h) Master Scheduler
- i) SCOR - P (Supply Chain Council)
- j) SCMP - Supply Chain Management Respondent (PMAC)
- k) CPSM - Certified Respondent in Supply Chain Management (Institute for Supply Management)
- l) MCIPS - Member Chartered Institute of Purchasing & Supply (CIPS)
- m) Other (please identify)

- 21) When considering a new upstream related administrative process that is IT enabled, how important are the following operational factors in determining the relative merits of such a process?
- a) Cost reduction (e.g. cost per invoice, cost per remittance)
 - b) Cycle time (e.g. DSO, Average time to process an invoice)
 - c) Productivity improvement (e.g. invoices processed per accounts payable full time employee)
 - d) Quality improvement (e.g. error exception rates)
 - e) Supplier relationship management improvement
- 22) When considering a new upstream related administrative process that is IT enabled how important are the following managerial factors in determining the relative merits of such a process?
- a) Better resource management
 - b) Improved decision making and planning
 - c) Performance improvement
- 23) When considering a new upstream related administrative process that is IT enabled how important are the following strategic factors in determining the relative benefits of such a process?
- a) Supports business growth
 - b) Supports business alliances
 - c) Builds business innovations
 - d) Builds cost leadership
 - e) Builds external linkages with suppliers
- 24) When considering a new upstream related administrative process that is IT enabled how important are the following IT infrastructure factors in determining the relative benefits of such a process?
- a) Builds business flexibility for current and future changes
 - b) Results in IT cost reduction
 - c) Increases IT infrastructure capability

- 25) When considering a new upstream related administrative process that is IT enabled how important are the following organizational factors in determining the relative benefits of such a process?
- a) Supports organizational change
 - b) Facilitates business learning's
 - c) Facilitates empowerment
 - d) Builds common vision
- 26) When considering a new administrative process that is upstream related and which has been identified as having "relative advantages", how difficult is it perceived to be to deal with the following challenges of implementation?
- a) Resistance from internal third parties other than Supply Chain and Finance
 - b) Lack of support from Supply Chain function
 - c) Lack of support from Finance function
 - d) Value proposition is more qualitative than quantitative
 - e) Time to implementation is too long
 - f) Cost to implement is perceived as too high
 - g) Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority
 - h) Limited qualified staff to implement
 - i) The change management program to implement the process will be perceived as too difficult to implement
 - j) It will be too difficult to get supplier adoption
 - k) Integration/compatibility with other systems is too complex
- 27) Please describe the level of priority your firm would assign to the following "administrative process innovation" investments in the next 3 years.
- a) Changes to customer oriented activities (e.g. customer portal, external web site, on line sales, customer analytics, CRM)
 - b) Changes to enterprise centric production activities (e.g. warehouse management systems, inspection technologies, material handling technologies)
 - c) Changes to enterprise centric support activities (e.g. Finance, HR, Legal, R and D)
 - d) Changes to supplier oriented activities (e.g. EIPP, Supplier portal, Transportation management system)

Appendix 5 – Summary of Results from Stage 2 Interviews³

Each question discussed below is organized in the following manner:

- The question under discussion is identified.
- Comments are provided on the salient conclusions from the interviews, regarding the question under discussion.
- Where relevant, the key learnings from Stage 2, that were considered in the development of the Stage 3 questionnaire, are identified.
- The final question which was used in the Stage 3 survey is presented.

Q1 - Within your organization please identify the level of your reporting relationship to the President/ CEO of your firm.	
Variable Evaluated	Descriptive variable to evaluate impact of organizational level.
Feedback from Interviewees	Acceptable
Key Adjustments Made	None
Stage 3 Revised Question - Within your organization please identify the level of your reporting relationship to the President/CEO of your firm.	

Q2 - Please identify an existing supplier that you believe is of strategic importance to your company. This survey will refer to that supplier as your company's "current strategic supplier".	
Variable Evaluated	Not a variable but intended to bring a commonality of focus to the two respondents. Used successfully in Stage 1 and 2, thus replicated.
Feedback from Interviewees	Acceptable
Key Adjustments Made	The ultimate capacity to transfer this tool to the Stage 3 electronic survey with the same effect as in Stage 1 and 2 is limited, as there is no way to ensure a) a Finance and SC person

³It should be noted that although the vast majority of the questions posed were identical for each participant there were a number of questions that were framed in the context of one function's perspective of the other function's performance or role. Therefore in Appendix 5 when the wording (Supply Chain/Finance) is used, it is meant to indicate that the question posed was specific to the interviewee's function and his/her perspective of the other function.

	from the same company are responding, and b) that they would pick the same firm. However the decision was taken to retain the tool for Stage 3 as, at a minimum, it encourages a focus on ONE supplier by the respondent, not a portfolio of suppliers as might be expected, if such an ask was not made of the respondent.
Stage 3 Revised Question - Please identify an existing supplier that you believe is of strategic importance to your firm. Once identified please use that supplier as the focal point for the Questions 5 to 10. The questions will refer to this supplier as your firm's "current strategic supplier".	

Q3 - Having identified a "current strategic supplier" to your firm, in what category does this supplier fall within?	
Variable Evaluated	Descriptive variable to evaluate the nature of the supplier (i.e. raw materials, stocked material, semi-finished material, services).
Feedback from Interviewees	Categories provided were acceptable, and did not create confusion. Suggestions were made that the list should be expanded to include contract manufacturing.
Key Adjustments Made	List was expanded to capture contract manufacturing.
Stage 3 Revised Question - Having identified a "current strategic supplier" to your firm, which one of the following categories are they most closely related to?	

Q4 - How important were each of the following operational factors in your decision to categorize the supplier you chose as your "current strategic supplier"?	
Variable Evaluated	This question was an attempt to identify those operational issues that firms would use to determine the level/type of influence (H1) or would be used to evaluate supplier effectiveness (H2) at an operational level.
Feedback from Interviewees	The list was considered inclusive of all material categories (i.e. innovative, adaptable, reputation, financially supportive, shared risk, shared technology, trust, level of purchases).
Key Adjustments Made	Suggestions were made that examples of each should be provided, to ensure clarity, and if definitions could be shortened, all the better.
Stage 3 Revised Question - How important were each of the following factors in your decision to categorize the supplier you chose as your "current strategic supplier"?	

Q5 - How important were these strategic rationales for identifying your "current strategic supplier" as a strategic supplier?	
Variable Evaluated	This question was an attempt to identify issues that firms could use to determine level/type of influence (H1) or would use to evaluate supplier effectiveness (H2), at a strategic level. The measures were grounded in cross-enterprise theories of Transaction Cost, Contingency, Institutionalization, Resource Based, Resource Dependence, and Network.
Feedback from Interviewees	General observation was that this question was confusing – too many key words to understand and interpret. There were comments about the confusion around the distinction between the use of the term operational in Q4, and that of strategic in Q5.
Key Adjustments Made	The concept of “ integration” was added to bring greater focus to the question, and the suggested operationalizations were simplified.
Stage 3 Revised Question - In terms of the degree of integration (i.e. the level of shared practices and information) your firm has with the "current strategic supplier", how important are the following rationales in explaining that integration?	

Q6 - During the past 12 months, what has been your function's frequency of contact with the "current strategic supplier" on the following issues?	
Variable Evaluated	This question was an effort to determine a measure of the external partner influence (H1) and perceived effectiveness of the supplier (H2), by using the frequency of contact concept (derived from direction information flow (H3)). Additionally this question was meant to determine issues of commonality between the Finance and the SC function, in a cross-enterprise context. This commonality of functions was also evaluated in Q12 but in an enterprise centric context.
Feedback from Interviewees	When this question was posed, it began to underscore a theme as to whether respondent should provide an answer that represented the collective perspective of his/her function within their firm, or their personal opinion. Operationalizations were grounded in SCOR terminology, which tended to cause confusion of interpretation.
Key Adjustments Made	Decision was taken (also based on responses to other questions), to phrase the question for Stage 3 as a “personal” question. Also there was the recognized need to simplify language used for

	operationalizations.
Stage 3 Revised Question - During the past 12 months, what has been your personal frequency of contact with the "current strategic supplier" on the following operationally related issues?	

<p>Q7 - On a continuum of interaction (i.e. Contractual > Coordination > Mutually Adaptive) between your firm and your "current strategic supplier" where would you position the relationship over the last 12 months? Three broad categories apply:</p> <p>Contractual/Market based/Transaction Specific - usually structured around contractual language to provide protection to the buyer in order to mitigate the risks associated with the partnership. Characterized by limited informal relationships and limited non transactional exchange of information between both parties.</p> <p>Coordination/Collaboration - Characterized by growing informal relationships that focus on the efficiency of processes that bind the transaction flow between both firms.</p> <p>Mutually Adaptive - Characterized by a commitment to a long term relationship usually evidenced by sharing of forecast, market or product development information/knowledge that is of value add to both partners.</p>	
Variable Evaluated	This was an effort to determine if there were differences in the perspective of the functions based on the category of consideration (cost, time related, responsiveness, quality). As the categories of Q7 are identical to those of Q8, it was expected for example that Mutually Adaptive would correlate with high frequency of contact, which would presumably provide support for H1 and H2
Feedback from Interviewees	Respondents found the questions complicated, however despite this they all found it an interesting way of looking at issues.
Key Adjustments Made	The wording of the definitions as well as the categories was simplified.
<p>Stage 3 Revised Question - On a continuum of interaction (Contractual > Coordinated > Collaborative) between yourself and your "current strategic supplier", where would you position the relationship over the last 12 months? General characteristics of each level of interaction are provided below:</p> <p>Contractual interaction - characterized by limited informal relationships and limited non transactional exchange of information.</p> <p>Coordinated interaction - characterized by growing informal relationships that focus</p>	

on the efficiency of processes that bind the transaction flow between both firms. Collaborative interaction - characterized by a long term relationship usually evidenced by sharing of forecast, market or product development information/knowledge that is of value add to both firms.	
Q8 - How do you believe your "current strategic supplier" would describe their relationship with your firm?	
Variable Evaluated	This question was meant to act as a validation of the supplier effectiveness just in case there was a discrepancy between the two functions.
Feedback from Interviewees	Acceptable
Key Adjustments Made	The responses appeared to be forming a pattern of repetition with previous questions, and as this question was not as granular as the previous questions, it was decided to remove it from further consideration
Not used in Stage 3	

Q9 - During the last 12 months how has the "current strategic supplier" influenced the following operational practices?	
Variable Evaluated	This question was an effort to identify the strength, and category of influence that a supplier had. It was an attempt to place some direction on the influence effort and its relationship to H1 and H2.
Feedback from Interviewees	In several instances the term "influence" created a discussion as to meaning. Greater clarification was requested.
Key Adjustments Made	The term "influenced" was amended to "...contribution been to changes..." to create a more direct link to tangibility and immediacy of impact.
Stage 3 Revised Question - During the last 12 months how important has the "current strategic supplier's" contribution been to changes in the following operational practices?	

Q10 - During the past 12 months, how often did the (Supply Chain/Finance) function engage in the following activities with the (Supply Chain/Finance) function?	
Variable Evaluated	The purpose of this question was to determine the frequency of contact (related to H3) between both functions and begin the effort to narrow down categories that would resonate with both functions. The nature of these categories

	can also allow them to be associated with the H6 (centralization) and H7 (formalization).
Feedback from Interviewees	This question continued to underscore the theme as to whether a respondent should provide an answer that represented the collective perspective of his/her function within their firm, or their personal opinion. Respondents had no issues with the operationalizations.
Key Adjustments Made	Decision was taken to personalize the question.
Stage 3 Revised Question - During the past 12 months how often did you personally engage in the following activities with the (Supply Chain/Finance) function in your firm?	

Q11 - During the past 12 months, how satisfied have you been with the relationship in relation to the following activities?	
Variable Evaluated	This question was related to the cross-functional effectiveness of the relationship (H5).
Feedback from Interviewees	There appeared to be a clear bias that the relationship between SC and Finance is better from the perspective of SC than of Finance. This leaning may in fact be due to the full knowledge that the other function was talking to the interviewer shortly.
Key Adjustments Made	In an actual survey one would believe that such "bias" would be neutralized as the respondent would not know whether or not someone from within his firm in the other function was responding or not, and even if they suspected they might not be aware of who it was...therefore because anonymity is even more assured in a survey, we would probably see a dispersion across the categories, not just to the positive side of things.
Stage 3 Revised Question - During the past 12 months, how satisfied have you been with your relationship with the (Supply Chain/Finance) function in your firm?	

Q12 - During the past 12 months to what extent has your function been involved in the following activities?	
Variable Evaluated	This question was related to H5 and was trying to identify tangible examples of working together, not just the qualitative perceptions of Q11. It also has undertones of H3 (direction of information), H6 (centralization) and H7

	(formalization). This question also allowed identification of areas where more granular questions related to Q11 (cross-functional effectiveness) can be asked.
Feedback from Interviewees	This question continued to underscore the theme as to whether a respondent should provide an answer that represented the collective perspective of his/her function within their firm, or their personal opinion. Respondents had made suggestions re the retention or addition of operationalizations.
Key Adjustments Made	Changed to the personal perspective from the functional perspective, a number of the operationalizations were removed (back charges and transportation) and one was added (supplier audit).
Stage 3 Revised Question - During the past 12 months to what extent have you been involved in the modification of the following operational processes?	

Q13 - During the last 12 months how would you describe the (Finance/Supply Chain) function's leadership in the following areas of partnership with each other?	
Variable Evaluated	<p>This was an effort to determine the direction of leadership in cross-functional activities. Results in this question can be compared to Q12 to see if there is a line of thinking that is aligned....e.g. Finance does not lead nor does it have partnership role in supplier scorecards.</p> <p>Same scale was used for both Q12 and 13.</p>
Feedback from Interviewees	Acceptable
Key Adjustments Made	None
Stage 3 Revised Question - During the past 12 months how would you describe the leadership/partnership roles that the finance and supply chain functions exhibited in the following operational processes?	

Q14 - To what degree do you consider that the "current strategic supplier" has had a material impact on the following corporate measures?	
Variable Evaluated	The intent of this question was to respond to H4 (performance objectives). It was posed in the context of the supplier, to reinforce the upstream perspective.
Feedback from	When talking about performance measures there was a

Interviewees	clear sense that one should stick to those that can be quantified or are tangible, and remove those that are captured elsewhere (responsiveness and adaptability) in the questionnaire. Customer satisfaction is relatively intangible but it was a common theme during Stage 1 and 2 discussions so it was added.
Key Adjustments Made	Provision of examples is beneficial.
Stage 3 Revised Question - To what degree do you consider that the "current strategic supplier" has had a material impact on the following corporate measures?	

Q15 - Which statement best describes the current technological maturity between the Finance and Supply Chain functions?	
Variable Evaluated	This question was meant to examine H9 (Technological Maturity).
Feedback from Interviewees	Question was clear, but initial operationalizations, although generally understood, were considered too complicated and needed to be simplified, or placed more in layman's terms.
Key Adjustments Made	Operationalizations were simplified.
Stage 3 Revised Question - Which statement best describes the current technological maturity between the Finance and Supply Chain functions in your firm?	

Q16 - How would you describe the (Supply Chain/Finance) function's future participation level (e.g. in the next 12 months), with each of the applications identified below?	
Variable Evaluated	This question was an attempt to identify common areas of interest and importance re technology as a means to narrow down the questions that would be asked around perceptions of technological maturity/decision making in the survey.
Feedback from Interviewees	Respondents were not sure if the question was asking a past, present, or future state question. Although responses were received for all operationalizations some resonated less (sales and distribution, transportation management), while others were considered confusing so were merged (demand management and order fulfillment) and others were added due to the discussion (returns management).
Key Adjustments Made	Question was posed in a future state tense, and examples provided around operationalizations.

Stage 3 Revised Question - Please assume that your firm is considering a new IT enabled application related to the activities identified below. How important is it to you that the (Supply Chain/Finance) function be involved in the consideration process?	
Q17 - How much experience do you have in your current function? Please consider all previous positions including your current one, as long as they relate to the SC / Finance function.	
Variable Evaluated	This question was related to investigating H8 (Organizational complexity)
Feedback from Interviewees	Acceptable
Key Adjustments Made	"Years of experience" was added for more precision.
Stage 3 Revised Question - How many years of experience do you have in your current function? Please consider all previous positions including your current one, as long as the experience relates to the Supply Chain/Finance function.	

Q18 - Please indicate which of the following educational/respondent designation(s) apply to you?	
Variable Evaluated	This question is related to investigating H8 - Organizational complexity.
Feedback from Interviewees	Operationalizations were very comprehensive in order to ensure no obvious category was overlooked. As a result the APICS designation was added. However it was acknowledged that for an electronic survey the list was far too long.
Key Adjustments Made	Categorizations were simplified.
Stage 3 Revised Question - Please indicate which of the following educational/respondent designations that apply to you.	

Q19 - How many direct reports do you have?	
Variable Evaluated	This question was to establish the parameters for Q20.
Feedback from Interviewees	Acceptable
Key Adjustments Made	None
Stage 3 Revised Question - How many employees report directly to you?	

Q20 - Of the direct reports (up to 6) to your position what is the level of their education or respondent designations?	
Variable Evaluated	This question was related to investigating H8 - Organizational complexity.
Feedback from Interviewees	Acceptable, but at this stage it was realized that added value could be gained by asking an experience level question as well related to the direct reports.
Key Adjustments Made	In Stage 3 an experience level question similar to Q17 in Stage 2 was added for direct reports and in regards to this question the number of positions requested was reduced to 3, on the assumption that the respondent would pick the top three performing direct reports.
Stage 3 Revised Question - Of the direct reports (up to 3) to your position what is the level of their education or respondent designation?	

Q21 - When considering a new upstream related administrative process that is IT enabled, how important are the following operational factors in determining the relative merits of such a process?	
Variable Evaluated	These questions are related to H10 “relative advantage”.
Feedback from Interviewees	Clear, although “upstream” term caused some confusion.
Key Adjustments Made	Reworded to include “supplier” term. Operationalizations clarified and examples provided from SCOR.
Stage 3 Revised Question - When considering a new supplier related IT enabled administrative process, how important are the following OPERATIONAL factors in determining the relative merits of such a process?	

Q22 - When considering a new upstream related administrative process that is IT enabled how important are the following MANAGERIAL factors in determining the relative merits of such a process?	
Variable Evaluated	These questions are related to H10 “relative advantage”.
Feedback from Interviewees	Understandable, but when the Q21 to 25 were prioritized by Stage 2 participants (see below Addendum Q25 A) this category did not receive any recognition.
Key Adjustments Made	In the interests of reducing the number of questions in Stage 3 the categories were included in the question related to organizational factors use in Stage 3.

Stage 3 Revised Question - Deleted	
Q23 - When considering a new upstream related administrative process that is IT enabled how important are the following STRATEGIC factors in determining the relative benefits of such a process?	
Variable Evaluated	These questions are related to H10 “relative advantage”.
Feedback from Interviewees	Clear, although “upstream” term caused some confusion.
Key Adjustments Made	Reworded to include “supplier” term.
Stage 3 Revised Question - When considering a new supplier related IT enabled administrative process, how important are the following STRATEGIC factors in determining the relative merits of such a process?	

Q24 - When considering a new upstream related administrative process that is IT enabled how important are the following IT INFRASTRUCTURE factors in determining the relative benefits of such a process?	
Variable Evaluated	These questions are related to H10 “relative advantage”.
Feedback from Interviewees	Clear, although “upstream” term caused some confusion.
Key Adjustments Made	Reworded to include “supplier” term.
Stage 3 Revised Question - When considering a new supplier related IT enabled administrative process, how important are the following IT INFRASTRUCTURE factors in determining the relative merits of such a process?	

Q25 - When considering a new upstream related administrative process that is IT enabled how important are the following ORGANIZATIONAL factors in determining the relative benefits of such a process?	
Variable Evaluated	These questions are related to H10 “relative advantage”.
Feedback from Interviewees	Clear, although “upstream” term caused some confusion.
Key Adjustments Made	Reworded to include “supplier” term.
Stage 3 Revised Question - When considering a new supplier related IT enabled administrative process, how important are the following ORGANIZATIONAL factors in determining the relative merits of such a process?	

Q25 A - This question was a “verbal” add on during the Stage 2 process to provide some form of level of prioritization or importance to the IT applications	
Variable Evaluated	Each respondent was asked to pick which one of the previous five questions was the most important to them.
Feedback from Interviewees	Acceptable
Key Adjustments Made	Added formally in Stage 3. Managerial was incorporated into organizational.
Stage 3 Revised Question - When considering the four factors (Operational, Strategic, IT Infrastructure, Organizational), how important are each when considering a supplier related IT enabled administrative process?	

Q26 - When considering a new administrative process that is upstream related and which has been identified as having "relative advantages", how difficult is it perceived to be to deal with the following challenges of implementation?	
Variable Evaluated	Effort to operationalize H11 Complexity (also included compatibility as an operationalization of the variable).
Feedback from Interviewees	“Perceived” was considered too abstract. Feedback was to change it to more of an action oriented Question. Operationalizations were well understood and considered to be comprehensive.
Key Adjustments Made	Concept of managing challenges was incorporated.
Stage 3 Revised Question - When considering a new supplier related IT enabled process which has been identified as having "relative merits" , how difficult would it be to manage the following challenges/perceptions of implementation?	

Q27 - Please describe the level of priority your firm would assign to the following "administrative process innovation" investments in the next 3 years.	
Variable Evaluated	Dependent Variable
Feedback from Interviewees	Acceptable, but respondents favored “integration” over “innovation.”
Key Adjustments Made	“Integration” incorporated into Question.
Stage 3 Revised Question - Please describe the level of priority your firm would assign to the following "administrative process integration" investments in the next 3 years?	

Appendix 6 – Migration of the Operationalizations of Questions from Stage 2 to Stage 3

Q1 – Stage 2	Q1 – Stage 3
Within your organization please identify the level of your reporting relationship to the President/ CEO of your firm.	Within your organization please identify the level of your reporting relationship to the President/CEO of your firm.

Q2 – Stage 2	Q3 – Stage 3
Please identify an existing supplier that you believe is of strategic importance to your company. This survey will refer to that supplier as your company's "current strategic supplier".	Please identify an existing supplier that you believe is of strategic importance to your firm. Once identified please use that supplier as the focal point for the questions 3 and 4. The questions will refer to this supplier as your firm's "current strategic supplier".

Q3 – Stage 2	Q4 - Stage 3
They provide raw materials (e.g. commodities)	They provide raw materials (e.g. commodities)
They provide stocked material (e.g. light bulbs/small engines for incorporation into a finished product)	They provide stocked material (e.g. electronic or miscellaneous factors, commercial off the shelf factors)
They provide a service (e.g. logistics provider)	They provide a service (e.g. logistics provider, engineering and or design services)
They provide semi-finished material that requires further value added work (e.g. assembly and painting) for incorporation into a finished product.	They provide semi-finished material that requires further value added work (e.g. assembly/rework) for incorporation into a finished product
Contract Manufacturer	They are a contract manufacturer
	Other, please specify: _____

Q4 – Stage 2 (importance scale)	Q5 - Stage 3 (importance scale)
Innovative - They are willing to share their knowledge and expertise in product and process development.	They share knowledge and expertise (e.g. product development, logistics processes)
Reputation - They have an excellent reputation and we benefit by being associated with them.	They have an excellent reputation and we benefit by being associated with them
Financially supportive - They have been financially supportive of our operations during times of difficulty	They have been financially supportive of operations during times of difficulty (e.g. extension of payment terms)
Shared technology - We share critical information across shared technology platforms.	We share critical information across shared technology platforms (e.g. forecast data and capacity capabilities)
Share risk - They are willing to share risks that our industry encounters.	They share risks (e.g. product development, warranty costs)
Trust - We have a long standing relationship based on mutual trust.	We have a long standing relationship based on transparency of critical information
Level of Purchases - They represent a major share of our annual spend	They represent a major share of our annual spend
Adaptable - They have shown adaptability in the face of changing external circumstances.	They show adaptability in responding to planned long term changes
	They show flexibility in their capacity to respond to short or long term disruptions

Q5 – Stage 2 (importance scale)	Q6 – Stage 3 (importance scale)
(TCE) - It is important that our firm's dealings with the supplier be executed in a transparent, almost standardized manner in order to minimize the possibility of opportunistic behaviour.	Removed
(Contingency) - It is important for our firm to be integrated with the strategic supplier, in order to maintain our competitive position vis a vis our competition.	Integration allows our firm to maintain its competitive position vis a vis our competition
(Institutionalization) - It is important for our firm to be integrated with the strategic	Integration is important to our firm because it represents adoption of best

supplier as it is considered a best practice in our sector.	practices in our sector
(RBV) - It is important that our firm be integrated with the strategic supplier, as it provides our firm with first mover advantage (e.g. competency/capability) vis a vis our competition.	Integration provides our firm with first to market advantage (e.g. competency, capability, product)
(TCE) - It is important that our firm be integrated with the strategic supplier as it provides our firm with competitive cost advantages.	Integration provides our firm with competitive cost advantage
(RD) - It is important for our firm to be integrated with the strategic supplier as it provides our firm with security of supply.	Integration provides our firm with security of supply
(Network) - It is important for our firm to be integrated with the strategic supplier as it provides mutual competitive advantage vis a vis other competitive supply chain partnerships.	Integration provides mutual competitive advantage

Q6 – Stage 2 (frequency scale)	Q7 – Stage 3 (frequency scale)
Cost related importance (e.g. initial price, back charges, claims)	Cost related importance (e.g. initial price, back charges, claims)
Time related importance (e.g. schedule product deliveries cycle time, receive/verify cycle time, authorize supplier payment cycle time).	Adaptability related performance (e.g. ability to respond to planned long term change)
Responsiveness/Flexibility related importance (e.g. ability to respond to unplanned demand for inputs)	Flexibility related performance (e.g. ability to respond to short or long term disruptions)
Operational quality related importance (e.g. perfect order fulfillment)	Quality related importance (e.g. perfect order fulfillment)
Innovation related performance (e.g. new product development)	Innovation related performance (e.g. new product development, cross-enterprise integration of inventory levels)
Sales and operational planning	Regularly scheduled business reviews with supplier (e.g. the sharing of forecasts and performance data re: inventory, point of sale, sales forecast)

Q7 – Stage 2 (continuum scale)	Q8 – Stage 3 (continuum scale)
Cost related importance (e.g. initial price, back charges, claims)	Cost related importance (e.g. initial price, back charges, claims)
Time related Importance (e.g. schedule product deliveries cycle time, receive/verify cycle time, authorize supplier payment cycle time)	Adaptability related performance (e.g. ability to respond to planned long term change)
Responsiveness/Flexibility related importance (e.g. ability to respond to unplanned demand for inputs)	Flexibility related performance (e.g. ability to respond to short or long term disruptions)
Operational quality related importance (e.g. perfect order fulfillment)	Quality related importance (e.g. perfect order fulfillment)
	Innovation related performance (e.g. new product development, cross-enterprise integration of inventory levels)
	Regularly scheduled business reviews with supplier (e.g. the sharing of forecasts and performance data re: inventory, point of sale, sales forecast)

Q8 – Stage 2 (pick one of multiple choice)	Stage 3
The supplier defines us as a key account.	Removed
We are an important customer but not a key account.	Removed
We are an average customer with this supplier.	Removed
We are a rather small customer with this supplier.	Removed

Q9 – Stage 2 (importance scale)	Q9 – Stage 3 (importance scale)
Our firms effectively share operational information (e.g. forecast information, inventory levels).	Sharing operational information (e.g. forecast information, inventory levels)
Our firms have developed performance metrics (e.g. claims to sales ratio) that are shared and extended across our supply	Developing performance metrics (e.g. claims to sales ratios) that are shared and extended across our supply chain

relationship.	relationships
Our firms have improved our individual performances (e.g. ROI, cash to cash cycle time) by integrating operations with each other.	Improving our individual performances (e.g. ROI, cash to cash cycle time) by integrating operations with each other
Our firms have identified risk issues (e.g. cross border compliance, environmental) that are shared and extended across our supply relationship.	Removed
Our firms have increased our operational flexibility (e.g. meet cycle times) through the increased collaboration.	Increasing our mutual operational flexibility to meet short or long term disruptions
Our firms have increased our operational adaptability (e.g. respond to unexpected demand) through increased collaboration.	Increasing our mutual operational adaptability to meet planned long term change

Q10 – Stage 2 (frequency scale)	Q 11 – Stage 3 (frequency scale)
Informally working together	Informally working together
Sharing ideas, information and/or resources	Sharing ideas, information and/ or resources
Working together in a formal team	Working together in a formal team
Conducting joint planning to anticipate and resolve operational problems	Conducting joint planning to anticipate and resolve operational problems
Achieving collective goals	Achieving collective goals
Developing mutual understanding of responsibilities	Developing mutual understanding of responsibilities
Making joint decisions about the ways to improve overall cost efficiency	Making joint decisions about the ways to improve overall cost efficiency

Q11 – Stage 2 (satisfaction scale)	Q12 – Stage 3 (satisfaction scale)
Has the time and effort spent in developing the relationship with the finance/supply chain function been worthwhile?	With the time and effort spent in developing the relationship with the supply chain/finance function?
How satisfied are you with the productivity of the relationship between the finance and supply chain functions?	With the productivity of the relationship between the finance and supply chain functions?
How satisfied are you with the overall finance/supply chain relationship?	With the overall finance/supply chain relationship?

How satisfied are you with the performance of the finance function/supply chain function in carrying out their responsibilities in regard to supply chain? activities?	With the performance of the supply chain/finance function in carrying out their responsibilities in regard to supply chain activities?
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Q12 – Stage 2 (frequency scale)	Q 13 – Stage 3 (frequency scale)
Supplier scorecards	Supplier scorecards processes
Supplier selection criteria	Supplier selection criteria processes
Back charges	Removed
Creation of standardized terms and conditions with suppliers	Creation of standardized terms and conditions with suppliers
Authorization of purchase orders	Purchase orders authorization processes
Payment processes	Payment management processes
Inventory management practices	Inventory management processes
Compliance management practices	Compliance management processes
Transportation management practices	Removed
S & OP	Sales and operational planning processes
	Supplier audit processes

Q13 – Stage 2 (frequency scale)	Q14 – Stage 3 (frequency scale)
Supplier scorecards	Supplier scorecards processes
Supplier selection criteria	Supplier selection criteria processes
Back charges	
Standardized terms and conditions with suppliers	Creation of standardized terms and conditions with suppliers
Authorization of purchase orders	Purchase order authorization processes
Payment management practices	Payment management processes
Inventory management practices	Inventory management processes
Compliance management practices	Compliance management processes
Transportation management practices	
S & Op	Sales and operational planning processes
	Supplier audit processes

Q14 – Stage 2 (importance scale)	Q10 – Stage 3 (importance scale)
Sales	Gross sales

Profit	Gross profit
Fill rate	Perfect order fill rate (i.e. orders fulfilled on time and in full/total orders)
Inventory turnover	Inventory turnover rate (i.e. annual sales/average inventory)
AP turnover	Accounts payable turnover rate (i.e. annual supplier purchases/average accounts payable)
On time delivery	On time delivery rate (i.e. number of orders received from supplier on or before promised delivery date)
Responsiveness	
Adaptability	
Distribution costs	
Total cost of goods	
Manufacturing costs	
	Direct cost of goods (i.e. material costs and labor)
	Direct and transparent impact on customer satisfaction

Q15 – Stage 2 (pick one of multiple choice)	Q15 – Stage 3 (pick one of multiple choice)
Our current systems are principally spreadsheet based with manual interfaces connecting the two functions.	Each function has their own excel spread sheets and we compare manually
Our current systems (i.e. technology based) are decentralized to meet specific efficiency opportunities of the two functions, but with minimal changes to established business processes.	Each function has their own Enterprise system (ERP or other) modules, but they don't talk to each other
Our current systems evidence technical interconnectivity of different systems and applications through a common IT platform, but with minimal changes to established business processes.	Each function has their own Enterprise system (ERP or other) modules, and they tend to talk to each other
Our current systems evidence both technical interconnectivity as well as business process interdependence, which imply substantive changes to established business processes.	Cross-functional processes were mapped out in advance, and then Enterprise system (ERP or other) modules adapted to agreed upon processes

Q16 – Stage 2 (importance scale)	Q16 - Stage 3 (importance scale)
Financial Accounting (e.g. AP/AR)	Financial Accounting (e.g. accounts payable/accounts receivable)
Asset Accounting (fixed assets/depreciation)	Removed
Inventory (raw, work in process, finished goods)	Inventory management (e.g. raw, work in process, finished goods, vendor managed)
Sales and distribution	
Cost control	Cost control (e.g. direct cost of goods)
Production management (e.g. manufacturing resource planning)	Production management (e.g. manufacturing resource planning)
Transportation management system	Removed
E commerce (e.g. supplier /buyer portal)	E commerce (e.g. supplier/buyer portal)
Payment (ETF/EIPP)	Payment (e.g. electronic funds transfer, electronic invoice presentment and payment)
Customer management relationships (CRM)	Customer relationship management
Demand management	Demand management (e.g. order fulfillment, sales forecasting)
Order fulfillment	Removed
	Returns management (e.g. disposal, refurbishment)

Q17 – Stage 2 (pick one of multiple choice)	Q24 – Stage 3 (pick one of multiple choice)
0 to 5 years	0 to 5 years
6 to 10 years	6 to 10 years
11 to 15 years	11 to 15 years
16 to 20 years	16 to 20 years
> than 20 years	Greater than 20 years

Q18 – Stage 2 (pick all that apply)	Q25 – Stage 3 (pick all that apply)
Undergraduate	Undergraduate or College degree
College	Merged with “undergraduate”
Masters	Masters degree

Doctoral	Removed
CA, CMA, CGA (completed or in process)	CA, CMA, CGA (completed or in process)
P. Eng.	
CISA (Certified Information Systems Auditor)	Supply chain respondent designation (e.g. Certified Respondent in Supply Chain Management, Member Chartered Institute of Purchasing and Supply Management, Master Scheduler)
Master Scheduler	Incorporated into "supply chain designation"
SCOR - P (Supply Chain Council)	Incorporated into "supply chain designation"
SCMP - Supply Chain Management Respondent (PMAC)	Incorporated into "supply chain designation"
CPSM - Certified Respondent in Supply Chain Management (Institute for Supply Management)	Incorporated into "supply chain designation"
MCIPS - Member Chartered Institute of Purchasing & Supply (CIPS)	Incorporated into "supply chain designation"
APICS	Incorporated into "supply chain designation"
	Other

Q19 – Stage2 (pick one of multiple choice)	Q26 – Stage 3 (pick one of multiple choice)
1 to 3	0 to 3
4 to 6	4 to 6
> than 6	greater than 6

Q20 – Stage 2) (pick all that apply)	Q27 – Stage 3 (pick all that apply)
Undergraduate	Undergraduate or College degree
College	
Masters	Masters degree
Doctoral	
CA, CMA, CGA (completed or in process)	CA, CMA, CGA (completed or in progress)
P. Eng.	
CISA (Certified Information Systems	Supply chain respondent designation (e.g.

Auditor)	Certified Respondent in Supply Chain Management, Member Chartered Institute of Purchasing and Supply, Master Scheduler)
Master Scheduler	Incorporated into “supply chain designation”
SCOR - P (Supply Chain Council)	Incorporated into “supply chain designation”
SCMP (Supply Chain Management Designation - PMAC)	Incorporated into “supply chain designation”
CPSM (Certified Respondent in Supply Management - Institute for Supply Management)	Incorporated into “supply chain designation”
MCIPS - Member Chartered Institute of Purchasing & Supply (CIPS)	Incorporated into “supply chain designation”
Other (please identify)	Incorporated into “supply chain designation”
APICS	Incorporated into “supply chain designation”
	Other

Q21 – Stage 2 (importance scale)	Q17 – Stage 3 (importance scale)
Cost reduction (e.g. cost per invoice, cost per remittance)	Cost reduction (e.g. cost per invoice, cost per remittance)
Cycle time (e.g. DSO, Average time to process an invoice)	Cycle time (e.g. days sales outstanding, average time to process an invoice)
Productivity improvement (e.g. invoices processed per accts payable full time employee)	Productivity improvement (e.g. invoices processed per accounts payable full time employee)
Quality improvement (e.g. error exception rates)	Quality improvement (e.g. error exception rates)
Supplier relationship management improvement	Supplier relationship improvement (e.g. accuracy of information exchange)

Q22 – Stage 2 (importance scale)	Q25 – Stage 3 (merged into expanded “new” Q25)
Better Resource Management	
Improved Decision Making and Planning	
Performance Improvement	

Q23 – Stage 2 (importance scale)	Q18 – Stage 3 (importance scale)
Supports business growth	Supports business growth
Supports business supplier alliances	Supports business supplier alliance
Builds business innovations	Builds business innovations
Builds cost leadership	Builds cost leadership
Builds external linkages with suppliers	Builds external linkages with suppliers

Q24 – Stage 2 (importance scale)	Q19 – Stage 3 (importance scale)
Builds business flex ability for current and future changes	Builds business flexibility for current and future changes
Results in IT cost reduction	Results in IT cost reduction
Increases IT infrastructure capability	Increases IT infrastructure capability

Q25 – Stage 2 (importance scale)	Q20 – Stage 3 (importance scale)
Supports organizational change	Supports organizational change
Facilitates business learning's	Facilitates business learnings
Facilitates empowerment	Facilitates empowerment
Builds common vision	Builds common vision
	Better resource management
	Improved decision making and planning
	Improved performance management

Addendum verbal question – Stage 2 (prioritize)	Q 21 – Stage 3 (prioritize)
Operational	Operational
Managerial	
Strategic	Strategic
IT Infrastructure	IT Infrastructure
Organizational	Organizational

Q26 – Stage 2 (difficulty scale)	Q22 - Stage 3 (difficulty scale)
Resistance from internal third parties	Resistance from internal third parties

other than supply chain and finance	other than the supply chain and finance functions
Lack of support from finance function	Lack of support from within the finance function
Lack of support from supply chain function	Lack of support from within the supply chain function
Value proposition is more qualitative than quantitative	Value proposition is more qualitative than quantitative
Time to implementation is too long	Time to implementation is too long
Cost to implement is perceived as too high	Cost to implement is too high
Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority	Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority
Limited qualified staff to implement	Limited qualified staff to implement
The change management program to implement the process will be perceived as too difficult to implement.	The change management program to implement the process will be too difficult to implement
It will be too difficult to get supplier adoption	It will be too difficult to get supplier adoption
Integration/compatibility with other systems is too complex	Integration /compatibility with other systems is too complex

Q27 – Stage 2 (priority scale)	Q23 – Stage 3 (priority scale)
Changes to customer oriented activities (e.g. customer portal, external web site, on line sales, customer analytics, CRM)	Changes to customer oriented activities (e.g. customer portal, external web site, on line sales, customer analytics)
Changes to enterprise centric production activities (e.g. warehouse management systems, inspection technologies, material handling technologies)	Changes to enterprise centric production activities (e.g. warehouse management systems, inspection technologies, material handling technologies)
Changes to enterprise centric support activities (e.g. Finance, HR, Legal, R and D)	Changes to enterprise centric support activities (e.g. Finance, HR, Legal , IT)
Changes to supplier oriented activities (e.g. EIPP, Supplier portal, Transportation management system)	Changes to supplier oriented activities (e.g. electronic invoice presentment and payment, supplier portals, transportation management system)

Appendix 7 – Primary Originating Sources for Operationalizations of Stage 3 Questions

Questions	Variables Evaluated	Measures Originated or Adapted From
1. Organizational level of respondent	Moderator	EDC
2. Size of firm	Moderator	EDC
3. Type of supply chain	Moderator	SCOR and EDC
4. Category of supplier input	Moderator,	SCOR/ Case Studies/ EDC
5. Current supplier categorization based on operational reasons	Perceived effectiveness of supplier (H2)	Donaldson, 2000; Stank et al., 2001; Barratt, 2007; Ivens & Pardo, 2007; SCOR/EDC
6. Current supplier categorization based on strategic reasons	Perceived effectiveness of supplier (H2)	Pfeffer & Salancik, 1978; Jarillo, 1998; Barney, 2001; Donaldson, 2001; Williamson, 2002; Teo , et al., 2003
7. Frequency of relationship with the supplier	Perceived effectiveness of supplier (H2), External partner influence (H1)	Thompson, 1967; Gimenez & Ventura, 2005; SCOR/EDC
8. Continuum of interaction with the supplier	Perceived effectiveness of supplier (H2), External partner influence (H1)	Harland et al., 2004; Gimenez & Ventura, 2003; deBurca et al., 2005; Gereffi et al., 2005; Cannon & Perrault, 2009
9. Contribution to operational activities	External partner influence (H1)	Stank et al., 2001; Barrat & Oke, 2007; Ivens & Pardo, 2007; SCOR/EDC
10. Supplier's impact on corporate measures	External partner influence (H1), Performance objectives (H4)	Venkatraman ,1994; Beamon, 1999; Gunasekaran & Kobu, 2007; Aberdeen, 2009; SCOR /EDC
11. Cross-functional frequency/activity	Direction of flow of information (H3), Centralization (H6),	Thompson, 1967; Damanpour, 1991; Van de Ven & Ferry, 1999;

Questions	Variables Evaluated	Measures Originated or Adapted From
	Formalization (H7)	Ellinger, 2000 (a); Ellinger et al., 2000 (b); Donaldson, 2001
12. Satisfaction with cross-functional effectiveness	Effectiveness of cross-functional (H5)	Van de Ven & Ferry, 1999 ; Ellinger, 2000 (a); Ellinger et al., 2000 (b) ; Eng, 2006; Massey & Dawes, 2007
13. Involvement in modification of processes	Direction of flow of information (H3), Effectiveness of Cross-functional (H5), Centralization (H6), Formalization (H7)	Thompson, 1967; Damanpour, 1991; Ellinger, 2000 (a); Ellinger et al., 2000 (b); Donaldson, 2001; SCOR, Case Studies and EDC
14. Leadership roles in processes	Direction of flow of information (H3), Effectiveness of cross-functional (H5), Centralization (H6), Formalization (H7)	Damanpour, 1991; Ellinger, 2000 (a); Ellinger et al., 2000 (b); Donaldson 2001, Eng, 2006; SCOR, Case Studies and EDC
15. Stage of technological maturity	Technological maturity (H9)	Tornatsky et al., 1990; Venkataraman, 1994; Shang & Seddon, 2002; Cassivi et al., 2004
16. Type of application	Technological maturity and priorities (H9)	Tornatsky et al., 1990; Venkataraman, 1994; Shang & Seddon, 2002; Cassivi et al., 2004; SCOR/EDC
17. Importance of operational issues related to technology applications	Innovation – relative advantage (H10)	Morrison, 1996; Shang & Seddon, 2002; Rogers, 2003; Bernroider, Sudzina, & Pucihar, 2009; Spathis, 2006
18. Importance of strategic issues related to technology applications	Innovation – relative advantage (H10)	Morrison, 1996; Shang & Seddon, 2002; Rogers, 2003; Bernroider et al., 2009; Spathis, 2006
19. Importance of IT infrastructure issues to technology applications	Innovation - innovation relative advantage (H10)	Morrison, 1996; Shang & Seddon, 2002; Rogers, 2003; Bernroider et al., 2009

Questions	Variables Evaluated	Measures Originated or Adapted From
		Spathis, 2006
20. Importance of organizational issues to technology applications	Innovation - innovation relative advantage (H10)	Morrison, 1996; Shang & Seddon, 2002; Rogers, 2003; Bernroider et al., 2009; Spathis, 2006
21. Technology application priority	Innovation - innovation relative advantage (H10)	Morrison, 1996; Rogers, 2003; Bernroider et al., 2009; EDC
22. Challenges	Complexity (H11)	Rogers, 2003; Bernroider et al., 2009; Rogers, 2003; EDC
23. Tech choice importance	Dependent variable	Rogers, 2003; EDC
24. Experience/Education	Organizational Complexity (H8)	Damanpour, 1991; Morrison, 1996; EDC
25. Experience/Education	Organizational Complexity (H8)	Damanpour, 1991; Morrison, 1996; EDC
26. Experience/Education	Organizational Complexity (H8)	Damanpour, 1991; Morrison, 1996; EDC
27. Experience/Education	Organizational Complexity (H8)	Damanpour, 1991; Morrison, 1996; EDC
28. Experience/Education	Organizational Complexity (H8)	Damanpour, 1991; Morrison, 1996; EDC

Appendix 8 – Stage 3 Questionnaire

Dear Survey Participant, thank you for agreeing to participate in the “CROSS-FUNCTIONAL GAP ANALYSIS” SURVEY. Completion of the survey will help EDC deliver more effective engagement strategies with firms in the pursuit of developing new products and services that will facilitate the competitiveness of Canadian firms in international trade.

By way of background, EDC has been delivering supply chain diagnostics to Canadian companies for the past four years to help them identify strengths and weaknesses in how they manage their global supply chains. One area that we would like to explore further is the relationship between a company’s supply chain function (e.g. procurement, negotiation activities with suppliers, the management of supplier alliances, inventory management), and its finance function (e.g. financial planning, cash management, funding, payments). How well the two functions are integrated directly impacts efficiencies and productivity for both your firm and your suppliers.

This specific research effort is grounded in a collaborative effort between EDC and the Sprott School of Business of Carleton University (Sprott), associated with seven case studies with senior supply chain and finance representatives in each case study. This survey is the end result of those case studies, with the objective of confirming/substantiating the findings of those interviews. A report will be provided to you upon completion of the analysis if you request it, and if not, summary results will be made available on EDC’s web site in at a later date in 2012. If there are any questions specific to Sprott’s involvement in the application of this survey to academic purposes, please do not hesitate to contact Dr. Vinod Kumar at 613 0520-2379 or Vinod_Kumar@carleton.ca. All other enquiries should be directed to Peter Cowan at EDC, 613 598 2961 or pcowan@edc.ca.

Privacy Statement

Thank you for participating in our survey. The survey should take approximately 20 minutes to complete and is anonymous. Aggregate, not individual information, will be used by EDC to analyze the survey results. All survey data will be stored on servers located in Canada. Narrative comments may identify you by your writing style and/or the language in which the narrative is written. EDC collects and uses personal information in accordance with the Federal Privacy Act. By clicking on the link to the survey below, you consent to the collection, use and disclosure of your personal information for the purpose of this survey. For more information about your rights under the Privacy Act or for questions about this statement, please email the ATIPOffice@edc.ca.

- ☐ Continue to survey: I have read and understand the purpose of the survey, and I accept how the survey data will be stored and used.

Part 1 - Organizational Characteristics

1) Within your organization please identify the level of your reporting relationship to the President/CEO of your firm.

- a) I am the President/ CEO.
- b) I have a direct reporting relationship to the President/CEO.
- c) My position is one level removed from a direct reporting relationship to the President/CEO.
- d) My position is two levels removed from a direct reporting relationship to the President/CEO.
- e) My position is greater than two levels removed from a direct reporting relationship to the President/CEO.

2) What level best represents the current level of total GROSS annual sales (CDN \$) of your firm?

- a) Under 10 Million
- b) Between 10 and 20 Million
- c) Between 20 and 50 Million
- d) Between 50 and 100 Million
- e) Between 100 and 250 Million
- f) Between 250 and 500 Million
- g) Above 500 million

Part 2 - "Current Strategic Supplier".

Please identify an existing supplier that you believe is of strategic importance to your firm. Once identified please use that supplier as the focal point for the questions 3 and 4. The questions will refer to this supplier as your firm's "current strategic supplier".

3) What type of supply chain relationship most closely resembles the relationship your firm has with your "current strategic supplier"?

- a) Source to Stock - Your "current strategic supplier" provides products to your

company to maintain a predetermined level of inventory for materials, sub assemblies or products.

- b) Make to Order - Your "current strategic supplier" provides products to your company to maintain inventory ordered specifically for customer orders only.
- c) Engineer to Order - Your "current strategic supplier" provides specialized products to your company designed, ordered or built based on the requirement or specification of a specific customer order.
- d) Services - Your "current strategic supplier" provides specialized "professional" services to your company that are based on the requirements or specification of a specific customer order.

4) Having identified a "current strategic supplier" to your firm, which one of the following categories are they most closely related to?

- a) They provide raw materials (e.g. commodities).
- b) They provide stocked material (e.g. electronic or miscellaneous factors, commercial off the shelf factors).
- c) They provide a service (e.g. logistics provider, engineering and or design services).
- d) They provide semi finished material that requires further value added work (e.g. assembly/rework) for incorporation into a finished product.
- e) They are a contract manufacturer.
- f) Other, please specify: _____

Part 3 - "Current Strategic Supplier"/Firm Relationship.

Unless indicated otherwise, the respondent is asked to respond to the questions at the individual level (what you yourself personally think), not at the enterprise level (what the firm would say collectively, to an external third party). For the purposes of Question 5 to 10, please use the supplier that you previously identified in Part 2, as the "current strategic supplier".

5) How important were each of the following factors in your decision to categorize the supplier you chose as your "current strategic supplier"?

- | | Not at all
important | Slightly
important | Moderately
important | Very
important | Extremely
important |
|---|-------------------------|-----------------------|-------------------------|-----------------------|------------------------|
| a) They share knowledge and expertise (e.g. product | ☐ | ☐ | ☐ | ☐ | ☐ |

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
development, logistics processes)					
b) They have an excellent reputation and we benefit by being associated with them	☐	☐	☐	☐	☐
c) They have been financially supportive of operations during times of difficulty (e.g. extension of payment terms)	☐	☐	☐	☐	☐
d) We share critical information across shared technology platforms (e.g. forecast data and capacity capabilities)	☐	☐	☐	☐	☐
e) They share risks (e.g. product development, warranty costs)	☐	☐	☐	☐	☐
f) We have a long standing relationship based on transparency of critical information	☐	☐	☐	☐	☐
g) They represent a major share of our annual spend	☐	☐	☐	☐	☐
h) They show flexibility in	☐	☐	☐	☐	☐

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
their capacity to respond to short or long term disruptions					
i) They show adaptability in responding to planned long term changes	☐	☐	☐	☐	☐

6) In terms of the degree of integration (i.e. the level of shared practices and information) your firm has with the "current strategic supplier", how important are the following rationales in explaining that integration?

	Not important at all	Slightly important	Moderately important	Very important	Extremely important
a) Integration allows our firm to maintain its competitive position vis a vis our competition	☐	☐	☐	☐	☐
b) Integration is important to our firm because it represents adoption of best practices in our sector	☐	☐	☐	☐	☐
c) Integration provides our firm with first to market advantage (e.g. competency/capability/product)	☐	☐	☐	☐	☐

	Not important at all	Slightly important	Moderately important	Very important	Extremely important
d) Integration provides our firm with competitive cost advantage	☐	☐	☐	☐	☐
e) Integration provides our firm with security of supply	☐	☐	☐	☐	☐
f) Integration provides mutual competitive advantage	☐	☐	☐	☐	☐

7) During the past 12 months, what has been your personal frequency of contact with the "current strategic supplier" on the following operationally related issues?

	Not at all	Daily	Weekly	Monthly	Quarterly	Annually
a) Cost related issues (e.g. initial price, back charges, claims)	☐	☐	☐	☐	☐	☐
b) Quality related issues (e.g. perfect order fulfillment)	☐	☐	☐	☐	☐	☐
c) Innovation related issues (e.g. new product development, cross-enterprise integration of inventory levels)	☐	☐	☐	☐	☐	☐
d) Regularly scheduled business reviews with supplier (e.g. the sharing of forecasts and performance data re: inventory, point of sale, sales forecast)	☐	☐	☐	☐	☐	☐

	Not at all	Daily	Weekly	Monthly	Quarterly	Annually
e) Adaptability related issues (e.g. ability to respond to planned long term changes)	☐	☐	☐	☐	☐	☐
f) Flexibility related issues (e.g. ability to respond to short or long term disruptions)	☐	☐	☐	☐	☐	☐

8) On a continuum of interaction (Contractual > Coordinated > Collaborative) between yourself and your "current strategic supplier", where would you position the relationship over the last 12 months? General characteristics of each level of interaction are provided below:

Contractual interaction - characterized by limited informal relationships and limited non transactional exchange of information.

Coordinated interaction - characterized by growing informal relationships that focus on the efficiency of processes that bind the transaction flow between both firms.

Collaborative interaction - characterized by a long term relationship usually evidenced by sharing of forecast, market or product development information/knowledge that is of value add to both firms.

	Contractual	Coordinated	Collaborative
a) Cost related importance (e.g. initial price, back charges, claims)	☐	☐	☐
b) Flexibility related performance (e.g. ability to respond to short or long term disruptions)	☐	☐	☐
c) Quality related importance (e.g. perfect order fulfillment)	☐	☐	☐
d) Innovation related performance (e.g. new product development, cross-enterprise integration of inventory levels)	☐	☐	☐
e) Regularly scheduled business reviews with supplier (e.g. the sharing of forecasts and performance data re:	☐	☐	☐

	Contractual	Coordinated	Collaborative
inventory, point of sale, sales forecast)			
f) Adaptability related performance (e.g. ability to respond to planned long term change)	☐	☐	☐

9) During the last 12 months how important has the "current strategic supplier's" contribution been to changes in the following operational practices?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
a) Sharing operational information (e.g. forecast information, inventory levels)	☐	☐	☐	☐	☐
b) Developing performance metrics (e.g. claims to sales ratios) that are shared and extended across our supply chain relationships	☐	☐	☐	☐	☐
c) Improving our individual performances (e.g. ROI, cash to cash cycle time) by integrating operations with each other	☐	☐	☐	☐	☐
d) Increasing our mutual operational adaptability to meet planned long	☐	☐	☐	☐	☐

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
term change					
e) Increasing our mutual operational flexibility to meet short or long term disruptions	☐	☐	☐	☐	☐

10) To what degree do you consider that the "current strategic supplier" has had a material impact on the following corporate measures?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
a) Gross sales	☐	☐	☐	☐	☐
b) Gross profit	☐	☐	☐	☐	☐
c) Perfect order fill rate (i.e. orders fulfilled on time and in full/total orders)	☐	☐	☐	☐	☐
d) Inventory turnover rate (i.e. annual sales/ average inventory)	☐	☐	☐	☐	☐
e) Accounts payable turnover rate (i.e. annual supplier purchases/average accounts payable)	☐	☐	☐	☐	☐
f) On time delivery rate (i.e. number of orders received from supplier on or before promised delivery)	☐	☐	☐	☐	☐

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
date)					
g) Direct cost of goods (i.e. material costs and labor)	☐	☐	☐	☐	☐
h) Direct and transparent impact on customer satisfaction	☐	☐	☐	☐	☐

Part 4 - Cross-functional Relationship

Questions 11 to 14 are related to the nature of the relationship between the supply chain and finance functions.

11) During the past 12 months how often did you personally engage in the following activities with the supply chain/finance function in your firm?

	Not at all	Daily	Weekly	Monthly	Quarterly	Annually
a) Informally working together	☐	☐	☐	☐	☐	☐
b) Sharing ideas, information and/ or resources	☐	☐	☐	☐	☐	☐
c) Working together in a formal team	☐	☐	☐	☐	☐	☐
d) Conducting joint planning to anticipate and resolve operational problems	☐	☐	☐	☐	☐	☐
e) Achieving collective goals	☐	☐	☐	☐	☐	☐
f) Developing mutual understanding of	☐	☐	☐	☐	☐	☐

responsibilities

- g) Making joint decisions about the ways to improve overall cost efficiency
☐	☐	☐	☐	☐	☐

12) During the past 12 months, how satisfied have you been with your relationship with the supply chain/finance function in your firm?

	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied
a) With the time and effort spent in developing the relationship with the supply chain/finance function	☐	☐	☐	☐	☐
b) With the productivity of the relationship between the finance and supply chain functions	☐	☐	☐	☐	☐
c) With the overall finance/supply chain relationship	☐	☐	☐	☐	☐
d) With the performance of the supply chain/finance function in carrying out their responsibilities in regard to supply chain activities	☐	☐	☐	☐	☐

13) During the past 12 months to what extent have you been involved in the modification of the following operational processes?

	Not at all	Daily	Weekly	Monthly	Quarterly	Annually
a) Supplier scorecards processes	☐	☐	☐	☐	☐	☐
b) Supplier selection criteria processes	☐	☐	☐	☐	☐	☐
c) Creation of standardized terms and conditions with suppliers	☐	☐	☐	☐	☐	☐
d) Purchase orders authorization processes	☐	☐	☐	☐	☐	☐
e) Payment management processes	☐	☐	☐	☐	☐	☐
f) Inventory management processes	☐	☐	☐	☐	☐	☐
g) Compliance management processes	☐	☐	☐	☐	☐	☐
h) Sales and operational planning processes	☐	☐	☐	☐	☐	☐
i) Supplier audit processes	☐	☐	☐	☐	☐	☐

14) During the past 12 months how would you describe the leadership/partnership roles that the finance and supply chain functions exhibited in the following operational processes?

	Finance had no role	Supply chain led the partnership	Jointly led	Finance led the partnership	Supply chain had no role
a) Supplier scorecards processes	☐	☐	☐	☐	☐
b) Supplier selection criteria processes	☐	☐	☐	☐	☐
c) Creation of standardized terms and conditions with suppliers	☐	☐	☐	☐	☐

	Finance had no role	Supply chain led the partnership	Jointly led	Finance led the partnership	Supply chain had no role
d) Purchase order authorization processes	☐	☐	☐	☐	☐
e) Payment management processes	☐	☐	☐	☐	☐
f) Inventory management processes	☐	☐	☐	☐	☐
g) Compliance management processes	☐	☐	☐	☐	☐
h) Sales and operational planning processes	☐	☐	☐	☐	☐
i) Supplier audit processes	☐	☐	☐	☐	☐

Part 5 - Technology Utilization/Implementation.

Question 15 to 23 are related to establishing the state of technological adoption in your firm as well as exploring what applications are considered of value between the supply chain and finance functions.

15) Which statement best describes the current technological maturity between the finance and supply chain functions in your firm?

- a) Each function has their own excel spread sheets and we compare manually
- b) Each function has their own Enterprise system (ERP or other) modules, but they don't talk to each other
- c) Each function has their own Enterprise system (ERP or other) modules, and they tend to talk to each other
- d) Cross-functional processes were mapped out in advance, and then Enterprise system (ERP or other) modules adapted to agreed upon processes

16) Please assume that your firm is considering a new IT enabled application related to the activities identified below. How important is it to you that the supply chain/finance function be involved in the consideration process?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
a) Financial accounting (e.g. accounts payable/accounts receivable)	☐	☐	☐	☐	☐
b) Inventory management (e.g. raw, work in process, finished goods, vendor managed)	☐	☐	☐	☐	☐
c) Cost control (e.g. direct cost of goods)	☐	☐	☐	☐	☐
d) Production management (e.g. manufacturing resource planning)	☐	☐	☐	☐	☐
e) E commerce (e.g. supplier/buyer portal)	☐	☐	☐	☐	☐
f) Payment (e.g. electronic funds transfer, electronic invoice presentment and payment)	☐	☐	☐	☐	☐
g) Customer relationship management	☐	☐	☐	☐	☐
h) Demand management (e.g. order fulfillment, sales forecasting)	☐	☐	☐	☐	☐
i) Returns management (e.g. disposal,	☐	☐	☐	☐	☐

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
refurbishment)					

17) When considering a new supplier related IT enabled administrative process, how important are the following OPERATIONAL factors in determining the relative merits of such a process?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
a) Cost reduction (e.g. cost per invoice, cost per remittance)	☐	☐	☐	☐	☐
b) Cycle time (e.g. days sales outstanding, average time to process an invoice)	☐	☐	☐	☐	☐
c) Productivity improvement (e.g. invoices processed per accounts payable full time employee)	☐	☐	☐	☐	☐
d) Quality improvement (e.g. error exception rates)	☐	☐	☐	☐	☐
e) Supplier relationship improvement (e.g. accuracy of information exchange)	☐	☐	☐	☐	☐

18) When considering a new supplier related IT enabled administrative process, how important are the following STRATEGIC factors in determining the relative merits of such a process?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
a) Supports business growth	☐	☐	☐	☐	☐
b) Supports business supplier alliance	☐	☐	☐	☐	☐
c) Builds business innovations	☐	☐	☐	☐	☐
d) Builds cost leadership	☐	☐	☐	☐	☐
e) Builds external linkages with suppliers	☐	☐	☐	☐	☐

19) When considering a new supplier related IT enabled administrative process, how important are the following IT INFRASTRUCTURE factors in determining the relative merits of such a process?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
a) Builds business flexibility for current and future changes	☐	☐	☐	☐	☐
b) Results in IT cost reduction	☐	☐	☐	☐	☐
c) Increases IT infrastructure capability	☐	☐	☐	☐	☐

20) When considering a new supplier related IT enabled administrative process, how important are the following ORGANIZATIONAL factors in determining the relative merits of such a process?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
a) Supports organizational change	☐	☐	☐	☐	☐
b) Facilitates business learnings	☐	☐	☐	☐	☐
c) Facilitates empowerment	☐	☐	☐	☐	☐
d) Builds common vision	☐	☐	☐	☐	☐
e) Better resource management	☐	☐	☐	☐	☐
f) Improved decision making and planning	☐	☐	☐	☐	☐
g) Improved performance management	☐	☐	☐	☐	☐

21) When considering the four factors (Operational, Strategic, IT Infrastructure, Organizational), how important are each when considering a supplier related IT enabled administrative process?

	Not at all important	Somewhat important	Moderately important	Very important	Extremely important
a) Operational	☐	☐	☐	☐	☐
b) Strategic	☐	☐	☐	☐	☐
c) IT Infrastructure	☐	☐	☐	☐	☐
d) Organizational	☐	☐	☐	☐	☐

22) When considering a new supplier related IT enabled process which has been identified as having "relative merits", how difficult would it be to manage the following challenges/perceptions of implementation?

	Not at all difficult	Slightly difficult	Moderately difficult	Very difficult	Extremely difficult
a) Resistance from internal third parties other than the supply chain and finance functions	☐	☐	☐	☐	☐
b) Lack of support from within the finance function	☐	☐	☐	☐	☐
c) Lack of support from within the supply chain function	☐	☐	☐	☐	☐
d) Value proposition is more qualitative than quantitative	☐	☐	☐	☐	☐
e) Time to implementation is too long	☐	☐	☐	☐	☐
f) Cost to implement is too high	☐	☐	☐	☐	☐
g) Limited qualified staff to implement	☐	☐	☐	☐	☐
h) The change management program to implement the process will be too difficult to implement	☐	☐	☐	☐	☐
i) It will be too difficult to get supplier adoption	☐	☐	☐	☐	☐
j) Integration /compatibility with other systems is too complex	☐	☐	☐	☐	☐
k) Other process improvements that are either enterprise centric or customer	☐	☐	☐	☐	☐

	Not at all difficult	Slightly difficult	Moderately difficult	Very difficult	Extremely difficult
centric, have traditionally taken priority					

23) Please describe the level of priority your firm would assign to the following "administrative process integration" investments in the next 3 years?

	No priority	Low priority	Moderate priority	High priority	Extreme priority
a) Changes to customer oriented activities (e.g. customer portal, external web site, on line sales, customer analytics)	☐	☐	☐	☐	☐
b) Changes to enterprise centric production activities (e.g. warehouse management systems, inspection technologies, material handling technologies)	☐	☐	☐	☐	☐
c) Changes to enterprise centric support activities (e.g. Finance, HR, Legal , IT)	☐	☐	☐	☐	☐
d) Changes to supplier oriented activities (e.g. electronic invoice presentment and payment, supplier portals, transportation management system)	☐	☐	☐	☐	☐

Part 6 - Organizational Capability/Experience.

Questions 24 to 28 explore the depth of competence/experience that resides in your firm within your function.

24) How many years of experience do you have in your current function? Please consider all previous positions including your current one, as long as the experience relates to the supply chain /finance function.

- a) 0 to 5 years
- b) 6 to 10 years
- c) 11 to 15 years
- d) 16 to 20 years
- e) Greater than 20 years

25) Please indicate which of the following educational/professional designations that apply to you.

- a) Undergraduate or College degree
- b) Masters degree
- c) CA,CMA, CGA (completed or in process)
- d) Supply chain professional designation (e.g. Certified Professional in Supply Chain Management, Member Chartered Institute of Purchasing and Supply Management, Master Scheduler)
- e) Other

26) How many employees report directly to you?

- a) 0 to 3
- b) 4 to 6
- c) greater than 6

27) Of the direct reports (up to 3) to your position what is the level of their education or professional designation?

	Person 1	Person 2	Person 3
a) Undergraduate or College degree	☐	☐	☐
b) Masters degree	☐	☐	☐
c) CA, CMA, CGA (completed or in progress)	☐	☐	☐
d) Supply chain professional designation (e.g. Certified Professional in Supply Chain Management, Member Chartered Institute of Purchasing and Supply, Master Scheduler)	☐	☐	☐
e) Other	☐	☐	☐

28) How many years of experience do each of your direct reports have in their current function (either with your firm or with previous employers)?

	Person 1	Person 2	Person 3
a) 0 to 5 years	☐	☐	☐
b) 6 to 10 years	☐	☐	☐
c) 11 to 15 years	☐	☐	☐
d) 16 to 20 years	☐	☐	☐
e) Greater than 20 years	☐	☐	☐

29) If you have any additional comments that you would like to make concerning the relationship between the two functions in your firm, please provide them below.

Thank you for completing this survey questionnaire. Your input is very much appreciated. If you would like to receive a summary of the research findings from this survey, please provide your email address...

Appendix 9 – Manova Tests Between Groups

These tables replicate information which is already in the body of the thesis, however the tables are structured to parallel the alphabetical sequencing of questions as provided in the actual survey (Appendix 8), rather than the manner it was provided in the body of the thesis (highest response to lowest).

Question 5	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
How important were each of the following factors in your decision to categorize the supplier you chose as your “current strategic supplier”?	a) Knowledge/expertise	3.81 (.91)	3.91 (.91)	3.70 (.91)	1.40	.239
	b) Reputational benefit	3.56 (1.01)	3.49 (1.00)	3.63 (1.03)	.51	.477
	c) Financially supportive	3.25 (1.28)	3.29 (1.23)	3.20 (1.35)	.12	.725
	d) Shared technology platforms	3.25 (1.27)	3.42 (1.21)	3.07 (1.32)	2.02	.158
	e) Risk sharing	3.24 (1.13)	3.60 (1.05)	2.87 (1.10)	12.60	.001
	f) Share critical information	3.72 (.97)	3.87 (.76)	3.57 (1.11)	2.62	.110
	g) Share of annual spend	3.38 (1.17)	3.42 (1.13)	3.33 (1.21)	.14	.707
	h) Flexibility re: disruptions	3.90 (.94)	4.13 (.80)	3.67 (1.03)	6.86	.010
	i) Adaptability re: long term change	3.83 (.92)	3.98 (.81)	3.67 (1.01)	3.25	.074

Question 6	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
In terms of the degree of integration (i.e. the level of shared practices and information) your firm has with the "current strategic supplier", how important are the following strategic rationales in explaining that integration?	a) Maintain competitive position	3.67 (1.07)	3.69 (1.03)	3.65 (1.12)	.04	.836
	b) Adoption of best practices	3.45 (.99)	3.53 (.96)	3.37 (1.02)	.69	.409
	c) First to market advantage	3.39 (1.15)	3.45 (1.18)	3.31 (1.13)	.40	.530
	d) Competitive cost advantage	3.72 (.99)	3.87 (.92)	3.56 (1.04)	2.84	.095
	e) Security of supply	3.92 (1.01)	4.09 (.91)	3.74 (1.08)	3.34	.070
	f) Mutual competitive advantage	3.52 (1.06)	3.76 (.92)	3.28 (1.14)	6.00	.016

Question 7	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the past 12 months what has been your personal frequency of contact with the "current strategic supplier" on the following operational issues?	a) Cost related issues	3.63 (1.42)	3.55 (1.37)	3.72 (1.48)	.42	.520
	b) Quality related issues	3.64 (1.44)	3.36 (1.30)	3.93 (1.54)	4.26	.041
	c) Innovation related issues	4.30 (1.25)	4.05 (1.19)	4.56 (1.27)	4.51	.036
	d) Regular business reviews	4.25 (1.27)	4.00 (1.49)	4.50 (1.37)	4.35	.039
	e) Adaptability re: long term change	4.23 (1.28)	4.09 (1.64)	4.37 (1.34)	1.30	.257
	f) Flexibility re: disruptions	3.79 (1.37)	3.51 (1.21)	4.07 (1.46)	4.81	.030

Question 9	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the past 12 months how important has the “current strategic supplier’s” contribution been to changes in the following operational practices?	a) Sharing operational information	3.38 (1.23)	3.60 (1.20)	3.15 (1.23)	3.77	.055
	b) Developing performance metrics	2.86 (1.26)	3.02 (1.28)	2.70 (1.24)	1.69	.196
	c) Integrating operations with each other	3.05 (1.29)	3.20 (1.30)	2.89 (1.28)	1.58	.211
	d) Increasing mutual adaptability	3.39 (1.16)	3.55 (1.10)	3.24 (1.20)	1.91	.170
	e) Increasing mutual flexibility	3.50 (1.02)	3.71 (.92)	3.30 (1.08)	4.66	.033

Question 10	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
To what degree (importance) do you consider that the “current strategic supplier” has had a material impact on the following corporate measures?	a) Gross sales	3.36 (1.24)	3.44 (1.17)	3.28 (1.31)	.45	.506
	b) Gross profit	3.83 (.97)	3.91 (.89)	3.74 (1.05)	.82	.368
	c) Perfect order fill rate	3.60 (1.11)	3.87 (.92)	3.31 (1.21)	7.33	.008
	d) Inventory turnover rate	3.16 (1.22)	3.40 (1.15)	2.91 (1.25)	4.60	.034
	e) The accounts payable turnover	3.12 (1.10)	3.35 (1.06)	2.89 (1.11)	4.83	.030
	f) On time delivery rate	3.83 (1.08)	4.05 (.95)	3.61 (1.17)	4.71	.032
	g) Direct cost of goods	3.98 (1.01)	4.09 (.93)	3.87 (1.08)	1.31	.256
	h) Direct	3.73	3.89	3.57	2.03	.158

Question 10	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
	impact on customer satisfaction	(1.17)	(1.07)	(1.25)		

Question 11	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the last 12 months how often did you personally engage in the following activities with the supply chain/finance function in your firm?	a) Informally working together	2.47 (1.31)	2.29 (1.21)	2.65 (1.39)	2.05	.155
	b) Sharing ideas information and or resources	3.00 (1.63)	2.85 (1.59)	3.15 (1.66)	.89	.349
	c) Working together in a formal team	3.50 (1.70)	3.40 (1.70)	3.61 (1.70)	.42	.519
	d) Conducting joint planning to anticipate and resolve problems	3.60 (1.58)	3.60 (1.53)	3.59 (1.64)	.09	.981
	e) Achieving collective goals	3.55 (1.49)	3.50 (1.55)	3.59 (1.45)	.01	.772
	f) Developing mutual understanding of responsibilities	3.56 (1.59)	3.54 (1.64)	3.57 (1.56)	.30	.926
	g) Making joint decision about the ways to improve overall cost efficiency	3.46 (1.48)	3.38 (1.54)	3.54 (1.42)	2.70	.587

Question 12	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N = 109	Supply Chain N = 55	Finance N = 54		
During the past 12 months, how satisfied have you been with your relationship with the supply chain/finance function in your firm?	a) With the time and effort spent in developing the relationship with the functional counterpart	3.45 (.86)	3.42 (.88)	3.48 (.84)	.15	.701
	b) With the productivity of the relationship between the finance and supply chain function	3.44 (.84)	3.42 (.90)	3.46 (.79)	.08	.783
	c) With the overall finance/supply chain relationship	3.43 (.90)	3.38 (.93)	3.48 (.86)	.34	.564
	d) With the performance of the supply chain/finance function in carrying out their responsibilities in regard to supply chain/finance activities	3.48 (.90)	3.47 (.88)	3.48 (.93)	.01	.960

Question 13	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
During the past 12 months to what extent have you been involved in the modification of the following operational processes?	a) Supplier scorecards processes	4.74 (1.40)	4.36 (1.35)	5.13 (1.36)	8.69	.004
	b) Supplier selection criteria processes	4.18 (1.55)	3.86 (1.47)	4.52 (1.56)	5.22	.024
	c) Creation of standardized terms and conditions with suppliers	4.28 (1.23)	4.38 (1.22)	4.17 (1.24)	.83	.364
	d) Purchase order authorization processes	3.23 (2.00)	3.02 (2.04)	3.44 (1.96)	1.24	.269
	e) Payment management processes	3.38 (1.80)	4.00 (1.84)	2.74 (1.53)	15.10	.000
	f) Inventory management processes	3.20 (1.76)	3.00 (1.76)	3.41 (1.75)	1.46	.229
	g) Compliance management processes	3.54 (1.76)	3.24 (1.71)	3.85 (1.77)	3.40	.068
	h) Sales and operational planning processes	3.52 (1.70)	3.53 (1.71)	3.52 (1.70)	.00	.979
	i) Supplier audit processes	4.68 (1.37)	4.15 (1.31)	5.22 (1.22)	19.61	.001

Question 16	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
How important is it to you that the finance/supply chain function be involved in the consideration process related to a new IT application associated with the following processes?	a) Financial accounting	4.09 (1.13)	3.45 (1.14)	4.74 (.65)	52.4 2	.000
	b) Inventory management	4.36 (.94)	4.38 (.85)	4.33 (1.03)	.07	.789
	c) Cost control	4.36 (8.34)	4.22 (.76)	4.50 (.89)	3.18	.078
	d) Production management	3.85 (1.11)	4.09 (1.06)	3.61 (1.38)	5.27	.024
	e) E commerce	3.63 (1.25)	3.78 (1.10)	3.48 (1.38)	1.58	.212
	f) Payment	3.94 (1.05)	3.45 (1.03)	4.43 (.81)	29.6 3	.000
	g) Customer relationship management	3.43 (1.11)	3.56 (1.03)	3.30 (1.18)	1.59	.210
	h) Demand management	3.83 (1.17)	4.11 (.98)	3.56 (1.28)	6.44	.013
	i) Returns management	3.53 (1.18)	3.64 (1.10)	3.43 (1.25)	.87	.352

Question 17	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
When considering a new supplier related IT enabled administrative process, how important are the following operational factors?	a) Cost reduction	3.87 (.98)	3.89 (.83)	3.85 (1.12)	.04	.837
	b) Cycle time	3.95 (.99)	3.93 (.92)	3.98 (1.07)	.08	.777
	c) Productivity improvement	3.80 (.99)	3.73 (1.01)	3.87 (.97)	.57	.452
	d) Quality improvement	4.07 (.81)	3.96 (.82)	4.19 (.80)	2.04	.156
	e) Supplier relationship improvement	4.00 (.92)	4.16 (.79)	3.83 (1.23)	3.57	.061

Question 18	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
When considering a new supplier related IT enabled administrative process, how important are the following strategic factors?	a) Supports business growth	4.05 (.92)	3.93 (.84)	4.17 (.99)	1.88	.174
	b) Supports business supplier alliance	3.65 (.90)	3.73 (.83)	3.57 (.96)	.80	.375
	c) Builds business innovations	3.70 (.96)	3.65 (.86)	3.74 (1.05)	.22	.641
	d) Builds cost leadership	3.82 (.95)	3.75 (.86)	3.89 (1.04)	.61	.435
	e) Builds external linkages with suppliers	3.65 (.90)	3.71 (.81)	3.51 (.98)	.46	.500

Question 19	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
When considering a new supplier related IT enabled administrative process, how important are the following IT infrastructure factors?	a) Builds business flexibility for current and future changes	3.98 (.79)	3.91 (.75)	4.05 (.83)	.93	.337
	b) Results in IT cost reduction	3.70 (.86)	3.62 (.80)	3.78 (.90)	.85	.332
	c) Increases IT infrastructure capability	3.90 (.80)	3.85 (.78)	3.94 (.83)	.34	.562

Question 20	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
When considering a new supplier related IT enabled administrative process, how important are the following organizational factors?	a) Supports organizational change	3.80 (.87)	3.82 (.82)	3.78 (.92)	.06	.810
	b) Facilitates business learnings	3.62 (.87)	3.62 (.83)	3.63 (.92)	.01	.946
	c) Facilitates empowerment	3.63 (.85)	3.64 (.89)	3.63 (.81)	.01	.967
	d) Builds common vision	3.79 (.84)	3.76 (.86)	3.81 (.83)	.10	.752
	e) Better resource management	4.05 (.77)	4.04 (.82)	4.05 (.74)	.02	.898
	f) Improved decision making and planning	4.24 (.79)	4.25 (.78)	4.22 (.82)	.04	.833
	g) Improved performance management	4.17 (.79)	4.20 (.68)	4.13 (.89)	.22	.643

Question 21	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
How important are each when considering a supplier related IT enabled administrative	a) Operational	4.14 (.88)	4.15 (.91)	4.13 (.85)	.01	.925
	b) Strategic	3.90 (.93)	3.93 (1.00)	3.87 (.87)	.10	.752
	c) IT Infrastructure	3.68 (.89)	3.75 (.91)	3.61 (.88)	.62	.434

Question 21	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
process?	d) Organizational	3.78 (.91)	3.73 (.95)	3.83 (.86)	.37	.544

Question 22	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
How difficult would it be to manage the following challenges or perceptions of implementation?	a) Resistance from internal third parties other than the supply chain and finance functions	2.81 (.96)	2.91 (.97)	2.70 (.94)	1.26	.265
	b) Lack of support from within the finance function	2.44 (1.19)	2.58 (1.272)	2.30 (1.38)	1.26	.264
	c) Lack of support from within the supply chain function	2.58 (1.33)	2.47 (1.135)	2.69 (1.24)	.87	.353
	d) Value proposition is more qualitative than quantitative	2.80 (1.00)	2.89 (.994)	2.70 (1.00)	.96	.330
	e) Time to implementation is too long	3.27 (1.06)	3.27 (1.01)	3.26 (1.12)	.01	.947
	f) Cost to implement is	3.49 (1.08)	3.56 (.94)	3.41 (1.21)	.57	.451

Question 22 How difficult would it be to manage the	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
	too high					
	g) Limited qualified staff to implement	3.49 (1.07)	3.56 (.94)	3.41 (1.19)	.58	.448
	h) The change management program to implement the process will be too difficult to implement	3.17 (1.00)	3.20 (.87)	3.15 (1.12)	.07	.788
	i) It will be too difficult to get supplier adoption	2.83 (1.04)	2.87 (.96)	2.78 (1.11)	.23	.634
	j) Integration /compatibility with other systems is too complex	3.34 (.99)	3.42 (.99)	3.25 (.99)	.70	.406
	k) Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority	3.03 (.97)	3.22 (.94)	2.83 (.98)	4.37	.039

Question 23	Measures	Mean (Standard Deviation)			F	Sig.
		Aggregate N =109	Supply Chain N = 55	Finance N = 54		
Please describe the level of priority your firm would assign to the following 'administrative process integration' investments in the next 3 years.	a) Changes to customer centric activities	3.33 (1.02)	3.15 (1.08)	3.52 (.925)	3.75	.056
	b) Changes to enterprise centric production activities	3.24 (1.09)	3.25 (1.04)	3.22 (1.14)	.02	.874
	c) Changes to enterprise centric support activities	3.14 (.98)	2.98 (.95)	3.30 (.98)	2.88	.093
	d) Changes to supplier oriented activities	3.18 (.99)	3.22 (1.03)	3.15 (.96)	.14	.714

**Appendix 10 – Correlation of Independent Variables (Questions 5 to 22)
to Dependent Variable (Question 23 d)**

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 5: How important were each of the following factors in your decision to categorize the supplier you chose as your "current strategic supplier"?	a) Knowledge/ expertise	.091	.120	.052
	b) Reputational benefit	.109	.272*	-.058
	c) Financially supportive	.233*	.110	.355**
	d) Shared technology platforms	.177	.044	.305*
	e) Risk sharing	.134	.031	.233
	f) Share critical information	.053	.012	.078
	g) Share of annual spend	.124	.031	.216
	h) Flexibility re: disruptions	.159	.124	.185
	i) Adaptability re: long term change	.197*	.206	.188
Question 6: In terms of the degree of integration (i.e. the level of shared practices and information) your firm has with the "current strategic supplier", how important are the following strategic rationales in explaining that integration?	a) Maintain competitive position	.214*	.169	.260
	b) Adoption of best practices	.256**	.219	.291*
	c) First to market advantage	.261**	.175	.356**
	d) Competitive cost advantage	.345**	.263	.426**
	e) Security of supply	.265**	.236	.291*
	f) Mutual competitive advantage	.216*	.172	.255

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 7: During the past 12 months what has been your personal frequency of contact with the "current strategic supplier" on the following operational issues?	a) Cost related issues	-.037	-.060	-.010
	b) Quality related issues	-.155	-.130	-.095
	c) Innovation related issues	-.015	.050	-.069
	d) Regular business reviews	.037	.080	.014
	e) Adaptability re: long term change	-.114	-.163	-.058
	f) Flexibility re: disruptions	.002	-.031	.046
Question 8: On a continuum of interaction (Contractual > Coordinated > Collaborative) between yourself and your "current strategic supplier", where would you position the relationship over the last 12 months?	a) Cost related issues	.043	.037	.039
	b) Quality related issues	-.011	-.018	-.011
	c) Innovation related issues	.030	-.044	.102
	d) Regular business reviews	-.005	-.034	.018
	e) Adaptability re: long term change	.188	.066	.307*
	f) Flexibility re: disruptions	.158	-.143	.167
Question 9: During the past 12 months how important has the "current strategic supplier's" contribution been to changes in the following operational practices?	a) Sharing operational information	.170	.177	.156
	b) Developing performance metrics	.367**	.277*	.466**
	c) Integrating operations with each other	.282**	.133	.442**
	d) Increasing mutual adaptability	.146	.089	.198
	e) Increasing mutual	.257**	.186	.322*

	flexibility			
Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 10: To what degree (importance) do you consider that the "current strategic supplier" has had a material impact on the following corporate measures?	a) Gross sales	.120	-.019	.252
	b) Gross profit	.264**	.245	.282*
	c) Perfect order fill rate	.313**	.341*	.300*
	d) Inventory turnover rate	.282**	.238	.327*
	e) Accounts payable turnover	.327**	.337*	.317*
	f) On time delivery rate	.330**	.384**	.287*
	g) Direct cost of goods	.244*	.230	.255
	h) Direct impact on customer satisfaction	.202*	.224	.179
Question 11: During the last 12 months how often did you personally engage in the following activities with the supply chain/finance function in your firm?	a) Informally working together	-.003	.008	-.003
	b) Sharing ideas information and or resources	.006	-.048	.069
	c) Working together in a formal team	-.127	-.208	-.033
	d) Conducting joint planning to anticipate and resolve problems	-.088	-.155	-.021
	e) Achieving collective goals	-.006	-.036	.031
	f) Developing mutual understanding of responsibilities	-.095	-.115	-.070
	g) Making joint decision about the ways to improve overall cost efficiency	-.070	-.193	.079

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 12: During the past 12 months, how satisfied have you been with your relationship with the supply chain/finance function in your firm?	a) With the time and effort spent in developing the relationship with the functional counterpart	-.011	.020	-.043
	b) With the productivity of the relationship between the finance and supply chain function	-.086	-.020	-.166
	c) With the overall finance/supply chain relationship	-.069	.008	-.156
	d) With the performance of the supply chain/finance function in carrying their responsibilities in regard to supply chain/finance activities	.026	.109	-.061
Question 13: During the past 12 months to what extent have you been involved in the modification of the following operational processes?	a) Supplier scorecards processes	-.145	-.244	-.029
	b) Supplier selection criteria processes	-.010	-.052	.048
	c) Creation of standardized terms and conditions with suppliers	.034	.021	.042
	d) Purchase order authorization processes	.109	.236	-.026
	e) Payment management processes	.127	.205	.014
	f) Inventory management processes	-.069	.163	-.317*
	g) Compliance management processes	.080	.243	.076
	h) Sales and operational	-.036	.091	-.175

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
	planning processes			
	i) Supplier audit proc.	.098	.182	.052
Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 14: How would you describe the leadership/partnership roles that the finance and supply chain functions exhibited in the following operational processes?	a) Supplier scorecards processes	.140	.224	.040
	b) Supplier selection criteria processes	.051	.169	-.035
	c) Creation of standardized terms and conditions with suppliers	.023	.028	.022
	d) Purchase order authorization processes	-.069	-.092	-.038
	e) Payment management processes	-.093	-.136	-.040
	f) Inventory management processes	.227*	.292*	.177
	g) Compliance management processes	.173	.219	.117
	h) Sales and operational planning processes	-.089	-.187	.026
	i) Supplier audit processes	.064	.265	-.147
Question 15: Which statement best describes the current technological maturity between the finance and supply chain	Measures by varying degrees of mutual usage of excel spread sheets to ERP systems	-.080	.142	-.320*

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
functions in your firm?				
Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 16: How important is it to you that the finance/supply chain function be involved in the consideration process?	a) Financial accounting	.126	.167	.214
	b) Inventory management	.267**	.136	.389*
	c) Cost control	.155	.103	.222
	d) Production management	.226*	.236	.212
	e) E commerce	.278*	.353**	.215
	f) Payment	.201*	.269*	.231
	g) Customer relationship management	.146	.074	.211
	h) Demand management	.178	.197	.162
	i) Returns management	.344**	.301*	.386**
Question 17: When considering a new supplier related IT enabled administrative process, how important are the following OPERATIONAL factors?	a) Cost reduction	.366**	.244	.476**
	b) Cycle time	.243*	.232	.259
	c) Productivity improvement	.265**	.290*	.243
	d) Quality improvement	.270**	.340*	.209
	e) Supplier relationship improvement	.263**	.229	.295*
Question 18: When considering a new supplier related IT enabled admin.	a) Supports business growth	.296**	.212	.392**
	b) Supports business supplier alliance	.395**	.267*	.518**

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
process, how important are the following STRATEGIC factors ?	c) Builds business innovations	.342**	.252	.432**
	d) Builds cost leadership	.280**	.105	.452**
	e) Builds external linkages with suppliers	.270**	-.011	.526**

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 19: When considering a new supplier related IT enabled administrative process, how important are the following IT INFRASTRUCTURE factors?	a) Builds business flexibility for current and future changes	.287**	.122	.461**
	b) Results in IT cost reduction	.230*	.080	.387**
	c) Increases IT infrastructure capability	.232*	.178	.293
Question 20: When considering a new supplier related IT enabled administrative process, how important are the following	a) Supports organizational change	.204*	.180	.229
	b) Facilitates business learnings	.296**	.273*	.321*
	c) Facilitates empowerment	.324**	.290*	.364**
	d) Builds common vision	.258**	.122	.416**

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
ORGANIZATION AL factors?	e) Better resource management	.194*	.123	.281*
	f) Improved decision making and planning	.191*	.068	.318*
	g) Improved performance management	.221*	.201	.242
Question 21: How important are each when considering a supplier related IT enabled administrative process?	a) Operational	.173	.084	.277*
	b) Strategic	.190*	.052	.363**
	c) IT Infrastructure	.193*	-.039	.450**
	d) Organizational	.210*	.156	.281**

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 22: How difficult would it be to manage the following challenges/perceptions of implementation?	a) Resistance from internal third parties other than the supply chain and finance functions	.047	-.017	.112
	b) Lack of support from within the finance function	.086	.127	.037
	c) Lack of support from within the supply chain function	.239*	.258	.230
	d) Value proposition is more qualitative than	.113	-.049	.282*

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
	quantitative			
	e) Time to implementation is too long	.059	-.201	.315*
	f) Cost to implement is too high	.124	-.206	.403**
	g) Limited qualified staff to implement	.064	-.264	.343*
	h) The change management program to implement the process will be too difficult to implement	.070	-.194	.294*
	i) It will be too difficult to get supplier adoption	.122	.140	.102
	j) Integration /compatibility with other systems is too complex	.087	.090	.078
	k) Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority	.043	-.127	.206

Question	Measures	Pearson's Correlation Coefficients (significance .05*, .01**)		
		Aggregate N=109	Supply Chain N=55	Finance N=54
Question 24: How many years of experience do you have in your current function?	Years of experience	-.093	-.155	.015
Question 25: Please indicate which of the following educational designations that apply to you.	Level of education	-.093	.163	-.241

Appendix 11 – Factor Analysis (Principal Axis: Pattern Matrix (Promax/Oblim))⁴ of Continuous Variables

Question 5 (Aggregate)

How important were each of the following factors in your decision to categorize the supplier you chose as your “current strategic supplier”?	Factor		
	1	2	3
a) They share knowledge and expertise	.326/.337	.239/.246	.068/.090
b) They have an excellent reputation and we benefit by being associated with them	-.114/-.052	.243/.258	.329/.296
c) They have been financially supportive of operations during times of difficulty	-.003/.076	.064/.111	.615/.562
d) We share critical information across shared technology platforms	.447/.481	.107/.147	.373/.376
e) They share risks	1.040/.966	-.150/-.127	-.163/-.072
f) We have a long standing relationship based on transparency of critical information	.367/.387	.296/.306	.113/.136
g) They represent a major share of our annual spend	-.054/.009	-.164/-.112	.601/.542
h) They show flexibility in their capacity to respond to short or long term disruptions	-.054/-.003	.553/.539	.079/.077
i) They show adaptability in responding to planned long term changes	-.004/.043	.992/.942	.197/-.164

⁴ Measures that are considered eligible for interpretation are identified in the Promax rotation results by the following shading xxx and in the Oblim rotation results by the following shading xxx.

Question 5 (Supply Chain)

How important were each of the following factors in your decision to categorize the supplier you chose as your “current strategic supplier”?	Factor		
	1	2	3
a) They share knowledge and expertise	.695/.671	.097/.119	-.170/-.127
b) They have an excellent reputation and we benefit by being associated with them	.231/.234	.383/.387	.024/.046
c) They have been financially supportive of operations during times of difficulty	.151/.160	.425/.431	.235/.252
d) We share critical information across shared technology platforms	.634/.615	.117/.141	.025/.063
e) They share risks	.790/.758	-.158/-.124	-.020/.021
f) We have a long standing relationship based on transparency of critical information	.416/.404	-.041/-.015	.352/.371
g) They represent a major share of our annual spend	-.123/-.108	-.005/.013	.907/.892
h) They show flexibility in their capacity to respond to short or long term disruptions	-.230/-.199	.871/.847	-.072/-.063
i) They show adaptability in responding to planned long term changes	.185/.194	.597/.595	-.011/.015

Question 5 (Finance)

How important were each of the following factors in your decision to categorize the supplier you chose as your “current strategic supplier”?	Factor		
	1	2	3
a) They share knowledge and expertise	.246/.275	.273/.065	.047/-.271
b) They have an excellent reputation and we benefit by being associated with them	.323/.309	-.035/.080	.095/.000
c) They have been financially supportive of operations during times of difficulty	.161/.178	.199/.367	.357/-.214
d) We share critical information	.196/.272	.638/.280	.227/-.608

How important were each of the following factors in your decision to categorize the supplier you chose as your “current strategic supplier”?	Factor		
	1	2	3
across shared technology platforms			
e) They share risks	-.267/-.135	.920/-.033	-.135/-.806
f) We have a long standing relationship based on transparency of critical information	.519/.559	.392/-.079	-.101/-.394
g) They represent a major share of our annual spend	-.048/-.072	-.100/.851	.870/.048
h) They show flexibility in their capacity to respond to short or long term disruptions	.653/.612	-.157/.121	.161/.079
i) They show adaptability in responding to planned long term changes	.911/.873	-.125/-.237	-.196/.047

Question 6 (Aggregate)

In terms of the degree of integration your firm has with the “current strategic supplier” how important are the following rationales in explaining that integration?	Factor
	1
a) Integration allows our firm to maintain its competitive position vis a vis our competition	.801/.801
b) Integration is important to our firm because it represents adoption of best practices in our sector	.675/.675
c) Integration provides our firm with first to market advantage	.650/.650
d) Integration provides our firm with competitive cost advantage	.653/.653
e) Integration provides our firm with security of supply	.660/.660
f) Integration provides mutual competitive advantage	.725/.725

Question 6 (Supply Chain)

In terms of the degree of integration your firm has with the “current strategic supplier” how important are the following rationales in explaining that integration?	Factor	
	1	2
a) Integration allows our firm to maintain its competitive position vis a vis our competition	.450/.467	.494/-.500
b) Integration is important to our firm because it represents adoption of best practices in our sector	-.159/-.102	.968/-.934

c) Integration provides our firm with first to market advantage	.038/.076	.713/-.694
d) Integration provides our firm with competitive cost advantage	.789/.770	-.013/-.024
e) Integration provides our firm with security of supply	.739/.716	-.108/.071
f) Integration provides mutual competitive advantage	.770/.753	.016/-.051

Question 6 (Finance)

In terms of the degree of integration your firm has with the “current strategic supplier” how important are the following rationales in explaining that integration?	Factor 1
a) Integration allows our firm to maintain its competitive position vis a vis our competition	.777/.777
b) Integration is important to our firm because it represents adoption of best practices in our sector	.733/.733
c) Integration provides our firm with first to market advantage	.671/.671
d) Integration provides our firm with competitive cost advantage	.603/.603
e) Integration provides our firm with security of supply	.723/.723
f) Integration provides mutual competitive advantage	.730/.730

Question 7 (Aggregate)

During the past 12 months, what has been your personal frequency of contact with the “current strategic supplier” on the following operationally related issues?	Factor 1
a) Cost related issues	.789/.789
b) Quality related issues	.785/.785
c) Innovation related issues	.727/.727
d) Regularly scheduled business reviews with supplier	.614/.614
e) Adaptability related issues	.762/.762
f) Flexibility related issues	.812/.812

Question 7 (Supply Chain)

During the past 12 months, what has been your personal frequency of contact with the “current strategic supplier” on the following operationally related issues?	Factor 1
a) Cost related issues	.792/.792
b) Quality related issues	.647/.647

c) Innovation related issues	.611/.611
d) Regularly scheduled business reviews with supplier	.429/.429
e) Adaptability related issues	.678/.678
f) Flexibility related issues	.649/.649

Question 7 (Finance)

During the past 12 months, what has been your personal frequency of contact with the “current strategic supplier” on the following operationally related issues?	Factor
	1
a) Cost related issues	.722/.722
b) Quality related issues	.867/.867
c) Innovation related issues	.794/.794
d) Regularly scheduled business reviews with supplier	.695/.695
e) Adaptability related issues	.820/.820
f) Flexibility related issues	.895/.895

Question 9 (Aggregate)

During the last 12 months how important has the “current strategic supplier's” contribution to changes in the following operational practices?	Factor
	1
a) Sharing operational information	.705/.705
b) Developing performance metrics that are shared and extended across our supply chain relationships	.777/.777
c) Improving our individual performances by integrating operations with each other	.778/.778
d) Increasing our mutual operational adaptability to meet planned long term change	.910/.910
e) Increasing our mutual operational flexibility to meet short or long term disruptions	.754/.754

Question 9 (Supply Chain)

During the last 12 months how important has the “current strategic supplier's” contribution to changes in the following operational practices?	Factor
	1
a) Sharing operational information	.747/.747
b) Developing performance metrics that are shared and extended across our supply chain relationships	.800/.800
c) Improving our individual performances by integrating operations with each other	.702/.702

d) Increasing our mutual operational adaptability to meet planned long term change	.890/.890
e) Increasing our mutual operational flexibility to meet short or long term disruptions	.625/.625

Question 9 (Finance)

During the last 12 months how important has the “current strategic supplier's” contribution to changes in the following operational practices?	Factor 1
a) Sharing operational information	.655/.655
b) Developing performance metrics that are shared and extended across our supply chain relationships	.759/.759
c) Improving our individual performances by integrating operations with each other	.840/.840
d) Increasing our mutual operational adaptability to meet planned long term change	.919/.919
e) Increasing our mutual operational flexibility to meet short or long term disruptions	.845/.845

Question 10 (Aggregate)

To what degree do you consider that the “current strategic supplier” has had a material impact on the following corporate measures?	Factor	
	1	2
a) Gross sales	-.144/-.080	.894/.860
b) Gross profit	.073/.121	.686/.662
c) Perfect order fill rate	.543/.563	.324/.317
d) Inventory turnover rate	.792/.787	-.023/-.015
e) Accounts payable turnover rate	.846/.830	-.162/-.147
f) On time delivery rate	.820/.817	.006/.014
g) Direct cost of goods	.637/.639	.078/.082
h) Direct and transparent impact on customer satisfaction	.344/.364	.308/.300

Question 10 (Supply Chain)

To what degree do you consider that the “current strategic supplier” has had a material impact on the following corporate measures?	Factor	
	1	2
a) Gross sales	-.225/-.229	.881/.884
b) Gross profit	.118/.115	.600/.599

c) Perfect order fill rate	.550/.550	.279/.275
d) Inventory turnover rate	.772/.774	-.083/-.090
e) Accounts payable turnover rate	.879/.882	-.070/-.078
f) On time delivery rate	.836/.838	-.027/-.035
g) Direct cost of goods	.671/.672	.082/.076
h) Direct and transparent impact on customer satisfaction	.287/.285	.479/.477

Question 10 (Finance)

To what degree do you consider that the “current strategic supplier” has had a material impact on the following corporate measures?	Factor 1
a) Gross sales	.717/.717
b) Gross profit	.676/.676
c) Perfect order fill rate	.814/.814
d) Inventory turnover rate	.776/.776
e) Accounts payable turnover rate	.586/.586
f) On time delivery rate	.788/.788
g) Direct cost of goods	.665/.665
h) Direct and transparent impact on customer satisfaction	.564/.564

Question 11 (Aggregate)

During the past 12 months how often did you personally engage in the following activities with the supply chain/finance function in your firm?	Factor 1
a) Informally working together	.749/.749
b) Sharing ideas, information and/ or resources	.769/.769
c) Working together in a formal team	.890/.890
d) Conducting joint planning to anticipate and resolve operational problems	.892/.892
e) Achieving collective goals	.858/.858
f) Developing mutual understanding of responsibilities	.839/.839
g) Making joint decisions about the ways to improve overall cost efficiency	.868/.868

Question 11 (Supply Chain)

During the past 12 months how often did you personally engage in the following activities with the supply chain/finance function in your firm?	Factor 1
a) Informally working together	.692/.692
b) Sharing ideas, information and/ or resources	.769/.769
c) Working together in a formal team	.856/.856
d) Conducting joint planning to anticipate and resolve operational problems	.859/.859
e) Achieving collective goals	.870/.870
f) Developing mutual understanding of responsibilities	.853/.853
g) Making joint decisions about the ways to improve overall cost efficiency	.901/.901

Question 11 (Finance)

During the past 12 months how often did you personally engage in the following activities with the supply chain/finance function in your firm?	Factor 1
a) Informally working together	.807/.807
b) Sharing ideas, information and/ or resources	.767/.767
c) Working together in a formal team	.922/.922
d) Conducting joint planning to anticipate and resolve operational problems	.928/.928
e) Achieving collective goals	.848/.848
f) Developing mutual understanding of responsibilities	.831/.831
g) Making joint decisions about the ways to improve overall cost efficiency	.834/.834

Question12 (Aggregate)

During the past 12 months, how satisfied have you been with your with your relationship with the supply chain/finance function in your firm?	Factor 1
a) With the time and effort spent in developing the relationship with the supply chain/finance function	.877/.877
b) With the productivity of the relationship between the finance and supply chain functions	.954/.954
c) With the overall finance/supply chain relationship	.933/.933

d) With the performance of the supply chain/finance function in carrying out their responsibilities in regard to supply chain/finance activities	.781/.781
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Question 12 (Supply Chain)

During the past 12 months, how satisfied have you been with your relationship with the supply chain/finance function in your firm?	Factor 1
a) With the time and effort spent in developing the relationship with the supply chain/finance function	.908/.908
b) With the productivity of the relationship between the finance and supply chain functions	.954/.954
c) With the overall finance/supply chain relationship	.915/.915
d) With the performance of the supply chain/finance function in carrying out their responsibilities in regard to supply chain/finance activities	.802/.802

Question 12 (Finance)

During the past 12 months, how satisfied have you been with your relationship with the supply chain/finance function in your firm?	Factor 1
a) With the time and effort spent in developing the relationship with the supply chain/finance function	.843/.843
b) With the productivity of the relationship between the finance and supply chain functions	.954/.954
c) With the overall finance/supply chain relationship	.953/.953
d) With the performance of the supply chain/finance function in carrying out their responsibilities in regard to supply chain/finance activities	.764/.764

Question 13 (Aggregate)

During the past 12 months to what extent have you been involved in the modification of the following operational processes?	Factor	
	1	2
a) Supplier scorecards processes	-.197/-.117	.608/.559
b) Supplier selection criteria processes	.123/.175	.459/.439
c) Creation of standardized terms and conditions with suppliers	.154/.187	.310/.301
d) Purchase orders authorization processes	.720/.682	-.137/-.083
e) Payment management processes	.826/.780	-.179/-.117
f) Inventory management processes	.663/.651	.068/.106

g) Compliance management processes	.564/.581	.281/.300
h) Sales and operational planning processes	.602/.603	.160/.188
i) Supplier audit processes	-.013/.066	.640/.601

Question 13 (Supply Chain)

During the past 12 months to what extent have you been involved in the modification of the following operational processes?	Factor		
	1	2	3
a) Supplier scorecards processes	.044/.049	-.005/.002	.511/.507
b) Supplier selection criteria processes	.299/.319	.193/.193	.119/.103
c) Creation of standardized terms and conditions with suppliers	.362/.374	.107/.113	.185/.172
d) Purchase orders authorization processes	.605/.606	.002/.019	.241/.222
e) Payment management processes	.559/.579	.176/.185	.264/.239
f) Inventory management processes	1.004/.979	-.206/-.175	-.083/-.104
g) Compliance management processes	.895/.883	-.092/-.067	-.019/-.041
h) Sales and operational planning processes	.551/.594	.445/.445	-.299/-.331
i) Supplier audit processes	-.172/-.073	.936/.892	.051/.020

Question13 (Finance)

During the past 12 months to what extent have you been involved in the modification of the following operational processes?	Factor		
	1	2	3
a) Supplier scorecards processes	-.116/-.046	.407/.401	.207/.155
b) Supplier selection criteria processes	-.196/-.106	.099/.086	.738/.691
c) Creation of standardized terms and conditions with suppliers	-.097/-.037	.422/.418	.098/.049
d) Purchase orders authorization processes	.589/.565	-.002/.035	-.023/.008
e) Payment management processes	.875/.822	-.111/.058	-.087/-.029
f) Inventory management processes	.211/.255	-.111/-.100	.654/.652
g) Compliance management processes	.174/.242	.195/.205	.542/.513
h) Sales and operational planning processes	.686/.679	.057/.100	.116/.141
i) Supplier audit processes	.100/.195	.988/1.00	-.129/-.213

Question 16 (Aggregate)

Please assume that your firm is considering a new IT enabled application related to the activities below. How important is it to you that the finance/supply chain function be involved in the consideration process?	Factor		
	1	2	3
a) Financial accounting	.056/.039	-.061/.874	.869/-.059
b) Inventory management	.953/.919	-.264/.039	.012/-.261
c) Cost control	.643/.634	-.049/.309	.294/-.054
d) Production management	.628/.654	.200/.091	-.098/.183
e) E commerce	.440/.469	.227/.020	.018/.210
f) Payment	-.007/.004	.151/.861	.864/.143
g) Customer relationship management	-.194/-.085	.874/.120	.149/.831
h) Demand management	.179/.267	.688/-.092	-.076/.651
i) Returns management	.551/.605	.417/-.105	-.103/.390

Question 16 (Supply Chain)

Please assume that your firm is considering a new IT enabled application related to the activities below. How important is it to you that the finance/supply chain function be involved in the consideration process?	Factor		
	1	2	3
a) Financial accounting	-.056/-.046	.207/.694	.695/-.179
b) Inventory management	-.144/-.084	.804/.014	.020/-.779
c) Cost control	.040/.086	.672/.185	.195/-.654
d) Production management	.260/.294	.514/-.001	.013/-.517
e) E commerce	.548/.543	.042/.057	.073/-.069
f) Payment	.063/.054	-.016/.988	.989/.041
g) Customer relationship management	.708/.671	-.347/.155	.170/.306
h) Demand management	.568/.572	.154/-.149	-.130/-.185
i) Returns management	.666/.676	.259/-.177	-.154/.294

Question 16 (Finance)

Please assume that your firm is considering a new IT enabled application related to the activities below. How important is it to you that the finance/supply chain function be involved in the consideration process?	Factor	
	1	2
a) Financial accounting	.714/.701	-.105/-.092

b) Inventory ,management	.967/.947	-.173/-.155
c) Cost control	.841/.832	-.051/-.039
d) Production management	.574/.594	.263/.258
e) E commerce	.607/.610	.072/.076
f) Payment	.597/.607	.155/.156
g) Customer relationship management	-.137/-.058	.896/.857
h) Demand management	-.010/.070	.920/.881
i) Returns management	.445/.483	.454/.440

Question 17 (Aggregate)

When considering a new supplier related IT enabled administrative process, how important are the following OPERATIONAL factors in determining the relative merits of such a process?	Factor
	1
a) Cost reduction	.678/.678
b) Cycle time	.780/.780
c) Productivity improvement	.731/.731
d) Quality improvement	.743/.743
e) Supplier relationship improvement	.616/.616

Question 17 (Supply Chain)

When considering a new supplier related IT enabled administrative process, how important are the following OPERATIONAL factors in determining the relative merits of such a process?	Factor
	1
a) Cost reduction	.563/.563
b) Cycle time	.762/.762
c) Productivity improvement	.698/.698
d) Quality improvement	.836/.836
e) Supplier relationship improvement	.482/.482

Question 17 (Finance)

When considering a new supplier related IT enabled administrative process, how important are the following OPERATIONAL factors in determining the relative merits of such a process?	Factor
	1
a) Cost reduction	.750/.750
b) Cycle time	.780/.780
c) Productivity improvement	.767/.767
d) Quality improvement	.708/.708
e) Supplier relationship improvement	.751/.751

Question 18 (Aggregate)

When considering a new supplier related IT enabled administrative process, how important are the following STRATEGIC factors in determining the relative merits of such a process?	Factor
	1
a) Supports business growth	.703/.703
b) Supports business supplier alliance	.851/.851
c) Builds business innovations	.749/.749
d) Builds cost leadership	.683/.683
e) Builds external linkages with suppliers	.775/.775

Question 18 (Supply Chain)

When considering a new supplier related IT enabled administrative process, how important are the following STRATEGIC factors in determining the relative merits of such a process?	Factor
	1
a) Supports business growth	.697/.697
b) Supports business supplier alliance	.796/.796
c) Builds business innovations	.732/.732
d) Builds cost leadership	.577/.577
e) Builds external linkages with suppliers	.585/.585

Question 18 (Finance)

When considering a new supplier related IT enabled administrative process, how important are the following STRATEGIC factors in determining the relative merits of such a process?	Factor
	1
a) Supports business growth	.729/.729
b) Supports business supplier alliance	.904/.904
c) Builds business innovations	.759/.759
d) Builds cost leadership	.747/.747
e) Builds external linkages with suppliers	.898/.898

Question 19 (Aggregate)

When considering a new supplier related IT enabled administrative process, how important are the following IT INFRASTRUCTURE factors in determining the relative merits of such a process?	Factor
	1
a) Builds business flexibility for current and future changes	.733/.733
b) Results in IT cost reduction	.772/.772
c) Increases IT infrastructure capability	.866/.866

Question 19 (Supply Chain)

When considering a new supplier related IT enabled administrative process, how important are the following IT INFRASTRUCTURE factors in determining the relative merits of such a process?	Factor
	1
a) Builds business flexibility for current and future changes	.609/.609
b) Results in IT cost reduction	.810/.810
c) Increases IT infrastructure capability	.945/.945

Question 19 (Finance)

When considering a new supplier related IT enabled administrative process, how important are the following IT INFRASTRUCTURE factors in determining the relative merits of such a process?	Factor
	1
a) Builds business flexibility for current and future changes	.849/.849
b) Results in IT cost reduction	.727/.727
c) Increases IT infrastructure capability	.804/.804

Question 20 (Aggregate)

When considering a new supplier related IT enabled administrative process, how important are the following ORGANIZATIONAL factor in determining the relative merits of such a process?	Factor	
	1	2
a) Supports organizational change	.801/.798	.015/.021
b) Facilitates business learnings	.884/.877	-.057/-.049
c) Facilitates empowerment	.925/.919	-.055/-.047
d) Builds common vision	.543/.552	.347/.344
e) Better resource management	.381/.395	.466/.459
f) Improved decision making and planning	-.103/-.068	1.037/1.015
g) Improved performance management	.004/.031	.814/.798

Question 20 (Supply Chain)

When considering a new supplier related IT enabled administrative process, how important are the following ORGANIZATIONAL factors in determining the relative merits of such a process?	Factor	
	1	2
a) Supports organizational change	.845/.838	-.082/-.073
b) Facilitates business learnings	.793/.790	.033/.040
c) Facilitates empowerment	.919/.911	-.109/-.098
d) Builds common vision	.728/.731	.178/.181
e) Better resource management	.446/.457	.347/.344
f) Improved decision making and planning	-.038/-.002	.974/.954
g) Improved performance management	-.028/.003	.835/.818

Question 20 (Finance)

When considering a new supplier related IT enabled administrative process, how important are the following ORGANIZATIONAL factors in determining the relative merits of such a process?	Factor
	1
a) Supports organizational change	.784/.784
b) Facilitates business learnings	.746/.746
c) Facilitates empowerment	.841/.841
d) Builds common vision	.815/.815
e) Better resource management	.847/.847
f) Improved decision making and planning	.820/.820
g) Improved performance management	.765/.765

Question 21 (Aggregate)

When considering the four factors (Operational, Strategic, IT Infrastructure, Organizational) how important are each when considering a supplier related IT enabled administrative process?	Factor
	1
a) Operational	.793/.793
b) Strategic	.735/.765
c) IT Infrastructure	.793/.793
d) Organizational	.877/.877

Question 21 (Supply Chain)

When considering the four factors (Operational, Strategic, IT Infrastructure, Organizational) how important are each when considering a supplier related IT enabled administrative process?	Factor
	1
a) Operational	.762/.762
b) Strategic	.719/.719
c) IT Infrastructure	.822/.822
d) Organizational	.866/.866

Question 21 (Finance)

When considering the four factors (Operational, Strategic, IT Infrastructure, Organizational) how important are each when considering a supplier related IT enabled administrative process?	Factor
	1
a) Operational	.832/.832
b) Strategic	.749/.749
c) IT Infrastructure	.766/.766
d) Organizational	.878/.878

Question 22 (Aggregate)

When considering a new supplier oriented IT enabled process that has been identified as having “relative merits, how difficult would it be to manage the following challenges/perceptions of implementation?	Factor	
	1	2
a) Resistance from internal third parties other than the supply chain and finance functions	.344/.364	.235/.218
b) Lack of support from within the finance function	-.010/.041	.741/.713
c) Lack of support from within the supply chain function	-.089/-.027	.931/.897
d) Value proposition is more qualitative than quantitative	.428/.458	.359/.336
e) Time to implementation is too long	.854/.858	-.097/-.112
f) Cost to implement is too high	.797/.802	-.066/-.081
g) Limited qualified staff to implement	.785/.793	-.011/-.027
h) The change management program to implement the process will be too difficult to implement	.793/.806	.048/.029
i) It will be too difficult to get supplier adoption	.358/.378	.228/.211
j) Integration /compatibility with other systems is too complex	.545/.566	.227/.206

k) Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority	.681/.687	-.034/-.048
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Question 22 (Supply Chain)

When considering a new supplier oriented IT enabled process that has been identified as having “relative merits, how difficult would it be to manage the following challenges/perceptions of implementation?	Factor	
	1	2
a) Resistance from internal third parties other than the supply chain and finance functions	.485/.493	.191/.197
b) Lack of support from within the finance function	.107/.149	.628/.611
c) Lack of support from within the supply chain function	-.276/-.205	1.019/.981
d) Value proposition is more qualitative than quantitative	.350/.377	.457/.451
e) Time to implementation is too long	.776/.760	-.119/-.097
f) Cost to implement is too high	.804/.785	-.155/-.132
g) Limited qualified staff to implement	.655/.646	-.034/-.017
h) The change management program to implement the process will be too difficult to implement	.779/.773	.022/.040
i) It will be too difficult to get supplier adoption	-.005/.036	.599/.581
j) Integration /compatibility with other systems is too complex	.436/.461	.428/.425
k) Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority	.536/.545	.225/.230

Question 22 (Finance)

When considering a new supplier oriented IT enabled process that has been identified as having “relative merits, how difficult would it be to manage the following challenges/perceptions of implementation?	Factor	
	1	2
a) Resistance from internal third parties other than the supply chain and finance functions	.256/.304	.255/.231
b) Lack of support from within the finance function	-.199/-.015	.955/.859
c) Lack of support from within the supply chain function	.080/.239	.833/.750
d) Value proposition is more qualitative than quantitative	.535/.577	.225/.205

e) Time to implementation is too long	.866/.867	.012/.015
f) Cost to implement is too high	.691/.716	.138/.127
g) Limited qualified staff to implement	.790/.811	.118/.110
h) The change management program to implement the process will be too difficult to implement	.693/.735	.226/.207
i) It will be too difficult to get supplier adoption	.655/.637	-.089/-.077
j) Integration /compatibility with other systems is too complex	.618/.635	.099/.092
k) Other process improvements that are either enterprise centric or customer centric, have traditionally taken priority	.876/.816	-.301/-.267

Appendix 12 – Audit Trail (Lines of Inquiry)

Presented below is an audit trail of how the research led to changes in the narrative associated with the lines of inquiry, that lead to the final proposed model in Chapter 8. Illustrative examples of how to follow the information is provided below.

Example

1. Independent Variable; Represents the original construct/variable (Chapter 3/4)
 - 1.1. Represents the development of the variable/hypothesis associated with the construct (Chapter 4)
 - 1.1.1. Represents the development of the hypothesis as a result of Stage 1 and 2 (Chapter 6)
 - 1.1.1.1. Represents the development of the hypothesis, incorporating inferences from the statistical analysis (Chapter 8)
2. Dependent Variable
 - 2.1. Represents Chapter 1 development
 - 2.1.1. Represents Chapter 6 development
 - 2.1.1.1. Represents Chapter 8 conclusion.

Audit Trail

1. **External Partner (Supplier) Influence**
 - 1.1. Innovation consideration is positively related to high external partner influences.
 - 1.1.1. Administrative innovation consideration is positively related to strategic partner influences.
 - 1.1.1.1. (a) New supplier oriented administrative process consideration associated with the financial value chain is positively related to an established collaborative cross-enterprise relationship.
 - 1.1.1.2. (b) New supplier oriented administrative process consideration associated with the financial value chain is positively related to an established technologically supported cross-enterprise relationship.

2. **Application Service Provider**
 - 2.1. Removed from consideration
 - 2.1.1.No relevance
 - 2.1.1.1.Reinserted for consideration: New supplier oriented administrative process consideration associated with the financial value chain is positively related to financial institution marketing efforts.
3. **Perceived Effectiveness of the Relationship with the Supplier**
 - 3.1. Innovation consideration is positively related to a high perceived effectiveness of the supplier relationship.
 - 3.1.1.Administrative innovation consideration is positively related to the positive perception of the effectiveness of the supplier by both the Finance and the SC functions.
 - 3.1.1.1.New supplier oriented administrative process consideration associated with the financial value chain is positively related to a positive perception of the operational effectiveness of the supplier by both the Finance and the SC functions.
4. **Direction of Information Flow**
 - 4.1. Innovation consideration is positively related to high information flow (i.e. reciprocal).
 - 4.1.1.Administrative innovation consideration is positively related to high levels of information exchanges between functions.
 - 4.1.1.1.New supplier oriented administrative process consideration associated with the financial value chain is positively related to high levels of information exchange between the functions related to inventory and accounts payables process management.
5. **Performance Metrics**
 - 5.1. Innovation consideration is positively related to cross-functional alignment of performance metrics that are supply chain centric versus enterprise centric.
 - 5.1.1.Administrative innovation consideration is positively related to the level of cross-functional understanding and alignment of the firm's performance metrics that exist between the functional groups.
 - 5.1.1.1.New supplier oriented administrative process consideration associated with the financial value chain is positively related to a high level of importance assigned to financial value chain "turnover" metrics at the enterprise level.

6. Performance Incentives

6.1. Innovation consideration is positively related to cross-functional alignment of performance incentives.

6.1.1. Removed from further consideration

7. Perceived Effectiveness of Cross-functional Relationship

7.1. Innovation consideration is positively related to high perceived effectiveness of the cross-functional relationships.

7.1.1. Administrative innovation consideration is positively related to the perceived effectiveness based on the degree of observed difficulty and uncertainty associated with the relationship.

7.1.1.1. New supplier oriented administrative process consideration associated with the financial value chain is positively related to the shared perception of the effectiveness of the functions in shaping responses to challenges to financial value chain assets and liabilities.

8. Centralization/Decentralization

8.1. Innovation consideration is negatively related to centralization

8.1.1. Administrative innovation consideration is positively associated with centralized organizations.

8.1.1.1. New supplier oriented administrative process consideration associated with the financial value chain is positively related to joint decision making related to financial assets and liabilities.

9. Formalization

9.1. Innovation consideration is negatively related to formalization.

9.1.1. Administrative innovation consideration is negatively associated with more formal organizations.

9.1.1.1. New supplier oriented administrative process consideration associated with the financial value chain is positively associated with formal (rules based) cross-functional process relationships.

10. Organizational Complexity

10.1. Innovation consideration is positively related to high organizational complexity.

10.1.1. Administrative innovation consideration is positively related to the level of sophistication and education of representatives in each function.

10.1.1.1. New supplier oriented administrative process consideration associated with the financial value chain is positively related to the experience and educational/certification level of representatives in each function.

11. Technological Maturity

11.1. Innovation consideration is positively related to high technological maturity.

11.1.1. Administrative innovation consideration is positively related to high technological maturity.

11.1.1.1. New supplier oriented administrative process consideration associated with the financial value chain is positively related to the degree of direct involvement of each function in managing the technological maturity of cross-functional and upstream cross-enterprise relationships.

12. Relative Advantage

12.1. Innovation consideration is positively related to high relative advantage.

12.1.1. Administrative innovation consideration is positively related to high technological maturity.

12.1.1.1. New supplier oriented administrative process consideration associated with the financial value chain is positively related to a shared perception of high “relative advantage” over existing processes.

13. Compatibility

13.1. Innovation consideration is positively related to high compatibility.

13.1.1. Remove, but incorporate as a measure into Complexity

14. Complexity

14.1. Innovation consideration is negatively related to high complexity.

14.1.1. Administrative innovation consideration is negatively related to complexity (i.e. difficult to use, implement and understand).

14.1.1.1. New supplier oriented administrative process consideration associated with the financial value chain is negatively related to a shared perception of high “complexity” of migrating from an existing process to a new process.

15. Observability

15.1. Innovation consideration is positively related to high observability.

15.1.1. Removed from further consideration.

16. Trialability

16.1. Innovation consideration is positively related to high trialability.

16.1.1. Removed from further consideration

17. Level of Uncertainty

17.1. Innovation consideration is positively related to low perceptions of uncertainty.

17.1.1. Removed from further consideration

18. Dependent Variable

18.1. Propensity to consider improvements to the “source to pay” process.

18.1.1. Propensity to consider cross-enterprise upstream administrative supply chain related applications.

18.1.1.1. Propensity to consider new supplier oriented administrative process consideration associated with the financial value chain.

Appendix 13 – PhD Fellowship Framework

Basic Concept

- The Fellowship candidate must be at the PhD level. Fundamentally, this is because the candidate will face the test of neutrality and impartiality driven by the academic discipline of doctoral committee review and peer review in the pursuit of publication.
- The time line from start to finish of the fellowship would be a period of two to three years (normal time for full time PhD student to complete their degree from comprehensive completion stage to thesis examination stage).
- The choice of research methodology would not be restrictive. It could range from case studies, complemented by a statistical component within the thesis; or a quantitative analysis of existing CC databases, without direct interface with Canadian firms.
- The study will focus on Canadian firms, in order to establish a Canadian brand/reputation in research.
- The research idea would fill a theoretical gap in academic literature, or the core nature of the thesis could be a replication of previous research, but in the Canadian context. The functional space that the research can fall in could be anything from Accounting to HR to Logistics to Enterprise Risk Management to Financing to Marketing etc., as all of these functions/activities can be related to the competitiveness of Canadian firms.
- There must be supportable documentation that the questions to be explored have been identified as issues of current relevance to Canadian firms, or subject matters that have been identified as desirable to do's. This could be supported by private sector testimonials, supporting letters, Crown Corporation/Conference Board/Academic research.

Crown Corporation (CC) Involvement

- CC would act in a resource/mentor capacity to the student and oversight committee in question.
- CC would not replace/duplicate the role of the doctoral oversight committee.
- CC would provide the opportunity for access to the desired research sample using CC's branding, in order to increase response rate; or provide access to CC data sets.
- CC would provide financial support to the doctoral candidate in question.

Benefits to CC

- Reputation enhancement through collaborative efforts.
- Innovative and original support to academic community.
- CC would in turn learn (i.e. expand its horizon of issues it is aware of, and decide to whether or not to use the lessons learned).
- It may help in shaping the CC's agenda (e.g. continuous improvement, adaptation of the best practices, knowledge transfer and transformation of work development, etc.).
- It could set a precedent for other CC's to follow.

Benefits to Faculty in Question

- They keep the research at the level of rigor they wish to, and even enhance the rigor due to the CC's participation due to sources of information/data previously unattainable.
- They will get outside support for PhD research related to methodologies/subject matters that are not often pursued thus enhancing their institution's research reputation.
- With CC participation their reputation as an institution that is bridging the academic /practitioner divide will be enhanced.

Benefits to PhD Candidate

- A substantive thesis question that transcends the academic/practitioner divide.
- Access to a rich data opportunity.
- Reputation enhancement.
- Mentoring.